# INDOT
# WORK PERFORMANCE STANDARDS

DIVISION OF MAINTENANCE


July 1, 2013 Revised
February 12, 2024

# INDIANA DEPARTMENT OF TRANSPORTATION

DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARDS

**July 1, 2013 REVISED**
**February 12, 2024**

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## Preface



## Contents



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## Appendices

This section contains tables and other useful documentation:

## ***Introduction***

INDOT's maintenance forces perform numerous work activities throughout the state, from pothole patching to signal repairs, by over 100 management units and over 1,000 employees. Consistent work methods and accurate reporting are essential to getting the job done, at the highest quality and lowest cost possible.

The purpose of these work performance standards is to ensure that our maintenance work is done correctly and reported properly. Many of our activities have unit cost goals and quality assurance reviews. By following the work method, the resulting job should meet or exceed the cost and quality goals.

## ***Traffic Control***

INDOT's Workzone Traffic Control Handbook should be utilized to plan the traffic control plan for each specific project. Since traffic control varies, traffic control equipment and crew are not shown in the standards, but still need to be planned for and reported into WMS.

The standards only show job-specific equipment and crew necessary to perform the specific work regardless of traffic control.

## ***Safety (PPE)***

INDOT recognizes its responsibility to provide a safe working environment. This should include making reasonable efforts to promptly investigate and address safety issues, not allowing employees to perform unsafe tasks and providing adequate training and safety equipment. All employees are required to use the appropriate personal protective equipment (PPE) per work performance standards.

"Base PPE" in these standards is defined as:

- Approved High Visibility Vest or Shirt
- Approved Hard Hat
- Approved Hard Toe and Hard Soled Work Boots
- Safety Bag inclusive of Hard Hat, Gloves, Hearing Protection and Eye Protection

The performance standards will indicate "Base PPE" for specific activities. Supervisors will be responsible for providing competent review of all safety hazards through the daily safety briefing inclusive of proper use of "Base PPE" and any additional listed specialized PPE. Supervisors will be responsible for ensuring any employee assigned to operate equipment/vehicles listed have been provided adequate training.

## ***Safety (Silica Exposure Control Plan)***

**BACKGROUND:**
Silica exists in aggregates and cement/grout mixes. Silica dust can be generated during various roadway maintenance activities. Maintenance crews will apply 29 CFR 1926.1153- based exposure control practices while performing activities that may generate silica dust. The generation of dust should be minimized to the extent possible by using water or vacuum equipment. Whenever it is not possible to minimize silica dust, workers 20 feet of the dust generating activity must wear an approved respirator.

**SCOPE AND PURPOSE OF PLAN:**
Pursuant to 29 CFR 1926.1153(d)(3)(i), the scope and purpose of this Plan is to establish and document the most efficient procedures and configurations of physical equipment, work methods, respiratory protection device use, attenuation measures, and other activities such that the potential for respirable crystalline silica exposure is minimized to the lowest feasible level within the worksite.

**IMPLEMENTATION DATE:**
The implementation date of this Exposure Control Plan is October 1, 2017.

**DESCRIPTION OF MAINTENANCE ACTIVITIES:**
The following tasks have the potential to generate silica dust. The following engineering controls must be followed:

| Equipment/Task | Engineering Control | Respiratory Protection (When Engineering Control is not sufficient) |
|---|---|---|
| Pavement Sawing | Use wet/water feature. If saw is NOT equipped for water, manually spray water to prevent dust generation. | Facepiece Respirator - APF 10 |
| Pavement Grinding | Use water sprayer if so equipped. If grinder is NOT equipped for water, manually spray water to prevent dust generation. | Facepiece Respirator - APF 10 |
| Pavement Drilling | Use wet or vacuum drill. If drill is NOT so equipped, manually spray water to prevent dust generation. | Facepiece Respirator - APF 10 |
| Loose Aggregate Sweeping | Whenever sweeping aggregate, such as chip seals, use a self-propelled broom with the wet/water feature. Ensure the cab is sealed, and air filtering system is working properly. | Facepiece Respirator - APF 10 |

The following maintenance activities will commonly involve these tasks:

| Code | Name |
|---|---|
| 2010 | Permanent Shallow Patching |
| 2020 | Deep Patching |
| 2030 | Spot Paving |
| 2050 | Seal Coat |
| 2051 | Fog Seal |
| 2052 | Scrub Seal |
| 2140 | Bump Grinding |
| 2150 | Expansion Foam Injection |
| 2331 | Culvert Replacement - Small Pipe |
| 2332 | Culvert Replacement - Large Pipe |
| 2336 | Pipe Lining - Small Pipe |
| 2337 | Pipe Lining - Large Pipe |
| 2451 | Permanent Bridge Deck Patching |
| 2480 | Bridge Deck Epoxy Injection |
| 2490 | Other Bridge Maintenance |
| 8360 | Special Markings Maintenance |
| 8541 | Detector Loop Splice Repair/Install |

**RESPIRATORY PROTECTION:**

Exposure is minimized by providing field personnel with appropriate respiratory protection devices. An adequate inventory of said devices will be maintained and restocked as needed. Field personnel are required to use appropriate respiratory protection when on jobsites where they are within 20 feet of silica dust being generated. Field personnel will be properly fitted with said devices pursuant to 29 CFR 1926.1153.

**WORKPLACE TRAINING:**

Field personnel will receive initial training satisfying the requirements of 29 CFR 1926.1153 within 30 days of the implementation of this Plan. Employees hired after implementation of this Plan will receive initial training within 30 days after start of employment. Pursuant to this Plan, field personnel may receive refresher training at least once annually. In such training, field personnel will be required to review procedures, identify and discuss health hazards such as cancer, lung effects, immune system effects, and kidney effects, and learn best practices for minimizing the generation of, and the exposure to respirable crystalline silica. A record of said training, including dates, names of trainees, and topics covered will be maintained.

## ***Work Orders***

**GENERAL REPORTING GUIDANCE:**
Most activities should be considered individual jobs or projects and be recorded on one work order, regardless of how many days it takes to complete the job. For example, a pipe replacement job that takes 3 days (cut pavement day 1, install pipe day 2, patch over cut day 3) shall be 1 work order, not three. Likewise, on a seal coat job all work shall be on one work order, including sign/detour placement, RPM protection, seal coat construction and final sweeping.

Certain activities do not have obvious start and end points (examples include mowing, resigning and restriping). For these types of activities, use a logical timeframe for the work order – if a crew is working in a specific area for the week, that could be a single work order. Depending on the work, duration, and location, the work order could be a single day, week, or pay period.

All work orders, other than those for Leave Time activities, are required to have comments. The comments should include details on any special considerations that happened during the job, or specific work performed on an "Other" activity. If a question comes up several months after the work is done, the comments should be able to answer it.

All work orders that are in a Manager's WMS Completion view should be completed by close of business each Monday. If a State of Indiana recognized holiday falls on a Monday, then the work orders should be completed by close of business the next business day.

When Work Requests are addressed and completed by Maintenance crews, the Work Request must be attached to the Work Order.

If you must re-create a work order and need to add people who have retired or no longer work with INDOT, their cost is also reported in the Cost + Acc + Contracts tab of the Work Order. The employee's name will not be available in the Labor Short List, so you cannot make an Employee Day Card in the Labor tab. Under the Cost pane, select Labor in the Cost Type column. Enter the employee's wages for the entire day (hourly rate x hours worked) in the Total Cost ($) field, select L - Misc for the Cost Specific, enter the total hours worked in the Amount column, and add the employee's name and PeopleSoft number in the comments. Further details on this process can be found at the following link:
https://ingov.sharepoint.com/sites/INDOTIntranet/SitePages/WMS-FAQs.aspx#besides-rented-equipment%2c-what-other-information-should-i-enter-in-the-cost-pane-of-the-cost-%2B-acc-%2B-contracts-tab

**EQUIPMENT REPORTING:**
All INDOT-owned equipment used on a job should be reported on the work order, for the duration of the job, regardless of how long it was actually used. For example, a backhoe used on a pipe replacement (2311) job for an entire 7.5-hour day would be shown on the work order for 7.5 hours, even if it was only operated for 2 hours. An exception would be if the equipment was on one job, then moved to another job. For example, if a backhoe was on a pipe job for 3 hours, then moved for the rest of the day to a patching job, the pipe work order would show 3 hours, and the patching work order would show 4.5 hours.

If INDOT equipment is reported under the Cost Day Card, for example small equipment such as chain saws, leaf blowers, pole saws, etc., the commission number of the piece of equipment used should be entered in the Comments of the Cost Day Card

Rental equipment should be reported on the work order with the actual total daily rental fee for all pieces of equipment rented shown as the cost. If equipment is rented by the month, the daily cost is calculated by dividing the total monthly fee by 20. If rented by the week, divide the total weekly fee by 5. The total number of pieces of equipment rented should be entered in the "Amount" field. The specific pieces of equipment rented and the daily rental cost for each piece of equipment should be entered in the comments of the Cost Day Card.

Except for Activity 2811 and Leave Time Activities, the following guidelines should be adhered to: Equipment hours should not exceed labor hours. The maximum number of equipment hours reported must be less than or equal to the number of labor hours reported.

**ACCOMPLISHMENT REPORTING:**
The accomplishment portion must be edited even if just one asset is reported on the Work Order. Using a "1" for the accomplishment is **no longer acceptable** unless that is the actual accomplishment.

**MATERIAL REPORTING:**
If a crew takes material and does not use it all, only the material that was used should be reported. If material is left on the truck or equipment, it must be deducted from the Work Order.

**REMOVAL OF DEAD ANIMALS REPORTING:**
When removing dead animals, the number of animals picked up is entered in the Cost Pane of the Work Order. Please note that there should be one cost day card for large animals and another cost day card for small animals. Select Other as the Cost Type, enter $0.00 for the Total Cost ($), select the appropriate Cost Specific and enter the number of animals picked up in the Amount Field. Deer, coyotes, cows, and horses are considered large animals; any other type of animal that is removed is considered a small animal. For further information on how to report this information in the Work Management System (WMS) see Work Order Reporting FAQS.

## ***Underground Locates***

Any work that could result in utility damage must have an underground utility locate submitted at least 2 business days in advance. This includes not only excavation, such as ditching, but also removal or installation of sign or fence posts. See http://indiana811.org/ for more details.

Note that INDOT facilities (such as signal interconnect, lighting wiring, ITS, etc.) are NOT included in 811. Use https://entapps.indot.in.gov/dig/ to create a locate request when performing underground work around any equipment.

## ***Work Performance Standard Template***

Each standard contains the following information about the specific activity:

1. **Purpose** – *What the activity is for, and why we are doing it.*

2. **Category** – *Activities are placed into categories based on work and asset types; also noted is whether the activity is a Preventive Maintenance, has an associated Quality Assurance review, and should be performed in pre-planned locations.*

3. **Scheduling and Coordination** – *Information on when an activity is typically performed considering seasonal, temperature, or other limitations. Also includes other activities to coordinate with.*

4. **Reporting** – *Details on how to report accomplishment, as well as guidance on what should be reported to different activities.*

5. **Asset to Report to -** *Indicates which asset to report activity to in WMS.*

6. **Reporting Units** – *The units the specific activity is measured in.*

7. **Crew Size** – *Job specific, typical crew size to perform the specific activity. Traffic control personnel are not shown here.*

8. **Job Specific Equipment** – *Job specific, typical equipment to perform the specific activity. Traffic control equipment is not shown here.*

9. **Materials** – *Typical materials for the specific activity, as well as INDOT specification references.*

10. **PPE** – *Specific Personal Protective Equipment for the activity being performed.*

11. **Other References** – *Alternate sources of information relevant to the specific activity. Includes INDOT specification references, policies, handbooks, etc.*

12. **Sub Activities** – *Description of sub activities for the specific activity.*

13. **Work Method** – *Detailed guide on how to perform the specific activity.*

14. **Special Considerations** – *Any other tips for the specific activity.*

## ***Work Performance Standards Index***

Overhead, Leave Time, Pavement and Shoulders

| Code | Activity Name | Measurement Unit | Category |
|---|---|---|---|
| 1000 | LOANED OUT | MHR - WORK HR | Overhead |
| 1010 | INTERNAL LOANED OUT-MODULE TO MODULE | MHR - WORK HR | Overhead |
| 1020 | CEMP Plan | MHR - WORK HR | Overhead |
| 1030 | CEMP Exercise | MHR - WORK HR | Overhead |
| 1120 | FIELD MAINT SUPERVISION | MHR - WORK HR | Overhead |
| 1170 | TRAINING | MHR - WORK HR | Overhead |
| 1200 | STANDBY TIME | MHR - WORK HR | Overhead |
| 1360 | HOLIDAYS | MHR - WORK HR | Leave Time |
| 1370 | MILITARY LEAVE | MHR - WORK HR | Leave Time |
| 1380 | JURY DUTY | MHR - WORK HR | Leave Time |
| 1390 | COMMUNITY SERVICE LEAVE | MHR - WORK HR | Leave Time |
| 1490 | FUNERAL LEAVE | MHR - WORK HR | Leave Time |
| 1580 | RADIO OPERATION | MHR - WORK HR | Overhead |
| 1740 | LEAVE WITHOUT PAY | MHR - WORK HR | Leave Time |
| 1800 | SPECIAL SICK LEAVE | MHR - WORK HR | Leave Time |
| 1810 | OTHER PAID LEAVE | MHR - WORK HR | Leave Time |
| 1930 | SICK LEAVE | MHR - WORK HR | Leave Time |
| 1940 | VACATION LEAVE | MHR - WORK HR | Leave Time |
| 1950 | PERSONAL LEAVE | MHR - WORK HR | Leave Time |
| 2010 | PERMANENT SHALLOW PATCHING | STN - SHORT TON | Pavement & Shoulders |
| 2011 | TEMPORARY SHALLOW PATCHING | STN - SHORT TON | Pavement & Shoulders |
| 2020 | DEEP PATCHING | STN - SHORT TON | Pavement & Shoulders |
| 2030 | SPOT PAVING | STN - SHORT TON | Pavement & Shoulders |
| 2050 | SEAL COAT | SQY - SQUARE YARDS | Pavement & Shoulders |
| 2051 | FOG SEAL | SQY - SQUARE YARDS | Pavement & Shoulders |
| 2052 | SCRUB SEAL | SQY - SQUARE YARDS | Pavement & Shoulders |
| 2070 | CRACK SEALING | LNM - LANE MILE | Pavement & Shoulders |
| 2095 | RESEALING CONCRETE PAVEMENT JOINTS | LNM - LANE MILE | Pavement & Shoulders |
| 2100 | SPOT REPAIR OF UNPAVED SHOULDERS | STN - SHORT TON | Pavement & Shoulders |
| 2110 | BLADING SHOULDERS | SHM - SHLDR MI | Pavement & Shoulders |
| 2120 | CLIPPING SHOULDERS | SHM - SHLDR MI | Pavement & Shoulders |
| 2130 | RECONDITION SHOULDERS | SHM - SHLDR MI | Pavement & Shoulders |
| 2140 | JOINT & BUMP REPAIR | BMP - BUMPS | Pavement & Shoulders |
| 2150 | EXPANSION FOAM INJECTION | MHR - WORK HR | Pavement & Shoulders |
| 2190 | OTHER RDWAY/SHLDR MAINTENANCE | MHR - WORK HR | Pavement & Shoulders |

## ***Work Performance Standards Index***

Vegetation and Right-of-Way

| Code | Activity Name | Measurement Unit | Category |
|---|---|---|---|
| 2210 | MOWING | SWATH MILE | Vegetation |
| 2220 | MANUAL BRUSH CUTTING | SQF - SQUARE FT | Vegetation |
| 2221 | MECHANICAL BRUSH CUTTING | SQF - SQUARE FT | Vegetation |
| 2230 | HERBICIDE SPOT TREATMENT | ACR - ACRE | Vegetation |
| 2231 | HERBICIDE BROADCAST TREATMENT | ACR - ACRE | Vegetation |
| 2240 | SEEDING AND FERTILIZING | ACR - ACRE | Vegetation |
| 2241 | SPOT SEEDING/FERTILIZING | SQF - SQUARE FT | Vegetation |
| 2250 | TREE TRIMMING | TRE - TREES | Vegetation |
| 2251 | TREE REMOVAL | TRE - TREES | Vegetation |
| 2260 | STUMP REMOVAL | STM - STUMPS | Vegetation |
| 2270 | SPOT MOWING | SQF - SQUARE FT | Vegetation |
| 2280 | RIGHT OF WAY FENCE | LF - LIN FOOT | Right-of-Way |
| 2290 | OTHER ROADSIDE MAINT | MHR - WORK HR | Right-of-Way |
| 2291 | ROADWAY SLIDE MAINT | MHR - WORK HR | Right-of-Way |

## ***Work Performance Standards Index***

Drainage Structures & Drainage, Bridge, Snow & Ice, Safety Devices, and Facilities

| Code | Activity Name | Measurement Unit | Category |
|---|---|---|---|
| 2310 | MAJOR CLEAN/RESHAPE DITCH | LF - LIN FOOT | Drainage Str. & Drainage |
| 2311 | SPOT DITCHING | LOC - LOCATIONS | Drainage Str. & Drainage |
| 2331 | CULVERT REPLACEMENT - SMALL PIPE (<36") | LF - LIN FOOT | Drainage Str. & Drainage |
| 2332 | CULVERT REPLACEMENT - LARGE PIPE (>36") | LF - LIN FOOT | Drainage Str. & Drainage |
| 2336 | PIPE LINING - SMALL PIPE (<36") | LF - LIN FOOT | Drainage Str. & Drainage |
| 2337 | PIPE LINING - LARGE PIPE (>36") | LF - LIN FOOT | Drainage Str. & Drainage |
| 2350 | MANUAL DRAIN CLEANING | STR - STRUCTURE | Drainage Str. & Drainage |
| 2351 | MECHANICAL STRUCTURE CLEANING | STR - STRUCTURE | Drainage Str. & Drainage |
| 2360 | UNDERDRAIN CLEANING AND INSPECTION | STR - STRUCTURE | Drainage Str. & Drainage |
| 2390 | OTHER DRAINAGE MAINTENANCE | MHR - WORK HR | Drainage Str. & Drainage |
| 2410 | BRIDGE TOP CLEANING AND FLUSHING | BRG - BRIDGES | Bridge |
| 2440 | SUPERSTRUCTURE/SUBSTRUCTURE CLEANING AND FLUSHING | BRG - BRIDGES | Bridge |
| 2450 | TEMPORARY BRIDGE DECK PATCHING | SQF - SQUARE FT | Bridge |
| 2451 | PERMANENT BRIDGE DECK PATCHING | SQF - SQUARE FT | Bridge |
| 2470 | BRIDGE DECK CRACK FILLING | SQF - SQUARE FT | Bridge |
| 2471 | BRIDGE DECK BROADCAST SEALING | SQF - SQUARE FT | Bridge |
| 2480 | BRIDGE DECK EPOXY INJECTION | SQF - SQUARE FT | Bridge |
| 2490 | OTHER BRIDGE MAINTENANCE | MHR - WORK HR | Bridge |
| 2510 | NOISE WALL REPAIR | MHR - WORK HR | Right-of-Way |
| 2530 | CABLE BARRIER REPAIR | LF - LIN FOOT | Safety Devices |
| 2550 | IMPACT ATTENUATOR/GUARDRAIL END TREATMENT REPAIR | UNT - UNITS | Safety Devices |
| 2551 | IMPACT ATTENUATOR/GUARDRAIL END TREATMENT INSPECTION | UNT - UNITS | Safety Devices |
| 2560 | RAISED PAVEMENT MARKER MAINTENANCE | RPM - RPM MILES | Safety Devices |
| 2580 | GUARDRAIL MAINTENANCE | LF - LIN FOOT | Safety Devices |
| 2590 | OTHER SAFETY DEVICE MAINTENANCE | MHR - WORK HR | Safety Devices |
| 2610 | EMERGENCY MAINTENANCE | MHR - WORK HR | Emergency Response |
| 2611 | STORM DEBRIS REMOVAL | CY - CUBIC YARDS | Right-of-Way |
| 2630 | SNOW & ICE REMOVAL | MIL - MILES | Snow & Ice |
| 2640 | BRINE MIXING | GAL - GALLON (US LIQ) | Snow & Ice |
| 2650 | STOCKPILING WINTER MATERIALS | MHR - WORK HR | Snow & Ice |
| 2660 | PATROLLING | MIL - MILES | Snow & Ice/Right-of-Way |
| 2670 | NATURAL SNOW FENCE | ACR - ACRE | Snow & Ice |
| 2680 | MAN MADE SNOW FENCE | FT - FEET | Snow & Ice |
| 2690 | OTHER WINTER MAINTENANCE | MHR - WORK HR | Snow & Ice |
| 2710 | LIFT BRIDGE ATTENDANT | MHR - WORK HR | Facilities |
| 2720 | REST PARK AND WEIGH STATION MAINTENANCE | MHR - WORK HR | Facilities |
| 2750 | FULL WIDTH LITTER PICK UP | CY - CUBIC YARDS | Right-of-Way |
| 2760 | SPOT LITTER PICKUP | CY - CUBIC YARDS | Right-of-Way |
| 2770 | ROADWAY SWEEPING | LMI - LINEAR MILES | Pavement & Shoulders |
| 2790 | OTHER SERVICE ACTIVITIES | MHR - WORK HR | Overhead |
| 2791 | TRAFFIC CONTROL SUPPORT | MHR - WORK HR | Overhead |
| 2810 | EQUIPMENT SERVICING | MHR - WORK HR | Overhead |
| 2811 | FLEET CLEANING, MAINTENANCE & INSPECTION PREPARATION | MHR - WORK HR | Overhead |
| 2830 | BLDG & GRND MAINT | MHR - WORK HR | Facilities |
| 2831 | BLDG & GRND AIR COMPRESSOR PM | UNT - UNITS | Facilities |
| 2832 | BLDG & GRND BRINE MAKER PM | UNT - UNITS | Facilities |
| 2833 | BLDG & GRND CATWALK PM | UNT - UNITS | Facilities |
| 2834 | BLDG & GRND GENERATOR PM | UNT - UNITS | Facilities |
| 2835 | BLDG & GRND FACILITY OVERHEAD DOORS PM | UNT - UNITS | Facilities |
| 2836 | BLDG & GRND OIL WATER SEPARATOR PM | UNT - UNITS | Facilities |
| 2837 | BLDG & GRND GARAGE FLOOR DRAIN SYSTEMS PM | UNT - UNITS | Facilities |
| 2840 | MATRLS HNDLNG/STORNG | MHR - WORK HR | Overhead |
| 2890 | OTHER SUPPORT ACTIVITIES | MHR - WORK HR | Overhead |
| 2991 | MAJOR SURFACE/SHOULDER IMPROVEMENTS | MHR - WORK HR | Pavement & Shoulders |
| 7000 | SUPPORT WORK ASSIGNMENTS | MHR - WORK HR | Overhead |

## ***Work Performance Standards Index***

Traffic - Signs, Safety Devices, Traffic Markings, Signals, Lighting, Right-of-Way, Overhead, Leave Time

| Code | Activity Name | Measurement Unit | Category |
|---|---|---|---|
| 8100 | SHEET SIGN MODERNIZATION | SGN - SIGNS | Signs |
| 8110 | SHEET SIGN MAINTENANCE | SGN - SIGNS | Signs |
| 8120 | PANEL SIGN MAINTENANCE | SGN - SIGNS | Signs |
| 8121 | PANEL SIGN OVERLAY | SF - SQ | Signs |
| 8125 | PANEL SIGN INSPECTION/MINOR MAINT | SGN - SIGNS | Signs |
| 8140 | DELINEATOR MAINTENANCE | DLN - DELINEATOR | Safety Devices |
| 8150 | DETOUR WORK | MHR - WORK HR | Overhead |
| 8200 | TRAFFIC SIGN WORK ORDERS | SGN - SIGNS | Signs |
| 8300 | PAINT CENTERLINES | PTM - PAINT MI | Traffic Markings |
| 8320 | PAINT EDGELINES | PTM - PAINT MI | Traffic Markings |
| 8340 | RAMP OR PARKING LOT PAINTING | PTM - PAINT MI | Traffic Markings |
| 8350 | CURB PAINTING | LF - LIN FOOT | Traffic Markings |
| 8360 | SPECIAL MARKING MAINTENANCE | SQF - SQUARE FT | Traffic Markings |
| 8390 | INSPECT/REPLACE REFLECTOR | EA - EACH | Safety Devices |
| 8400 | NEW SPECIAL MARKING INSTALLATION | SF - SQ | Traffic Markings |
| 8500 | SIGNAL MAINTENANCE RESPONSE | S/F - SIGNAL / FLASHER | Signals |
| 8510 | SIGNAL PREVENTIVE MAINTENANCE | SIG - SIGNAL | Signals |
| 8511 | FLASHER PREVENTIVE MAINTENANCE | FLA - FLASHER | Signals |
| 8520 | SIGNAL SHOP ACTIVITIES | MHR - WORK HR | Signals |
| 8530 | SCHEDULED SIG/FLASH INDICATION REPLACEMENT | INDICATIONS | Signals |
| 8535 | NON SCHEDULED SIGNAL/FLASHER INDICATION REPLACEMENT | INDICATIONS | Signals |
| 8541 | DETECTOR LOOP SPLICE REPAIR/INSTALL | SPS- SPLICES | Signals |
| 8550 | NEW SIGNAL/FLASHER INSPECTION OR TURN ON | S/F - SIGNAL / FLASHER | Signals |
| 8551 | NEW LIGHTING INSPECTION | STR - STRUCTURE | Lighting |
| 8560 | SIGNAL/FLASHER EQUIPMENT REPLACEMENT/REPAIR | S/F - SIGNAL / FLASHER | Signals |
| 8570 | SIGNAL/FLASHER EQUIPMENT UPGRADE | S/F - SIGNAL / FLASHER | Signals |
| 8590 | SIGNAL/FLASHER INSTALLATION/REMOVAL | S/F - SIGNAL / FLASHER | Signals |
| 8610 | LIGHTING SURVEILLANCE | FIX - FIXTURE | Lighting |
| 8620 | LIGHTING REPAIRS/REPLACEMENTS | FIX - FIXTURE | Lighting |
| 8621 | SCHEDULED LIGHTING BULB REPLACEMENT | FIX - FIXTURE | Lighting |
| 8630 | UNDERGROUND LOCATION WORK | MHR - WORK HR | Signals or Lighting |
| 8920 | GATHER FIELD DATA | MHR - WORK HR | Right-of-Way |
| 9000 | DISABILITY / WORKMANS COMP LEAVE | MHR - WORK HR | Leave Time |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Loaned Out | CODE | 1000 |
|---|---|---|---|

**Purpose**

Report person hours of Maintenance and Traffic personnel assigned to work that is not reported in WMS (i.e. Construction and Testing) to this loaned out activity.

**Category** Overhead

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Dates and number of loaned personnel are provided by the District and are to be incorporated into the schedule.

*For long term assignments outside WMS, remove those employees from the FTE count.

| Reporting | | Asset to Report to | None | Reporting Units | Person Hours |
|---|---|---|---|---|---|

When working for Construction, Testing, or Shop, time must be **entered into PeopleSoft directly** using the **Regular Work Hours – REG** Time Reporting Code.

For additional work order reporting guidance see the Work Orders section of the Preface.

*For work performed in another WMS module (Facilities, Traffic, etc.) report to Activity 1010 – Internal Loaned Out

| Crew Size | Workers | QTY |
|---|---|---|

**P.P.E.**

**Materials**

**Job Specific Equipment**

**Other References**

**Sub Activities**

230 - Construction

231 - Testing

232 - Shop

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Loaned Out | CODE | 1000 |
|---|---|---|---|

**Work Method**

Includes assisting with District non-Operations activities.

**Special Considerations**

For long term assignments, remove from FTE total.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Internal Loaned Out - Module to Module (within the Work Management System) | CODE | 1010 |
|---|---|---|---|

**Purpose**

Report the person hours of planned Maintenance and Traffic personnel assigned to work in a WMS module other than where they were planned. (i.e. Roadway to Facilities or Signal to Roadway, etc.)

**Category** Overhead

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Include known projects in the annual plan when personnel will work with other WMS module personnel; not all Internal Loaned Out will be included in the plan due to unscheduled requests.

| Reporting | | Asset to Report to | None | Reporting Units | Person Hours |
|---|---|---|---|---|---|

This activity is not passed in the Time and Labor interface. The employee must be on a work order in the module in which they are working for this reason.

For additional work order reporting guidance see the Work Orders section of the Preface.

| Crew Size | Workers | QTY |
|---|---|---|

**P.P.E.**

**Materials**

**Job Specific Equipment**

**Other References**

**Sub Activities**

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Internal Loaned Out - Module to Module (within the Work Management System) | CODE | 1010 |
|---|---|---|---|

**Work Method**

**Special Considerations**

| APPROVED BY |
|---|
| Director, Highway Maintenance |

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# PERFORMANCE STANDARD

| ACTIVITY | Comprehensive Emergency Management Plan | CODE | 1020 |
|---|---|---|---|

**Purpose**

Capture all person hours responding to or assisting with an actual emergency event where no specific WMS activity applies to the work being performed.

**Category** Overhead

- ☐ PM
- ☐ QA
- ☐ Plan Location

**Scheduling & Coordination**

| Reporting | | Asset to Report to | Various* | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Report person hours of all personnel responding to or assisting during an emergency event where no established standard-activity exists. Examples of this may be bridge or structure inspections, assisting with WMS entry, manning the on-site command center, etc.

For additional work order reporting guidance see the Work Orders section of the Preface.

Reporting Options:

- Pavement Keys

*For Work Orders reported in the Signals Module, the Asset to Report To will be "None."

| Crew Size | Worker(s) | QTY |
|---|---|---|

**P.P.E.**

**Materials**

**Job Specific Equipment**

**Other References**

**Sub Activities**

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Comprehensive Emergency Management Plan | CODE | 1020 |
|---|---|---|---|

**Work Method**

**Special Considerations**

Paper work orders should be completed to record the actual work activities performed, all resources utilized, exact location of the work, and incident information for the actual event. The event lead will establish the location to turn in the completed paper WO and any additional requirements.

**Copies of the paper work order form will be available at the onsite command center trailer or from the individual in charge of the work location.*

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# PERFORMANCE STANDARD

| ACTIVITY | CEMP Exercise | CODE | 1030 |
|---|---|---|---|

**Purpose**

Report person hours of all personnel assigned to assist with a planned emergency training exercise.

**Category** Overhead

- ☐ PM
- ☐ QA
- ☐ Plan Location

**Scheduling & Coordination**

| Reporting | | Asset to Report to | Various* | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Record the number of hours worked by all personnel (including maintenance and traffic employees).

For additional work order reporting guidance see the Work Orders section of the Preface.

*Reporting Options:

- Pavement Keys
- Bridge Structures
- Site
- Structures

*For Work Orders reported in the Signals Module, the Asset to Report To will be "None."

| Crew Size | Worker(s) | QTY |
|---|---|---|
| | | |

**P.P.E.**

**Materials**

**Job Specific Equipment**

**Other References**

**Sub Activities**

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# PERFORMANCE STANDARD

| ACTIVITY | CEMP Exercise | CODE | 1030 |
|---|---|---|---|

**Work Method**

**Special Considerations**

Paper work orders should be completed to record the actual work activities performed, all resources utilized, exact location of the work, and incident information for the training event/exercise. The event lead will establish the location to turn in the completed paper WO and any additional requirements.

**Copies of the paper work order form will be available at the onsite command center trailer or from the individual in charge of the work location.*

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Field Maintenance Supervision | CODE | 1120 |
|---|---|---|---|

**Purpose**

The supervision and coordination of routine highway maintenance activities by personnel not normally in a supervisory role, i.e. when a Crew Leader fills in for a Unit Foreman while the Unit Foreman is on leave.

**Category** Overhead

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule and perform this activity as required to ensure adequate supervision and coordination of maintenance activities.

For additional work order reporting guidance see the Work Order section of the Preface

| Reporting | | Asset to Report to | None | Reporting Units | Person Hours |
|---|---|---|---|---|---|

This activity should only be used when performing supervisory functions. When working as part of the crew, the acting Unit Foreman should report to that specific work order as well i.e. hours spent as acting Unit Foreman would be reported to this activity with the remainder of the hours spent as part of the crew reported to the specific work activity.

Report Route Assessment work (sub activity 220) to the pavement key.

**Crew Size** — **Workers**

QTY

**P.P.E.**

**Materials**

**Job Specific Equipment**

**Other References**

**Sub Activities**

220 – Route Assessment (Inspect road system noting defects requiring corrective action)

| Average Daily Production | Person Hours | EFFECTIVE DATE | 2/12/2024 |
|---|---|---|---|

| ACTIVITY | Field Maintenance Supervision | CODE | 1120 |
|---|---|---|---|

**Work Method**

1. Note deficiencies and work with crews to improve performance.
2. Make sure that assigned activities are being performed.
3. Inspect finished work performed by crews.
4. Inspect road system; noting defects requiring corrective action.
5. Make sure that daily reports are completed correctly.

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 2/12/2024 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Training | CODE | 1170 |
|---|---|---|---|

**Purpose**

Report time spent by Maintenance and Traffic personnel participating in training sessions and safety trainings. Includes the training on snow removal routes and equipment when there is NOT a snow and ice event occurring.

**Category** Overhead

- ☐ PM
- ☐ QA
- ☐ Plan Location

**Scheduling & Coordination**

Schedule training sessions for personnel as training is available or required. During down time, utilization of training sessions and training materials should be emphasized.

| Reporting | | Asset to Report to | None | Reporting Units | Person Hours |
|---|---|---|---|---|---|

**Crew Size** — **Workers**

QTY

**P.P.E.**

**Materials**

**Job Specific Equipment**

**Other References**

**Sub Activities**

120 - HT Training
125 - CDL Training
627 - Safety
851 - Snow & Ice Training
915 - Roadeo
950 - EOP Emergency Operation Plan
955 - DOC Supervision Training

| Average Daily Production | Person Hours | EFFECTIVE DATE | 2/12/2024 |
|---|---|---|---|

| ACTIVITY | Training | CODE | 1170 |
|---|---|---|---|

**Work Method**

1. Determine training needs.
2. Become familiar with content.
3. Perform/attend training.
4. Record and report all participants.
5. Return training material to clean, safe storage.

**Special Considerations**

| APPROVED BY |
|---|
| Director, Highway Maintenance |

| Average Daily Production | Person Hours | EFFECTIVE DATE | 2/12/2024 |
|---|---|---|---|

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Standby Time | CODE | 1200 |
|---|---|---|---|

**Purpose**

If work is delayed 1 to 2 hours, standby time is used to report work delays due to weather conditions, equipment breakdowns, or other situations prohibiting productive work.

**Category** Overhead

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

With good planning and attention to weather reports, this activity should rarely be used.

| Reporting | | Asset to Report to | None | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Accomplishment is the total person hours.

Report time to this activity only when it's not possible to perform scheduled work activities.

If total down time is less than 1 hour, do not use this activity - keep time on the specific work activity. Do not report more than 2 hours of down time - reassign crew to another activity.

For example, a 5 person crew with a rain delay from 10:00AM to 12:00PM would report a total of 10 person hours accomplishment. There is more than 1 hour but no more than 2 hours (per crew member) of non-productive time spent.

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** — **Workers** — **QTY**

**P.P.E.**

**Materials**

**Job Specific Equipment**

**Other References**

**Sub Activities**

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Standby Time | CODE | 1200 |
|---|---|---|---|

**Work Method**

1. Determine expected length of work delay.
2. If determined to be two (2) hours or more, re-assign crew to a different activity.
3. If less than one (1) hour, leave time on the specific work activity.

**Special Considerations**

Use only when one (1) to two (2) hours are spent that cannot be associated to another work activity.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# PERFORMANCE STANDARD

| ACTIVITY | Holidays | CODE | 1360 |
|---|---|---|---|

**Purpose**

Report person hours for paid holiday time.

*To view the complete and most current policy and procedure guideline, see **"Other References"** below.*

**Category** Leave Time

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Legal holidays include: New Year's Day, Martin Luther King Jr. Day, Lincoln's Birthday (Observed with/ in addition to Thanksgiving Day), Washington's Birthday (Observed with/ in addition to Christmas Day), Good Friday, Primary Election Day, Memorial Day, Independence Day, Labor Day, Columbus Day, General Election Day, Veterans Day, Thanksgiving Day, and Christmas Day

| Reporting | | Asset to Report to | None | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Time reported for each employee for each holiday should not exceed 7.5 hours.

New Parental Leave and Family Medical Leave is not reported in WMS. These types of leave must be reported directly into PeopleSoft by the employee.

For additional work order reporting guidance see the Work Orders section of the Preface

| Crew Size | Worker(s) | QTY |
|---|---|---|

**P.P.E.**

N/A

**Materials**

**Job Specific Equipment**

**Other References**

http://www.in.gov/spd/files/holpol.pdf

http://www.in.gov/spd/files/holrandp.pdf

http://www.in.gov/spd/files/Leaves_of_Absence.pdf

For a complete listing of all Indiana State Personnel Department Standardized Policies:

http://www.in.gov/spd/2396.htm

**Sub Activities**

104 – Holiday

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Holidays | CODE | 1360 |
|---|---|---|---|

**Work Method**

**Special Considerations**

Employees are eligible to receive compensation for holidays in the following circumstances:

- Employee is full-time, part-time, or hourly occupying a permanent position; and
- Employee is in pay status during the calendar week in which the holiday is observed; however,
- Employees are not eligible to receive compensation for holidays observed prior to the first workday of employment or after the last workday of employment.

If a full-time, part-time, or permanent positioned employee is required to work on a date that a holiday is observed for his/her assigned operation, the employee is entitled to appropriate payment for such hours worked and, in addition, may choose to have the holiday compensation with the regular compensation for that pay period or may choose compensatory time off to be used on another date. Temporary and intermittent employees who are required to work on an observed holiday will receive the appropriate compensation for the hours worked, but are not entitled to any additional compensation under this policy.

The Governor will annually set the dates of observance for legal holidays which will be communicated prior to the start of the calendar year.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# PERFORMANCE STANDARD

| ACTIVITY | Military Leave | CODE | 1370 |
|---|---|---|---|

**Purpose**

Report person hours for paid military leave.

*To view the complete and most current policy and procedure guideline, see **"Other References"** below.*

**Category** Leave Time

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Employees who are members of the Armed Forces Reserves or the Indiana National Guard are entitled to not more than fifteen (15) calendar days paid military leave in each calendar year in which military service is performed, without loss of pay or vacation time. Leave(s) will be granted in accordance with any orders for military duty.

| Reporting | | Asset to Report to | None | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Time reported for each employee for each day of military leave should not exceed employee's daily scheduled hours, and not to exceed a total of 112.5 hours in a calendar year.

New Parental Leave and Family Medical Leave is not reported in WMS. These types of leave must be reported directly into PeopleSoft by the employee

For additional work order reporting guidance see the Work Orders section of the Preface

**Crew Size**

| Worker(s) | QTY |
|---|---|

**P.P.E.**

N/A

**Materials**

**Job Specific Equipment**

**Other References**

http://www.in.gov/spd/files/militarypol.pdf

http://www.in.gov/spd/files/militaryrandp.pdf

http://www.in.gov/spd/files/Leaves_of_Absence.pdf

For a complete listing of all Indiana State Personnel Department Standardized Policies:

http://www.in.gov/spd/2396.htm

**Sub Activities**

107 – Military Leave

108 – Military Leave Unpaid

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Military Leave | CODE | 1370 |
|---|---|---|---|

**Work Method**

**Special Considerations**

Active Military Service means state active duty service, federally funded state active service, or federal active service, but excludes service performed exclusively for training, including basic combat training, advanced individual training, annual training, inactive duty training, and special training periodically made available to reserve members.

If the military leave continues into the next calendar year, the employee may be eligible for an additional fifteen (15) days of military leave without loss of pay.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# PERFORMANCE STANDARD

| ACTIVITY | Jury Duty | CODE | 1380 |
|---|---|---|---|

**Purpose**

Report person hours for paid jury duty.

*To view the complete and most current policy and procedure guideline, see **"Other References"** below.*

**Category** Leave Time

- ☐ PM
- ☐ QA
- ☐ Plan Location

**Scheduling & Coordination**

| Reporting | | Asset to Report to | None | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Time reported for each employee for each day of jury duty (or witness in a court proceeding) should not exceed employees daily scheduled hours. *Approved length of paid time will be that stated within the official court document requesting the employee's appearance.

New Parental Leave and Family Medical Leave is not reported in WMS. These types of leave must be reported directly into PeopleSoft by the employee.

For additional work order reporting guidance see the Work Orders section of the Preface

| Crew Size | Worker(s) | QTY |
|---|---|---|

**P.P.E.**

N/A

**Materials**

**Job Specific Equipment**

**Other References**

http://www.in.gov/spd/files/Leaves_of_Absence.pdf

For a complete listing of all Indiana State Personnel Department Standardized Policies:

http://www.in.gov/spd/2396.htm

**Sub Activities**

106 – Jury Duty

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# PERFORMANCE STANDARD

| ACTIVITY | Jury Duty | CODE | 1380 |
|---|---|---|---|

**Work Method**

**Special Considerations**

Paid jury duty leave to be used when presence for jury trial or witness in a court proceeding is stated with an official court document.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# PERFORMANCE STANDARD

| ACTIVITY | Community Service Leave | CODE | 1390 |
|---|---|---|---|

**Purpose**

Report person hours for paid community service leave.

*To view the complete and most current policy and procedure guideline, see **"Other References"** below.*

**Category** Leave Time

- ☐ PM
- ☐ QA
- ☐ Plan Location

**Scheduling & Coordination**

| Reporting | | Asset to Report to | None | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Time reported for each employee for community service leave should not exceed 7.5 hours in a calendar year.

New Parental Leave and Family Medical Leave is not reported in WMS. These types of leave must be reported directly into PeopleSoft by the employee.

For additional work order reporting guidance see the Work Orders section of the Preface.

| Crew Size | Worker(s) | QTY |
|---|---|---|

**P.P.E.**

N/A

**Materials**

**Job Specific Equipment**

**Other References**

http://www.in.gov/spd/files/comservpol.pdf

http://www.in.gov/spd/files/comservrandp.pdf

http://www.in.gov/spd/files/Leaves_of_Absence.pdf

For a complete listing of all Indiana State Personnel Department Standardized Policies:

http://www.in.gov/spd/2396.htm

**Sub Activities**

103 – Community Service

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Community Service Leave | CODE | 1390 |
|---|---|---|---|

**Work Method**

**Special Considerations**

Each full time State employee who shows that s/he has volunteered his/her own time to a charitable organization will be allowed leave with pay from the employee's regular assigned duties, not to exceed a combined total of seven and one-half hours (7.5) each calendar year.

A Request for Leave form must be submitted seven (7) calendar days in advance unless in an emergency situation. This form can be found on Page 2 of the Community Service Leave Responsibilities & Procedures document (also referenced above):

http://www.in.gov/spd/files/comservrandp.pdf

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# PERFORMANCE STANDARD

| ACTIVITY | Funeral Leave | CODE | 1490 |
|---|---|---|---|

**Purpose**

Report person hours for paid funeral leave.

*To view the complete and most current policy and procedure guideline, see **"Other References"** below.*

**Category** Leave Time

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

| Reporting | | Asset to Report to | None | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Time reported for each employee for each day of funeral leave should not exceed employees daily scheduled hours and not to exceed three (3) consecutive scheduled work days per qualifying event.

New Parental Leave and Family Medical Leave is not reported in WMS. These types of leave must be reported directly into PeopleSoft by the employee.

For additional work order reporting guidance see the Work Orders section of the Preface

| Crew Size | Worker(s) | QTY |
|---|---|---|

**P.P.E.**

N/A

**Materials**

**Job Specific Equipment**

**Other References**

http://www.in.gov/spd/files/funeralpol.pdf

http://www.in.gov/spd/files/funeralrandp.pdf

http://www.in.gov/spd/files/Leaves_of_Absence.pdf

For a complete listing of all Indiana State Personnel Department Standardized Policies:

http://www.in.gov/spd/2396.htm

**Sub Activities**

117 – Funeral Leave

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Funeral Leave | CODE | 1490 |
|---|---|---|---|

**Work Method**

**Special Considerations**

Funeral leave will be granted in the event of a relatives death – relative being described as a husband, wife, father, mother, son, daughter, brother, sister, grandparent (including greats), grandchild (including greats), or spouse of any of these, or a person living in the same household with the employee. For a married employee, these members of the spouse's family are included.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Radio Operation | CODE | 1580 |
|---|---|---|---|

**Purpose**

Operation of base station radio equipment to provide communication between field units for the coordination of routine and emergency maintenance work.

**Category** Overhead

- ☐ PM
- ☐ QA
- ☐ Plan Location

**Scheduling & Coordination**

Typically performed during winter storms or other significant weather events.

| Reporting | | Asset to Report to | None | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Report hours of radio operation, performed by all personnel transferred from other divisions to Maintenance for the winter season, including all office and garage personnel.

For additional work order reporting guidance see the Work Orders section of the Preface.

| Crew Size | Workers | QTY |
|---|---|---|

**P.P.E.**

**Materials**

**Job Specific Equipment**

**Other References**

**Sub Activities**

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Radio Operation | CODE | 1580 |
|---|---|---|---|

**Work Method**

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# PERFORMANCE STANDARD

| ACTIVITY | Leave Without Pay | CODE | 1740 |
|---|---|---|---|

**Purpose**

Report person hours for leave without pay.

*To view the complete and most current policy and procedure guideline, see **"Other References"** below.*

**Category** Leave Time

- ☐ PM
- ☐ QA
- ☐ Plan Location

**Scheduling & Coordination**

| Reporting | | Asset to Report to | None | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Time reported for each employee for each day of leave without pay should not exceed employees daily scheduled hours.

New Parental Leave and Family Medical Leave is not reported in WMS. These types of leave must be reported directly into PeopleSoft by the employee.

For additional work order reporting guidance see the Work Orders section of the Preface

**Crew Size**

| Worker(s) | QTY |
|---|---|

**P.P.E.**

N/A

**Materials**

**Job Specific Equipment**

**Other References**

http://www.in.gov/spd/files/Leaves_of_Absence.pdf

For a complete listing of all Indiana State Personnel Department Standardized Policies:

http://www.in.gov/spd/2396.htm

**Sub Activities**

100 – Authorized Leave Without Pay

102 – Unauthorized Leave Without Pay

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Leave Without Pay | CODE | 1740 |
|---|---|---|---|

**Work Method**

**Special Considerations**

Please refer to the SPD Policy and Procedure document referenced in “Other References” above for specific information on each type of other paid leave.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# PERFORMANCE STANDARD

| ACTIVITY | Special Sick Leave | CODE | 1800 |
|---|---|---|---|

**Purpose**

Report person hours for paid special sick leave.

*To view the complete and most current policy and procedure guideline, see **"Other References"** below.*

**Category** Leave Time

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

| Reporting | | Asset to Report to | None | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Time reported should not exceed the employee's documented and eligible paid special sick leave balance.

New Parental Leave and Family Medical Leave is not reported in WMS. These types of leave must be reported directly into PeopleSoft by the employee.

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** | **Worker(s)** | **QTY**

**P.P.E.**

N/A

**Materials**

**Job Specific Equipment**

**Other References**

http://www.in.gov/spd/files/Leaves_of_Absence.pdf

For a complete listing of all Indiana State Personnel Department Standardized Policies:

http://www.in.gov/spd/2396.htm

**Sub Activities**

113 – Special Sick Leave

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Special Sick Leave | CODE | 1800 |
|---|---|---|---|

**Work Method**

**Special Considerations**

Documentation for Special Sick Leave will show that the employee had accrued the leave prior to July 1, 1989, and has not previously used the entire accrual or broken service. It must also show that the employee has exhausted all accrued sick, vacation, and personal leave.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# PERFORMANCE STANDARD

| ACTIVITY | Other Paid Leave | CODE | 1810 |
|---|---|---|---|

**Purpose**

Report person hours for other paid leave.

*To view the complete and most current policy and procedure guideline, see **"Other References"** below.*

**Category** Leave Time

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

| Reporting | | Asset to Report to | None | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Time reported for each employee for each day of other paid leave should not exceed employees daily scheduled hours. *See specific leave type for maximum allowances.

New Parental Leave and Family Medical Leave is not reported in WMS. These types of leave must be reported directly into PeopleSoft by the employee.

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** | **Worker(s)**

QTY

**P.P.E.**

N/A

**Materials**

**Job Specific Equipment**

**Other References**

http://www.in.gov/spd/files/Leaves_of_Absence.pdf

For a complete listing of all Indiana State Personnel Department Standardized Policies:

http://www.in.gov/spd/2396.htm

**Sub Activities**

119 – Other Paid Leave

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Other Paid Leave | CODE | 1810 |
|---|---|---|---|

**Work Method**

**Special Considerations**

Please refer to the SPD Policy and Procedure document referenced in “Other References” above for specific information on each type of other paid leave.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# PERFORMANCE STANDARD

| ACTIVITY | Sick Leave | CODE | 1930 |
|---|---|---|---|

**Purpose**

Report person hours for paid sick leave.

*To view the complete and most current policy and procedure guideline, see **"Other References"** below.*

**Category** Leave Time

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Request for sick leave shall be submitted to the appropriate person at least fifteen (15) minutes prior to the start of the shift or assigned work hours. For employees in seven (7) day, twenty-four (24) hour operations, notice shall be required one (1) hour prior to the start of the shift or assigned work hours.

| Reporting | | Asset to Report to | None | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Time reported should not exceed the employee's documented and eligible paid sick leave balance.

New Parental Leave and Family Medical Leave is not reported in WMS. These types of leave must be reported directly into PeopleSoft by the employee.

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size**

| Worker(s) | QTY |
|---|---|

**P.P.E.**

N/A

**Materials**

**Job Specific Equipment**

**Other References**

http://www.in.gov/spd/files/sickpol.pdf

http://www.in.gov/spd/files/sickrandp.pdf

http://www.in.gov/spd/files/Leaves_of_Absence.pdf

For a complete listing of all Indiana State Personnel Department Standardized Policies:

http://www.in.gov/spd/2396.htm

**Sub Activities**

111 – Sick Time

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# PERFORMANCE STANDARD

| ACTIVITY | Sick Leave | CODE | 1930 |
|---|---|---|---|

**Work Method**

**Special Considerations**

Eligible employees may use accumulated sick leave for an illness, injury, legal quarantine or visits to a licensed health care provider, for themselves or a member of the employee's immediate family or person residing in the employee's household who is dependent upon the employee for care, which necessitates the employee's absence from work.

**APPROVED BY**

Director, Highway Maintenance

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# PERFORMANCE STANDARD

| ACTIVITY | Vacation Leave | CODE | 1940 |
|---|---|---|---|

**Purpose**

Report person hours for paid vacation leave.

*To view the complete and most current policy and procedure guideline, see **"Other References"** below.*

**Category** Leave Time

- ☐ PM
- ☐ QA
- ☐ Plan Location

**Scheduling & Coordination**

Requests for vacation leave shall be submitted to the appropriate person no later than the close of the employee's shift or assigned work hours on the day before the requested vacation leave is to be taken.

| Reporting | | Asset to Report to | None | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Time reported should not exceed the employee's documented and eligible paid vacation leave balance.

New Parental Leave and Family Medical Leave is not reported in WMS. These types of leave must be reported directly into PeopleSoft by the employee.

For additional work order reporting guidance see the Work Orders section of the Preface

| Crew Size | Worker(s) | QTY |
|---|---|---|

**P.P.E.**

N/A

**Materials**

**Job Specific Equipment**

**Other References**

http://www.in.gov/spd/files/vacationpol.pdf

http://www.in.gov/spd/files/vacationrandp.pdf

http://www.in.gov/spd/files/Leaves_of_Absence.pdf

For a complete listing of all Indiana State Personnel Department Standardized Policies:

http://www.in.gov/spd/2396.htm

**Sub Activities**

115 – Vacation

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# PERFORMANCE STANDARD

| ACTIVITY | Vacation Leave | CODE | 1940 |
|---|---|---|---|

**Work Method**

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# PERFORMANCE STANDARD

| ACTIVITY | Personal Leave | CODE | 1950 |
|---|---|---|---|

**Purpose**

Report person hours for paid personal leave.

*To view the complete and most current policy and procedure guideline, see **"Other References"** below.*

**Category** Leave Time

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Requests for personal leave shall be submitted to the appropriate person at least fifteen (15) minutes prior to the start of the assigned work hours. For employees in seven (7) day, twenty-four (24) hour operations, notice shall be required one (1) hour prior to the start of the assigned work hours.

| Reporting | | Asset to Report to | None | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Time reported should not exceed the employee's documented and eligible paid personal leave balance.

New Parental Leave and Family Medical Leave is not reported in WMS. These types of leave must be reported directly into PeopleSoft by the employee.

For additional work order reporting guidance see the Work Orders section of the Preface.

| Crew Size | Worker(s) | QTY |
|---|---|---|

**P.P.E.**

N/A

**Materials**

**Job Specific Equipment**

**Other References**

http://www.in.gov/spd/files/personpol.pdf

http://www.in.gov/spd/files/personrandp.pdf

http://www.in.gov/spd/files/Leaves_of_Absence.pdf

For a complete listing of all Indiana State Personnel Department Standardized Policies:

http://www.in.gov/spd/2396.htm

**Sub Activities**

109 – Personal Time

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# PERFORMANCE STANDARD

| ACTIVITY | Personal Leave | CODE | 1950 |
|---|---|---|---|

**Work Method**

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Permanent Shallow Patching | CODE | 2010 |
|---|---|---|---|

**Purpose**

Permanent repair of minor patching of small areas of bituminous roadway or shoulder surface, where the depth of the patch is not greater than the thickness of the pavement. Patching should be completed with hot mix asphalt or asphalt emulsion and aggregate to correct potholes, edge failures, and other potential surface hazards to delay further deterioration of the surface.

**Category** Pavement & Shoulders

- ☐ PM
- ☒ QA
- ☒ Unit Cost
- ☐ Plan Location

**Scheduling & Coordination**

Repair surface failures exceeding 1" in depth and 1' in diameter as soon as possible after they are reported. Other surface failures, which do not present a hazard to traffic, should be scheduled as routine maintenance prior to the beginning of inclement weather, which is typically November 1st.

| Reporting | Asset to Report to | Pavement Keys | Reporting Units | Short Tons |
|---|---|---|---|---|

Accomplishment is reported in STN – Short Tons.

STN (Short Tons) is equal to 2,000 lbs.

Accomplishment should be reported as the total of all material quantities (HMA, asphalt emulsion, etc.) added together.

This activity is for permanent patching of the roadway which requires additional work such as squaring the patch area and the use of asphalt emulsion for a tack coat.

If the distressed area is simply patched with material and compacted, it should be reported to Activity 2011 – Temporary Shallow Patching.

If the pavement is removed to the sub-grade and replaced or if a portion of the sub-grade is removed and replaced along with the pavement during the patching operation, it should be reported to Activity 2020 – Deep Patching.

For additional work order reporting guidance see the Work Orders section of the Preface

**Crew Size** 4 - 6 Workers

| | QTY |
|---|---|
| Truck Driver/Laborer | 2 |
| Laborer | 2 – 4 |

Note: Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | QTY |
|---|---|
| Asphalt Storage Trailer | 1 |
| Compactor/Roller | 1 |
| Skid Loader/Grinder | 1 |
| Hand Tools (See Special Considerations) | 1 |
| Mastic Heater | 1 |
| Asphalt Recycler | 1 |
| Spray Injection Patcher (Durapatcher) | 1 |

Note: Traffic Control Equipment is NOT shown here

**P.P.E.**

1) Base P.P.E.
2) Approved APF 10 Respirator (See "Silicosis Awareness")

**Materials**

HMA Surface – Type B (STN – Short Ton)
INDOT Spec Section 902.01 (a)

Aggregate (STN – Short Ton)
INDOT Spec Section 904

Asphalt Emulsion (STN – Short Ton)
INDOT Spec Section 902.01 (b)

Mastic Material (Boxes)

Asphalt Recycle (Bags)

Surface Aggregate – See Manufacturer's recommendations

Specialty Patching Material – See Manufacturer's recommendations

**Other References**

Silica Exposure Control Plan (WPS Preface)

**Sub Activities**

| Average Daily Production | 4 STN – Short Tons | EFFECTIVE DATE | 2/12/2024 |
|---|---|---|---|

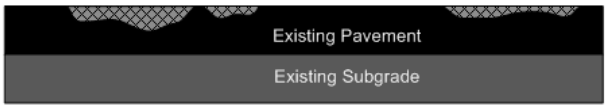
| ACTIVITY | Permanent Shallow Patching | CODE | 2010 |
|---|---|---|---|

**Work Method**

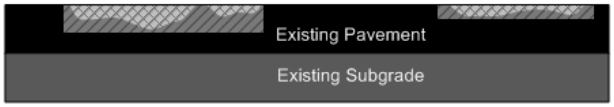
1. Place signs and safety devices.

**Using an Asphalt Storage Trailer**

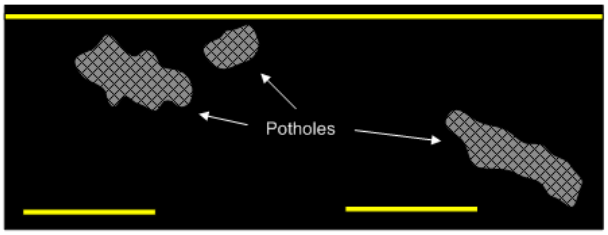
2. Use a pavement saw, grinder or jackhammer to cut a rectangular outline of the patch area.



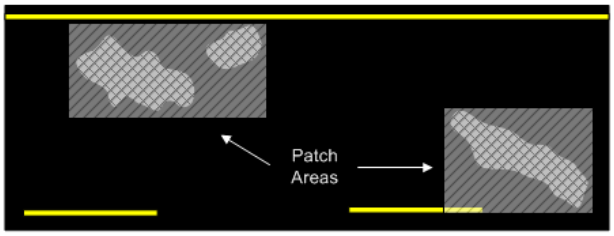

Elevation View




Elevation View

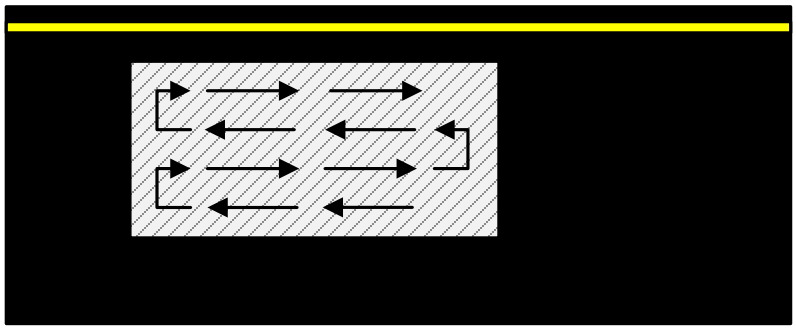



Plan View




Plan View

3. Remove all old material from the patch area.
4. Tack both the bottom and the sides of the patch area with asphalt emulsion.
5. Place asphalt in the patch in appropriate lifts.
   - For intermediate asphalt, 2 – 4 inches per lift
   - For surface asphalt, 1 – 2 inches per lift
6. Compact each lift with a roller or vibratory compactor for large patches or a hand tamper for small patches.
7. On the final lift, lute the top of the patch slightly higher than the surrounding pavement before compacting it.
8. When compacting, roll and vibrate (if possible) the asphalt longitudinally with the lane starting at high side and working toward the low side with overlapping passes.



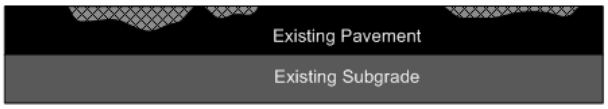
9. The surface should be flush to within ¼” higher than the original pavement after compaction.
10. Remove all signs and safety devices.

| ACTIVITY | Permanent Shallow Patching | CODE | 2010 |
|---|---|---|---|

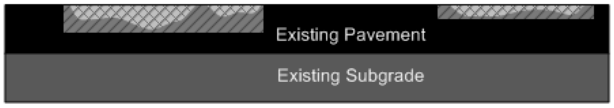
**Work Method (continued)**

**Using a Spray Injection Patcher**

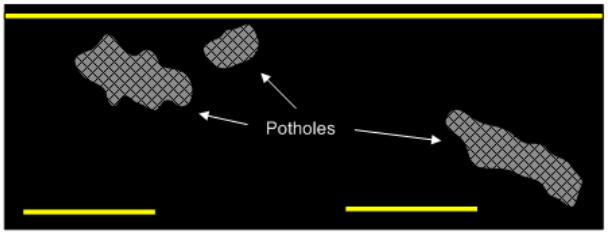
2. Use a pavement saw, grinder or jackhammer to cut a rectangular outline of the patch area.



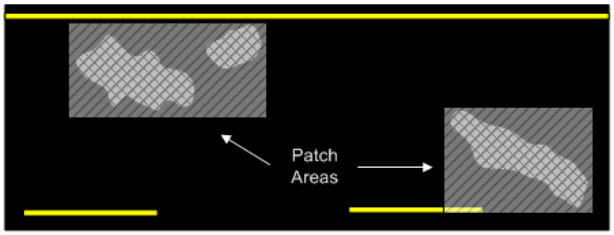

Elevation View




Elevation View




Plan View




Plan View

3. Blow water and any loose debris from the patch area.
4. Tack both the bottom and the sides of the patch area with asphalt emulsion.
5. Spray the asphalt emulsion and aggregate mixture into the patch area.
6. Cover the asphalt emulsion and aggregate mixture with a thin layer of uncoated aggregate.
7. Remove all signs and safety devices.

**HMA Recycling**

Note: Also refer to images below as you review the instructions.

1. After machine is started and chute is in position dump millings or unused asphalt into chute. The vibrator button should be periodically pushed to move all the millings/asphalt into the drum.
2. Raise the chute and lock into position after all millings/asphalt are in drum.
3. Put burner into position for heating and start it by following operating manual instructions.
4. Heat asphalt to remove excess moisture.
5. After excess moisture is removed, exhaust will change from steam to smoke (bluish), add the asphalt cement.
    a. If the material used is surface millings should use 2 to 3, or more bags, of asphalt recycler. The amount of asphalt recycler used should be based upon consistency of the mix.
    b. If the material used is hot mix asphalt that had not been previously placed should use 1 to 2, or more, bags of asphalt recycler. The amount of asphalt recycler should be based upon the consistency of the mix.
6. After machine is started and chute is in position dump millings or unused asphalt into chute. The vibrator button should be periodically pushed to move all the millings/asphalt into the drum.
7. Raise the chute and lock into position after all millings/asphalt are in drum.

| ACTIVITY | Permanent Shallow Patching | CODE | 2010 |
|---|---|---|---|

**Work Method (continued)**

**HMA Recycling (cont.)**

Note: Also refer to images below as you review the instructions.

8. Put burner into position for heating and start it by following operating manual instructions.
9. Heat asphalt to remove excess moisture.
10. After excess moisture is removed, exhaust will change from steam to smoke (bluish), add the asphalt cement.

a. If the material used is surface millings should use 2 to 3, or more bags, of asphalt recycle. The amount of asphalt recycler used should be based upon consistency of the mix.

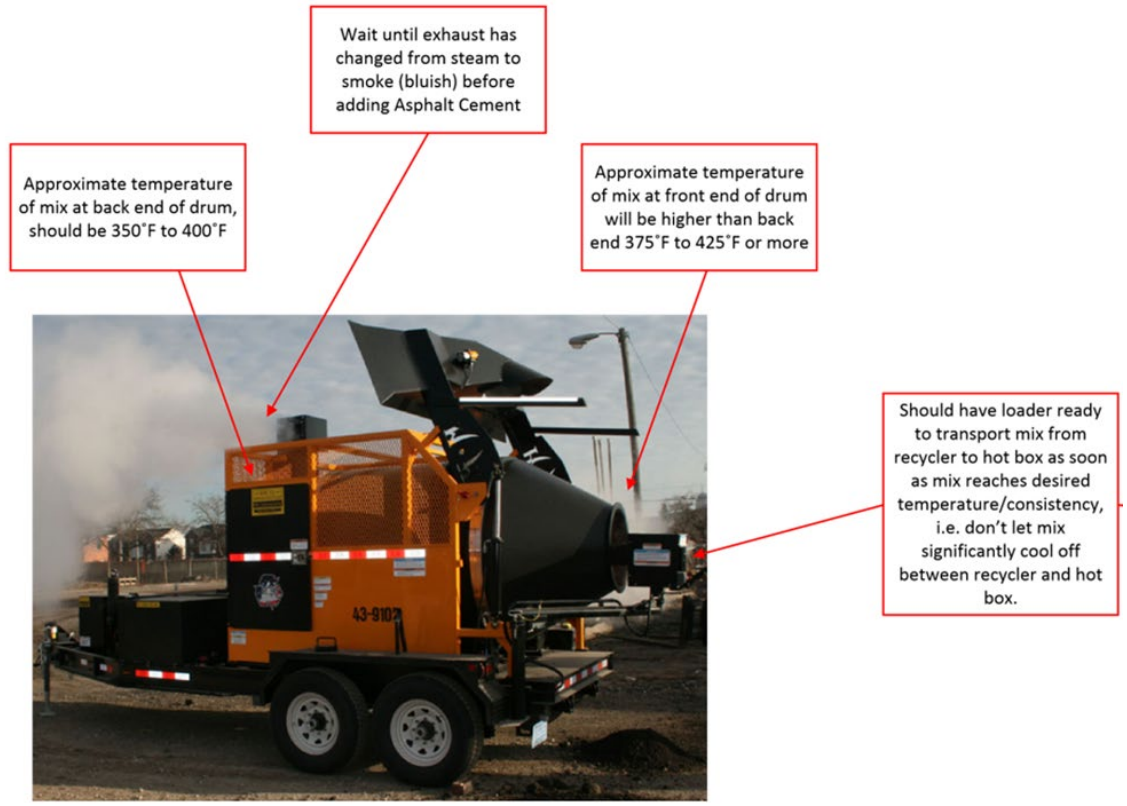
b. If the material used is hot mix asphalt that had not been previously placed should use 1 to 2, or more, bags of asphalt recycler. The amount of asphalt recycler should be based upon the consistency of the mix.

11. Heat the mix until the temperature at the back of the drum is between 350˚F and 400˚F.
12. Shut off the burner and move back into storage position in accordance with the operating manual instructions.
13. Dump mix into loader and move to hot box. Do not delay the movement of the mix into the hot box. (Hot box should be heated and prepared to accept mix prior to movement of mix.)
14. Maintain temperature of mix in hot box at 320˚F to 330˚F.
15. Take hot box to site and start patching.

| ACTIVITY | Permanent Shallow Patching | CODE | 2010 |
|---|---|---|---|

**Work Method (continued)**

**HMA Recycling (cont.)**




**Mastic Installation**

1. Use a pavement saw, grinder or jackhammer to cut a rectangular outline of the patch area.
2. The surface should be clean, dry and sound before placing mastic. Clean area of dirt and debris using compressed air and if all debris or dust coatings are not removed additional cleaning procedures such as cleaning with a stiff broom or sandblasting are required.
3. Pavement must be at least 40º Fahrenheit (4º Celsius) prior to installation. If pavement is less than this minimum requirement, it can be heated using a heat lance
4. Melting and heating of the mastic should be performed in accordance with the manufacturer's recommendations.
5. After the mastic is melted and heated, it can be applied directly onto the repair area in accordance with the manufacturer's recommendations.

| ACTIVITY | Permanent Shallow Patching | CODE | 2010 |
|---|---|---|---|

## Work Method (continued)

**Mastic Installation (cont.)**

6. For installations of mastic deeper than 2 inches the mastic shall be installed in layers not exceeding 2 inches thick and allowed to cool between installation of layers. Mastic requires 30 to 60 minutes of cooling for each 1 inch of material. For faster cooling apply ice or cool water. Additional aggregates may be added to speed cooling and improve stability for layers over 2 inches thick in accordance with the manufacturer's recommendations.
7. The minimum installed thickness is 3/8 inches.
8. Immediately following application of each layer of mastic it should be leveled and smoothed using a metal squeegee. The metal squeegee should be heated so the mastic does not adhere to it.
9. Mastic does not require compaction and the final layer should be applied smooth and level with the surrounding pavement surface. Use a heated metal squeegee to level the material with the surrounding surface.
10. If improved skid resistance is desired add surface aggregate in accordance with the manufacturer's recommendations.
11. Repaired area is safe to allow traffic on once it has cooled and solidified sufficiently to support loads.

**Specialty Patching Materials**

1. Specialty patching materials should be placed in accordance with the manufacturer's recommendations for use.

## Silicosis Awareness

All efforts should be made to eliminate/reduce the generation of dust while performing this activity, specifically pavement sawing and grinding. A wet saw should be used, or if not available, manually spray water to control dust.

If the generation of dust cannot be eliminated through use of water or other controls, then workers operating the saw or within 20' must wear an approved facepiece respirator that that are fit tested to wear

## Special Considerations

- If the distressed area is prepped prior to being patched, which includes squaring the distressed area and removing any loose debris, it is permanent shallow patching. Temporary patches typically require minimal, if any, prep work and consist of placing material in the pothole and tamping it.
- Hand tools include but are not limited to the following:

| | | |
|---|---|---|
| Pavement Saw (Wet) | Jackhammer w/ Air Compressor | Lutes |
| Vibrating Plate Compactor | Rakes | Hand Tempers |
| Vibratory Compactor | Push Brooms | Shovels |

- For patches >100 feet in length, pavement markings must be re-established on the roadway within 30 days of the completion of the patching work. Inform district traffic of the location of the patch requiring re-striping immediately after the completion of the work so that the re-striping work can be done. Temporary tape can also be used to re-establish pavement markings after patching.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 4 STN – Short Tons | EFFECTIVE DATE | 2/12/2024 |

# Indiana Department of Transportation

## Activity 2010 QA Form - Permanent Shallow Patching

Asset Inventory #:_____ District/Sub/Unit:_____
Work Order #:_____ Route:_____
Date completed:_____ Intersections:_____
Date inspected:_____ Limits:_____
Inspector:_____ RP Start/End:_____
QA Window: 0-2 months

**Observations:**

1. Is the patch squared with the adjacent pavement? (excludes areas < 1 foot)
   - 0 More than one side not squared
   - 5 One side not squared
   - 10 All sides squared

2. Does the patch cover the distressed area? (excludes shoulder side for patches > 25 feet)
   - 0 Missing on more than one side
   - 5 Missing on one side
   - 15 On all sides

3. Is the patch flush with the adjacent pavement?
   - 0 > 3/4"
   - 8 ≥ 1/4" and ≤ 3/4"
   - 15 < 1/4"

4. Is the patch compacted?
   - N/A
   - 0 No
   - 10 Yes

5. Was compaction equipment used? (from the Work Order Day Card)
   - N/A
   - 0 No
   - 5 Yes

6. Was tack used on the patch? (from the Work Order Day Card)
   - 0 No
   - 10 Yes

7. Is the patch area cleaned?
   - 0 Significant loose material in the lane; piles of material on the shoulder
   - 5 Minor loose material in the lane or on the shoulder
   - 10 No loose material

8. Are pavement markings reestablished for patches > 100 feet?

N/A

0 No

5 Yes

9. Is there indication of poor drainage? (mud, pumping, water at joints)

0 Yes

5 No

**Inspector Comments:**

**Score:**

| | **Possible** | **Actual** |
|---|---|---|
| **1** | 10 | |
| **2** | 15 | |
| **3** | 15 | |
| **4** | N/A *or* 10 | |
| **5** | N/A *or 5* | |
| **6** | 10 | |
| **7** | 10 | |
| **8** | N/A *or 5* | |
| **9** | 5 | |
| **Total:** | | |

**Final % score (divide Actual by Possible):_____**

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Temporary Shallow Patching | CODE | 2011 |
|---|---|---|---|

**Purpose**

Temporary repair of minor patching of small areas of bituminous or concrete roadway or shoulder surfaces, where the depth does not extend through the width of the pavement. Temporary patching should be completed with hot or cold bituminous mixtures as well as asphalt emulsion and aggregate to correct potholes and edge failures in bituminous pavement and crack and joint spalling in concrete pavement.

**Category** Pavement & Shoulders

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Temporarily repair surface failures as soon as possible after they are reported. Temporary repairs should be made to alleviate hazardous conditions **until** permanent repairs can be made. Temporary repairs should be performed when permanent patching cannot be completed due to inclement weather conditions.

| Reporting | Asset to Report to | Pavement Keys | Reporting Units | Short Tons |
|---|---|---|---|---|

Accomplishment is reported in STN – Short Tons.

STN (Short Tons) is equal to 2,000 lbs.

Accomplishment should be reported as the total of all material quantities added together.

This activity is for filling a distressed area with material and then compacting the material.

If the patching of the roadway includes additional work such as squaring the patch area and the use of asphalt emulsion for tack coat, it should be reported to Activity 2010 – Permanent Shallow Patching.

If the pavement is removed to the subgrade and replaced or if a portion of the subgrade is removed and replaced along with the pavement during the patching operation, it should be reported to Activity 2020 – Deep Patching.

For additional work order reporting guidance see the Work Orders section of the Preface

**Crew Size** 4 - 6 Workers

| | QTY |
|---|---|
| Truck Driver/Laborer | 2 |
| Laborer | 2 – 4 |

Note: Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | QTY |
|---|---|
| Asphalt Storage Trailer | 1 |
| Compactor | 1 |
| Hand Tools (See Special Considerations) | 1 |
| Mastic Heater | 1 |
| Asphalt Recycler | 1 |
| Spray Injection Patcher (Durapatcher) | 1 |

Note: Traffic Control Equipment is NOT shown here

**P.P.E.**

1) Base P.P.E.

**Materials**

HMA Surface – Type B (STN – Short Ton)
INDOT Spec Section 902.01 (a)

Cold Mix Bituminous for Patching (STN – Short Ton)

Aggregate (STN – Short Ton)
INDOT Spec Section 904

Asphalt Emulsion (STN – Short Ton)
INDOT Spec Section 902.01 (b)

Mastic Material (Boxes)

Asphalt Recycle (Bags)

Surface Aggregate – See Manufacturer's recommendations

Specialty Patching Materials – See Manufacturer's recommendations

**Other References**

**Sub Activities**

| Average Daily Production | 3 STN – Short Tons | EFFECTIVE DATE | 2/12/2024 |
|---|---|---|---|

| ACTIVITY | Temporary Shallow Patching | CODE | 2011 |
|---|---|---|---|

**Work Method**

1. Place signs and safety devices.

**Using an Asphalt Storage Trailer**

2. Remove all loose material from the patch area.
3. Place hot mix or cold mix asphalt in the patch.
4. Compact the patch using a hand tamper or a vibratory compactor.
5. Remove all signs and safety devices

**Using a Spray Injection Patcher**

6. Blow water and any loose debris from the patch area.
7. Tack both the bottom and the sides of the patch area with asphalt emulsion.
8. Spray the asphalt emulsion and aggregate mixture into the patch area.
9. Cover the asphalt emulsion and aggregate mixture with a thin layer of uncoated aggregate. The final layer should be smooth/level with the adjacent pavement.
10. Remove all signs and safety devices.

**HMA Recycling**

Note: Also refer to images below as you review the instructions.

1. After machine is started and chute is in position dump millings or unused asphalt into chute. The vibrator button should be periodically pushed to move all the millings/asphalt into the drum.
2. Raise the chute and lock into position after all millings/asphalt are in drum.
3. Put burner into position for heating and start it by following operating manual instructions.
4. Heat asphalt to remove excess moisture.
5. After excess moisture is removed, exhaust will change from steam to smoke (bluish), add the asphalt cement.
    a. If the material used is surface millings should use 2 to 3, or more bags, of asphalt recycler. The amount of asphalt recycler used should be based upon consistency of the mix.
    b. If the material used is hot mix asphalt that had not been previously placed should use 1 to 2, or more, bags of asphalt recycler. The amount of asphalt recycler should be based upon the consistency of the mix.
6. After machine is started and chute is in position dump millings or unused asphalt into chute. The vibrator button should be periodically pushed to move all the millings/asphalt into the drum.
7. Raise the chute and lock into position after all millings/asphalt are in drum.

| ACTIVITY | Temporary Shallow Patching | CODE | 2011 |
|---|---|---|---|

**Work Method (cont.)**

**HMA Recycling (cont.)**

Note: Also refer to images below as you review the instructions.

8. Put burner into position for heating and start it by following operating manual instructions.
9. Heat asphalt to remove excess moisture.
10. After excess moisture is removed, exhaust will change from steam to smoke (bluish), add the asphalt cement.

a. If the material used is surface millings should use 2 to 3, or more bags, of asphalt recycle. The amount of asphalt recycler used should be based upon consistency of the mix.

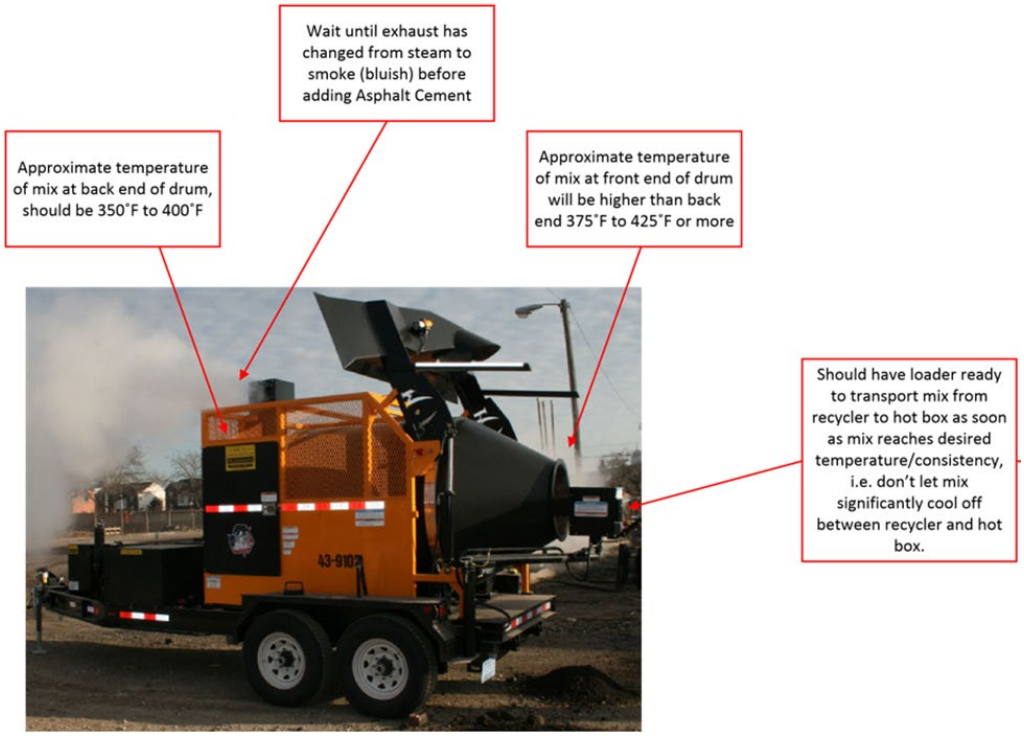
b. If the material used is hot mix asphalt that had not been previously placed should use 1 to 2, or more, bags of asphalt recycler. The amount of asphalt recycler should be based upon the consistency of the mix.

11. Heat the mix until the temperature at the back of the drum is between 350˚F and 400˚F.
12. Shut off the burner and move back into storage position in accordance with the operating manual instructions.
13. Dump mix into loader and move to hot box. Do not delay the movement of the mix into the hot box. (Hot box should be heated and prepared to accept mix prior to movement of mix.)
14. Maintain temperature of mix in hot box at 320˚F to 330˚F.
15. Take hot box to site and start patching.

| ACTIVITY | Temporary Shallow Patching | CODE | 2011 |
|---|---|---|---|

**Work Method (cont.)**

**HMA Recycling (cont.)**




**Mastic Installation**

1. The surface should be clean, dry and sound before placing mastic. Clean area of dirt and debris using compressed air and if all debris or dust coatings are not removed additional cleaning procedures such as cleaning with a stiff broom or sandblasting are required.
2. Pavement must be at least 40º Fahrenheit (4º Celsius) prior to installation. If pavement is less than this minimum requirement, it can be heated using a heat lance
3. Melting and heating of the mastic should be performed in accordance with the manufacturer's recommendations.
4. After the mastic is melted and heated, it can be applied directly onto the repair area in accordance with the manufacturer's recommendations.
5. For installations of mastic deeper than 2 inches the mastic shall be installed in layers not exceeding 2 inches thick and allowed to cool between installation of layers. Mastic requires 30 to 60 minutes of cooling for each 1 inch of material. For faster cooling apply ice or cool water. Additional aggregates may be added to speed cooling and improve stability for layers over 2 inches thick in accordance with the manufacturer's recommendations.

| ACTIVITY | Temporary Shallow Patching | CODE | 2011 |
|---|---|---|---|

**Work Method (cont.)**

**Mastic Installation (cont.)**

6. The minimum installed thickness is 3/8 inches.
7. Immediately following application of each layer of mastic it should be leveled and smoothed using a metal squeegee. The metal squeegee should be heated so the mastic does not adhere to it.
8. Mastic does not require compaction and the final layer should be applied smooth and level with the surrounding pavement surface. Use a heated metal squeegee to level the material with the surrounding surface.
9. If improved skid resistance is desired add surface aggregate in accordance with the manufacturer's recommendations.
10. Repaired area is safe to allow traffic on once it has cooled and solidified sufficiently to support loads.

**Specialty Patching Materials**

1. Specialty patching materials should be placed in accordance with manufacturer's recommendations for use.

| ACTIVITY | Temporary Shallow Patching | CODE | 2011 |
|---|---|---|---|

**Special Considerations**

Do **NOT** heat the cold mix **above** 100°F as it will damage the material and affect the longevity of the patch.

Proper compaction can **NOT** be achieved by the back of a shovel.

If the distressed area is prepped prior to being patched, which includes squaring the distressed area and removing any loose debris, it is permanent shallow patching (Activity 2010). Temporary patches typically require minimal, if any, prep work and consist of placing material in the pothole and tamping it.

Hand tools include but are not be limited to the following:

- Pavement saw
- Jackhammer with air compressor
- Vibratory compactor
- Vibrating plate
- Shovels
- Rakes
- Push brooms
- Lutes
- Hand tampers

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 3 STN – Short Tons | EFFECTIVE DATE | 2/12/2024 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Deep Patching | CODE | 2020 |
|---|---|---|---|

**Purpose**

Major patching of the roadway surface and paved shoulders to correct extensive surface failures caused by base failures, blowups or settlement in all pavement types is categorized as a deep patch. The full depth removal of the surface and base material is required along with replacement of compacted hot mix asphalt or Portland cement concrete.

**Category** Pavement & Shoulders

- ☐ **PM**
- ☒ **QA**
- ☒ **Plan Location**

**Scheduling & Coordination**

Schedule the repair of major surface failures or distortions caused by base failures as soon as possible after the failures are reported. Prior to removal of the distressed pavement, ensure the base is completely thawed and that the temperature is suitable for the placement of hot mix asphalt. If excavation equipment is needed, then the location should be reported with Indiana 811.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Short Tons |
|---|---|---|---|---|---|

Accomplishment is reported in STN – Short Tons.

All materials should be reported on the work order.

If patching is less than 100 feet, the patching should be reported to Activity 2020 – Deep Patching. If patching is greater than 100 feet, the patching should be reported to Activity 2991 – Major Surface/Shoulder Improvements.

For additional work order reporting guidance see the Work Orders section of the Preface.

| Average Daily Production | 11 STN – Short Tons | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Deep Patching | CODE | 2020 |
|---|---|---|---|

**Crew Size:** 4 – 7 Workers

| | QTY |
|---|---|
| Excavator Operator | 1 |
| Laborers | 3 – 6 |

Note: Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | QTY |
|---|---|
| Excavator/Backhoe | 1 |
| Dump Truck | 1 – 2 |
| Pavement Saw | 1 |
| Air Compressor | 1 |
| Jackhammer | 1 – 2 |
| Compactor | 1 |
| Vibratory Roller | 1 |
| Hand Tools (See Special Considerations) | |

Note: Traffic Control Equipment is NOT shown here

**P.P.E.**

1) Base P.P.E.
2) Approved APF 10 Respirator (See "Silicosis Awareness")

**Materials**

Aggregate (See Special Considerations)
(STN – Short Ton) INDOT Spec Section 904

Tack Coat (See Special Considerations)
(STN – Short Ton) INDOT Spec Section 406

HMA Base (See Special Considerations)
(STN – Short Tons) INDOT Spec Section 902.01 (a)

HMA Surface (See Special Considerations)
(STN – Short Tons) INDOT Spec Section 902.01 (a)

Geogrid (Type II) (See Special Considerations)
(YDK – Square Yards) INDOT Spec Section 918.05

**Other References**

Highway Maintenance Field Reference Manual

INDOT Spec Section 400

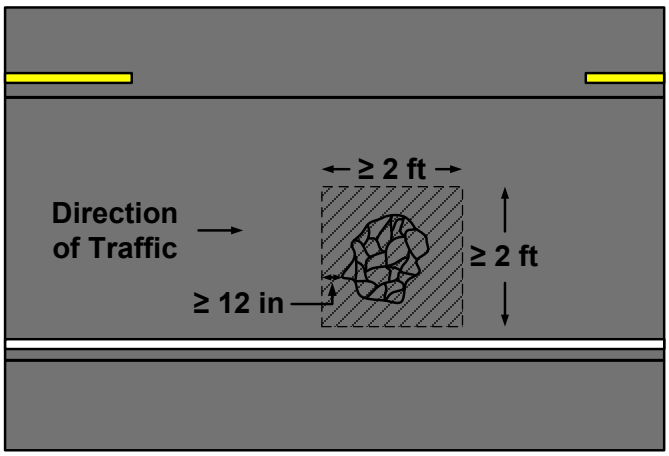
Silica Exposure Control Plan (WPS Preface)

**Sub Activities**

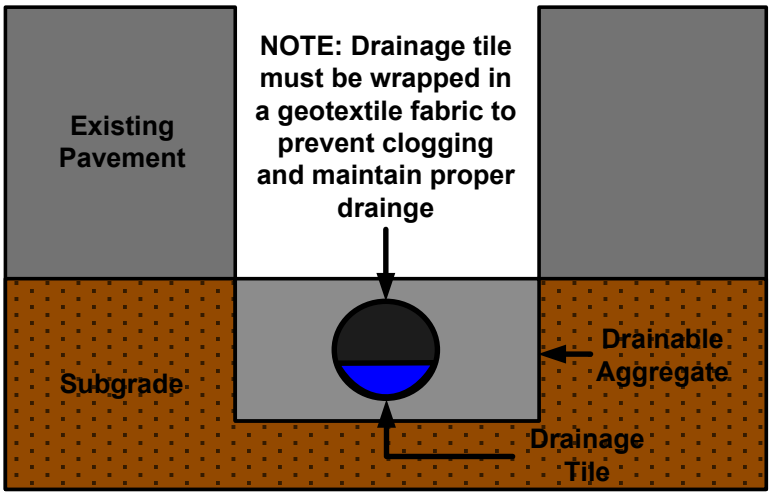
**Work Method**

1. After calling in the location with Indiana 811 at least two days prior, place signs and safety devices.

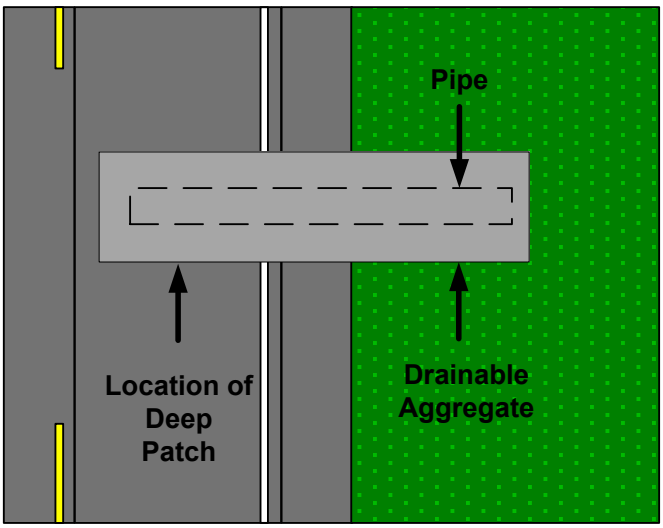
2. Mark the area to be patched with marking paint. The minimum patch dimension should be 2 feet; therefore, the minimum size of a patch should be 2 feet by 2 feet. The area should be at right angles to the direction of traffic. It should also extend at least 12 inches beyond the distressed pavement on each side of the patch to ensure the repair adjoins solid pavement. Cut the pavement with a pavement saw. If possible, the cut should extend through the entire thickness of the pavement.



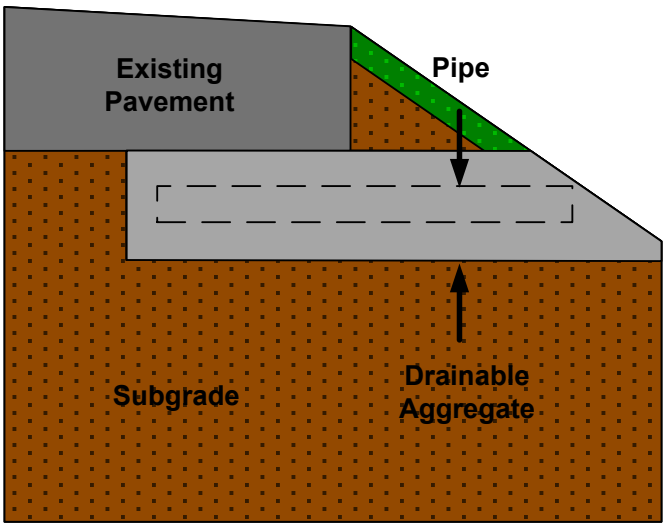
3. Excavate the distressed area to the depth of the pavement. If any subsurface water is present, a French drain may need to be installed to collect the water and remove it from underneath the pavement. The drain should be installed at the correct elevation to ensure that the water is properly draining. The pipe should be a plastic, perforated drainage tile wrapped in geotextile fabric. The geotextile fabric will prevent silt from clogging the perforations in the pipe. The area surrounding the pipe should be backfilled with an open graded ("drainable") aggregate such as #2s to allow the water to penetrate the pipe. The pipe and aggregate should extend to the ditch line to allow for proper drainage away from the pavement. **Please consult with the District Pavement Engineer for recommendations/approval on the proper solution.**




Elevation View

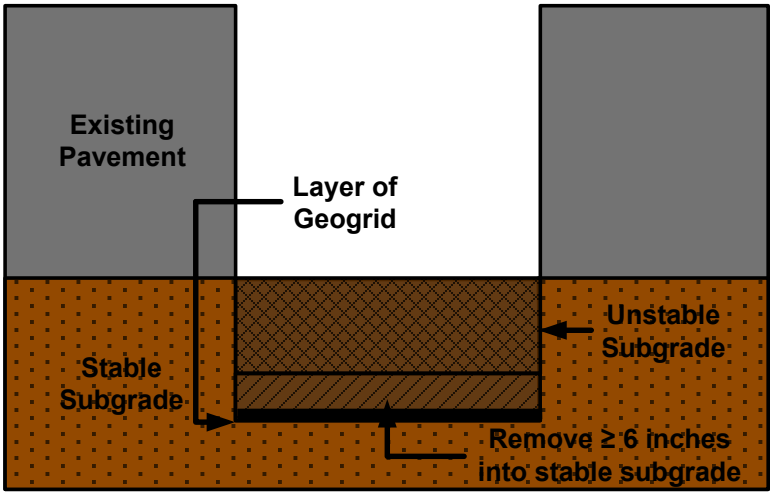



Plan View



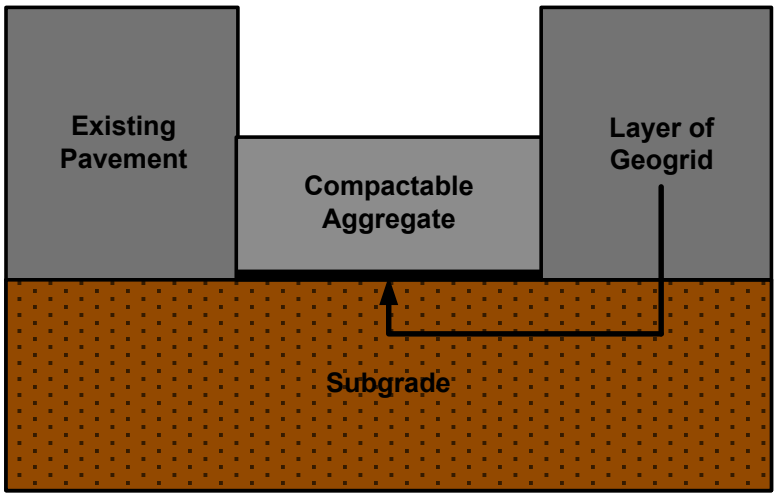

Side View

4. If the excavation reveals that the subgrade is unstable, then remove at least 6 inches of the subgrade until a stable subgrade is found. If any of the subgrade is removed, place geogrid over the existing subgrade before placing dense-graded ("compactable") aggregate such as #53s to reestablish the excavated subgrade.

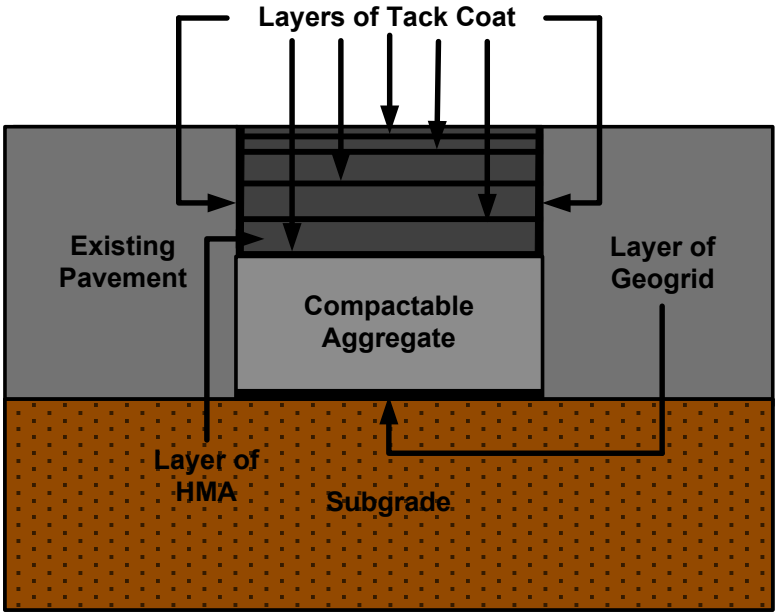



5. Ensure the sides of the excavated area are vertical and are adjoining reasonably sound pavement.

6. Prior to placing the new pavement, apply a layer of geogrid to the base of the patch. If multiple sections of geogrid are required to cover the subgrade, make sure to overlap the geogrid at least 12 inches but no more than 24 inches on all sides. Place dense-graded ("compactable") aggregate in appropriate lifts until the lifts reach the bottom of the existing HMA pavement.




7. Apply a tack coat to the base of the excavated area as well as on all vertical faces. Make sure to apply tack coat between each lift of hot mix asphalt (HMA). Proper coverage is uniform and covers the entire surface.




8. Place the HMA in the patch area ensuring to maintain the appropriate lift depths. The depth of the lift is dependent on the size of the aggregate in the mixture not the type of mixture. For instance, HMA Intermediate – 9.5mm has a lift thickness of 1 – 2 inches while a HMA Intermediate – 19.0 mm has a lift thickness of 2 – 4 inches. Please check with the HMA producer to ensure the appropriate HMA is used for the corresponding HMA lifts. Place sufficient material to allow for compaction of the asphalt. Asphalt that is compacted under proper compaction techniques will compact ¼" for every 1" of material. For instance, if 2 inches of HMA is desired after compaction, place 2 ½ inches of HMA.

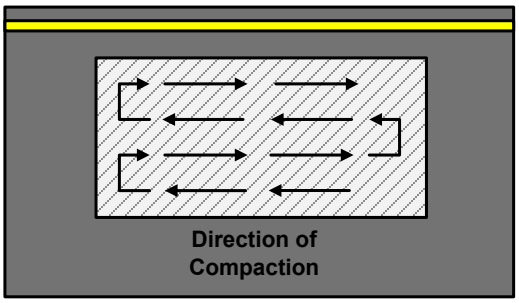
| Lift Thicknesses Based on HMA Size | | |
|---|---|---|
| HMA Aggregate Size | Minimum Thickness (inches) | Maximum Thickness (inches) |
| 9.5 mm | 1.0 | 2.0 |
| 12.5 mm | 1.5 | 3.0 |
| 19.0 mm | 2.0 | 4.0 |
| 25.0 mm | 3.0 | 6.0 |

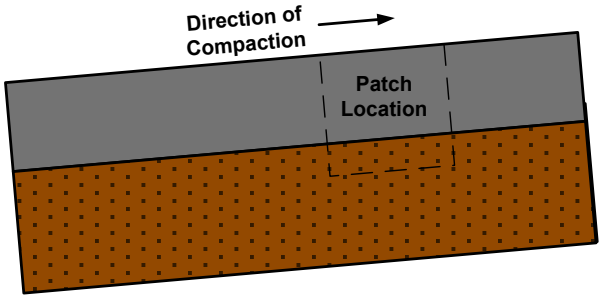
Place the HMA against the edges of the excavated area first. Avoid pulling the HMA from the center to the edges of the patch. If more material is needed at the edge of the patch, place more material at the edge and rake the excess away from the edge.

| ACTIVITY | Deep Patching | CODE | 2020 |
|---|---|---|---|

## Work Method (continued)

9. Compact each lift. The type of compaction equipment used should be suitable to the size of the job. A vibratory roller will provide the best compaction and should be used whenever possible, especially on large patching locations. A jumping jack compactor is acceptable for small patching locations. A vibratory plate compactor is not a preferred method for achieving compaction and should only be used on the final lift if there is no vibratory roller available.




If the patch location is on a grade, start the compaction on the lower end of the grade and compact toward the higher end to minimize the chance of shoving the asphalt.

10. Remove all excess debris and excavated material from the jobsite.

11. Remove all signs and safety devices.

## Silicosis Awareness

All efforts should be made to eliminate/reduce the generation of dust while performing this activity, specifically pavement sawing. A wet saw should be used, or if not available, manually spray water to control dust.

If the generation of dust cannot be eliminated through use of water or other controls, then workers operating the saw or within 20’ must wear an approved facepiece respirator that they are fit tested to wear.

## Special Considerations

- Indiana 811 should be notified at least two days prior to any excavation.
- All deep patching done on the interstate should have approval from the District Pavement Engineer prior to beginning the work.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 11 STN – Short Tons | EFFECTIVE DATE | 7/12/2023 |

# Indiana Department of Transportation

## Activity 2020 QA Form - Deep Patching

Asset Inventory #:_____ District/Sub/Unit:_____
Work Order #:_____ Route:_____
Date completed:_____ Intersections:_____
Date inspected:_____ Limits:_____
Inspector:_____ RP Start/End:_____
QA Window: 0-2 months

**Observations:**

1. Is the patch squared with the adjacent pavement? (excludes areas < 1 foot)
   - 0 More than one side not squared
   - 5 One side not squared
   - 10 All sides squared

2. Does the patch cover the distressed area? (excludes shoulder side for patches > 25 feet)
   - 0 Missing on more than one side
   - 5 Missing on one side
   - 15 On all sides

3. Is the patch flush with the adjacent pavement?
   - 0 > 3/4"
   - 8 ≥ 1/4" and ≤ 3/4"
   - 15 < 1/4"

4. Is the patch compacted?
   - 0 No
   - 10 Yes

5. Was compaction equipment used? (from the Work Order Day Card)
   - 0 No
   - 5 Yes

6. Was emulsion used on the patch? (from the Work Order Day Card)
   - 0 No
   - 10 Yes

7. Is the patch area cleaned?
   - 0 Significant loose material in the lane; piles of material on the shoulder
   - 5 Minor loose material in the lane or on the shoulder
   - 10 No loose material

8. Are pavement markings reestablished for patches > 100 feet?

N/A

0 No

5 Yes

9. Is there indication of poor drainage? (mud, pumping, water at joints)

0 Yes

5 No

**Inspector Comments:**

**Score:**

| | **Possible** | **Actual** |
|---|---|---|
| **1** | 10 | |
| **2** | 15 | |
| **3** | 15 | |
| **4** | 10 | |
| **5** | 5 | |
| **6** | 10 | |
| **7** | 10 | |
| **8** | N/A *or 5* | |
| **9** | 5 | |
| **Total:** | | |

**Final % score (divide Actual by Possible):_____**

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# BEST PRACTICES FOR LETTING HMA COOL

## ACTIVITIES 2010, 2020, 2030

To assist in determining the appropriate cooling methods, the Division of Maintenance has put together best practices for HMA cooling prior to allowing traffic. Below is a website that can be utilized when determining the appropriate cooling times for HMA, given the current conditions at the site.

https://www.eng.auburn.edu/users/timmdav/MultiCool/FinalRelease/Main.html.

Best Practices:

- The best cooling practices, for a permanent fix or an interim fix, is to let the HMA cool on its own and check temperatures at the site after the HMA is placed and do not cool the HMA with water. It is imperative that any permanent fix follows this practice for cooling, since rapid cooling could be detrimental to the HMA (See "CAUTION" note below).
- To return traffic on the HMA the temperature should be 175°F or less
- HMA mixture will resist compaction within the temperature range of 170°F -180°F
- For a patch that would be considered an interim fix until a more permanent fix is in place, cooling with water may be applicable to return the traffic sooner. Just ensure that rolling and compacting is done PRIOR to placing water. Also, if the patch involves multiple lifts, it is important that any standing water or steam has been removed so that the next lift is not placed on standing water or steam is trapped between lifts.
    - CAUTION: Cooling with water may be detrimental to the HMA performance as it could cool the HMA too quickly and cause density issues, or if water is applied at or above 212°F a steam may form as the water is boiled off and may cause raveling or rutting if the bond is broken between the asphalt cement and the aggregate. If the bond is not broken the steam could still cause premature aging of the asphalt and create a cracking issue with the pavement.

The following are examples from the above website:

- 9AM, 80 degree day, humid and hazy, 5 mph wind speed, 1.5" HMA on granular base, 300 degree initial temp takes 23 minutes to cool to 175 degrees
- 3PM, 75 degree day, clear and dry, 10 mph wind speed, 2" HMA on concrete, 300 degree initial temp takes 32 minutes to cool to 175 degrees.
- 2PM, 65 degree day, mostly cloudy, 15 mph wind speed, 3" HMA on granular base, 300 degree initial temp takes 43 minutes to cool to 175 degrees

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Spot Paving | CODE | 2030 |
|---|---|---|---|

**Purpose**

Spot paving is used to report machine paving of isolated areas of bituminous or concrete roadway and shoulder surfaces. Hot bituminous mixtures are applied to correct depressions at bridge ends, surface failures, and depressions caused by settlement at pipe replacements and deep patches.

**Category** Pavement & Shoulders

- ☐ PM
- ☒ QA
- ☒ Plan Location

**Scheduling & Coordination**

Schedule the repair of those deficiencies causing a hazardous ride at the posted speed limit. Paving of long sections to correct minor crown deficiencies, settlement between paved shoulder and road surfaces, rutting and grade depressions should be scheduled by material and equipment availability. Do not do within 2 years of upcoming road project.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Short Tons |
|---|---|---|---|---|---|

Accomplishment shall be reported in tons of HMA and tack placed.

New pavement in new locations, such as turn lanes or deceleration lanes are reported to Activity 2991- Major Surface/Shoulder Improvements

Continuous paving greater than ½ mile would be considered a “capital project” and should be reported to Activity 2991- Major Surface/Shoulder Improvements

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** 8-13 Workers

| | QTY |
|---|---|
| Distributor Operator /Laborer | 1 |
| Truck Driver | 3 |
| Laborer | 2-7 |
| Grader or Paver Operator | 1 |
| Roller Operator | 1 |

*Traffic Control Personnel are NOT shown here

| Job Specific Equipment | QTY |
|---|---|
| Distributor/Tar Kettle | 1 |
| Dump Trucks | 3 |
| Grader or Paver | 1 |
| Roller | 1 |
| Pavement Grinder | 1 |
| Sweeper | 1 |

*Traffic Control Equipment are NOT shown here

**P.P.E.**

1) Base PPE

2) Approved APF 10 Respirator (See “Silicosis Awareness”)

**Materials**

Bituminous Mixture HMA Surface (STN- Short Ton) INDOT Spec Section 902.01(a)

Bituminous Material AE-NT (tack oil) (STN-Short Ton), or SS-1h INDOT Spec Section 902.01(b)

**Other References**

INDOT Spec Section 402.07(b) Composition Limits for HMA Wedge and Leveling Mixtures.

OM 13-05, Compliance with ADA

Silica Exposure Control Plan (WPS Preface)

**Sub Activities**

| Average Daily Production | 105 STN - Short Tons | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Spot Paving | CODE | 2030 |
|---|---|---|---|

## Work Method

1. Place signs and safety devices
2. Mark approximate limits of area to be wedged using string line or straight edge
3. Mill transition areas (Butt joints)
   Butt joints allow the pavement thickness to continue all the way to the edges and avoids feathering or thinning down asphalt to meet connections.
4. Sweep surface to remove loose material (as required)
5. Apply a bituminous tack coat on area to be leveled at ~0.07 – 0.10 gal/SYD.
6. Spread bituminous mixture in lifts of not more than 3“
7. Compact bituminous mixture
   Compaction operations will begin at low side and proceed to high side. The roller wheel shall overlap previous pass by a minimum of 6”. Roller speed shall be limited to < 3mph. Compaction temperature range is 185 °F to 300 °F
8. Make sure the final layer matches the existing surface and pavement edge. Check with a string line or straight edge to make sure the final surface will provide smooth riding
9. Clean up the work area and sweep loose material off road surface
10. Seal butt joints with asphalt emulsion.
11. Remove signs and safety devices

## Silicosis Awareness

All efforts should be made to eliminate/reduce the generation of dust while performing this activity, specifically pavement grinding. If the grinder is equipped with a water system it must be used. If not, manually spray water to control dust during grinding.

If the generation of dust cannot be eliminated through use of water or other controls, then workers operating the grinder or within 20’ must wear an approved facepiece respirator that they are fit tested to wear.

## Special Considerations

- High cost activity.
- Usage of tack coat is critical for good performance of spot paving. SS-1h and AE-NT are asphalt emulsions specifically formulated for tack. However, other emulsions may be used, such as AE-90, AE-90S, CRS-2P, or AE-F.
- AE-F is delivered diluted, so if using for tack application rates should be higher (0.10 – 0.12 gal/SYD).
- For spot paving >100 feet in length, pavement markings must be re-established on the roadway within 30 days of the completion of the patching work. Inform district traffic of the location of the spot paving requiring re-striping immediately after the completion of the work so that the re-striping work can be done. Temporary tape can also be used to re-establish pavement markings after spot paving.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 105 STN - Short Tons | EFFECTIVE DATE | 7/12/2023 |

# Indiana Department of Transportation

## Activity 2030 QA Form - Spot Paving

Asset Inventory #:_____ District/Sub/Unit:_____
Work Order #:_____ Route:_____
Date completed:_____ Intersections:_____
Date inspected:_____ Limits:_____
Inspector:_____ RP Start/End:_____
QA Window: 0-2 months

**Observations:**

1. Is the wedge feathered or milled in at the ends? (smooth transition)
   - 0 No feathering
   - 3 Feathered but not milled
   - 10 Milled

2. Does the wedge cover the distressed area?
   - 0 No
   - 10 Yes

3. Is the wedge feathered or milled flush at the CL joint and curbline? (where applicable)
   - 0 No
   - 10 Yes

4. Is the wedge compacted?
   - 0 No
   - 10 Yes

5. Was compaction equipment used? (from the Work Order Day Card)
   - 0 No
   - 5 Yes

6. Was emulsion used on the patch? (from the Work Order Day Card)
   - 0 No
   - 10 Yes

7. How does the wedge ride?
   - 0 Significant dips or waves, both longitudinal and transverse
   - 5 Minor ride deficiency
   - 10 Wedge rides virtually identical to the adjacent pavement

8. Is the surface uniform?
   - 0 Surface pitted, gouged by equipment, or material is missing
   - 5 No imperfections on the surface

9. Is the wedge area clean?

0 Significant amount of loose material; piles of material on the shoulder
5 No loose material

10. Is the correct material on the surface?

0 HMA Intermediate, Base, or Other
10 HMA Surface

11. Are pavement markings reestablished for patches > 100 feet?

N/A
0 No
3 Centerline only
5 Centerline and edge line

12. What is the condition of the surface?

0 Depressions or ruts > 1"
8 Depressions or ruts between 1/4" and 1", or reflective cracking
15 Uniform transverse cross section with no reflective cracking

**Inspector Comments:**

**Score:**

| | **Possible** | **Actual** |
|---|---|---|
| **1** | 10 | |
| **2** | 10 | |
| **3** | 10 | |
| **4** | 10 | |
| **5** | 5 | |
| **6** | 10 | |
| **7** | 10 | |
| **8** | 5 | |
| **9** | 5 | |
| **10** | 10 | |
| **11** | N/A *or* 5 | |
| **12** | 15 | |
| **Total:** | | |

**Final % score (divide Actual by Possible):_____**

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Seal Coat | CODE | 2050 |
|---|---|---|---|

**Purpose**

Seal coat mainline, auxiliary lanes, turn lanes, and/or shoulder pavement surface with a single application of liquid asphalt emulsion and aggregate to address longitudinal, transverse and block cracking in low to moderate severity level, as well as raveling, low severity bleeding, and prevent moisture infiltration. Dry, raveled pavements are also addressed by seal coating.

**Category** Pavement & Shoulders

- ☒ **PM**
- ☒ **QA**
- ☒ **Plan Location**

**Scheduling & Coordination**

Schedule this work in conjunction with supporting operations to be completed prior to seal coating, such as crack sealing/filling or patching. This work should be performed on areas where water is penetrating the surface but not where a structural deficiency exists. The travel lane and auxiliary/turn lanes should not be sealed by a seal coat before May 1 or after October 1. The pavement surface and ambient temperature should be over 60°F. Coordinate the pavement striping with District Traffic.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Square Yards |
|---|---|---|---|---|---|

Accomplishment is reported in YDK – Square Yards

Each road should be completed on one work order with multiple day cards.

All work involved in a seal coat is reported to 2050, but the only accomplishment reported is placing the seal coat.

Installing/removing signage (no accomplishment), installing/removing detours and closures (no accomplishment), covering/ uncovering rpm's (no accomplishment), placing seal coat (accomplishment), follow-up brooming (no accomplishment)

All equipment should be reported for the full amount of time used, which includes 24 hours/day for programmable message boards.

If the aggregate spreader can expand wide enough to cover two feet beyond the mainline edge onto the shoulder in one pass, then seal beyond mainline onto the paved shoulder. This two foot amount of the shoulder, when completed in conjunction with the mainline, should be reported to this activity. Shoulder only projects are also reported to this activity.

Record the cost and number of installed pop-up markers to the work order.

Record daily all aggregate and asphalt emulsion application rates on to "Activity 2050 - Seal Coat Application Rate Form" and attach it to the work order. Rates should be checked and recorded at least twice per day (AM/PM).

Conversion of asphalt emulsion gallons to Tons is equal to the number of gallons ÷ 236.

If a fog seal is applied after the seal coat, all work done on the road after the fog seal has started should be reported to 2051 - Fog Seal. This includes but is not limited to the cleaning of the rpm's and removal of signage.

Double or triple application seal coats are reported to Activity 2991 - Major Surface/Shoulder Improvements.

For additional work order reporting guidance see the Work Orders section of the Preface.

| Average Daily Production | 50,000 YDK – Square Yards | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Seal Coat | CODE | 2050 |
|---|---|---|---|

**Crew Size** 17 - 28 Workers

| | QTY |
|---|---|
| Distributor Operator | 2 – 3 |
| Aggregate Spreader Operator | 2 |
| Self-propelled Broom Operator | 2 – 3 |
| Pneumatic Roller Operator | 2 – 3 |
| Dump Truck Driver | 6 – 14 |
| Laborer | 3 |

Note: Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | QTY |
|---|---|
| Distributor | 2 – 3 |
| Aggregate Spreader | 1 |
| Self-propelled Broom (Wet) | 2 – 3 |
| Pneumatic Roller | 2 – 3 |
| Dump Truck | 6 – 14 |

Note: Traffic Control Equipment is NOT shown here

**P.P.E.**

1) Base P.P.E.

2) Approved APF 10 Respirator (See “Silicosis Awareness”)

**Materials**

Liquid Bituminous (AE-90S/CRS-2P) (Gal - Gallons)
INDOT Spec Section 902.01(b)

Coarse Aggregate (STN - Short Ton)
INDOT Spec Section 904

Temporary Pop-up Pavement Marker

**Other References**

Treatment Guidelines for Pavement Preservation

INDOT Standard Specification Section 404

Operations Memorandum 16-01 – Asphalt Emulsion Sampling Procedure for Chip/Fog Seal Activities

OM14-03 - Seal Coat Operational Guidelines

OM 6-01 - Use of Worksite Speed Limit Signs

Silica Exposure Control Plan (WPS Preface)

**Sub Activities**

86- PPI- Pavement Preservation

| ACTIVITY | Seal Coat | CODE | 2050 |
|---|---|---|---|

## Work Method

1. Prior to the start of the job, place all necessary signs and traffic control devices for any closures and detours. Coordinate the chip seal schedule from beginning to end with Traffic. Closing a road is the preferred traffic control method for chip seal work. Work should be planned and scheduled so that the road is closed (with barricades up), chip sealed, fog sealed, and final markings are applied prior to re-opening the road to the public. This work should be done as expediently as possible.

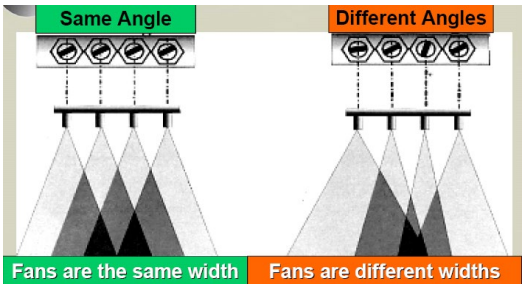
2. Place all necessary signs and traffic control devices for road construction. See “Signage” section below for more detailed sign information.

3. Close the road/lane to traffic. If the chip seal will be constructed under traffic, the use of a pilot vehicle to control traffic speeds is encouraged.

4. Sweep the roadway surface of any loose debris in front of the distributors.

5. Install temporary pop-up rpm reflectors, if necessary. Cover all rpms, castings and detector housings with sand or temporary tape. For roads that are going to have a second seal coat application after one seal coat has already been applied, the removal and replacement of RPMs on that roadway should be considered. The replacement of RPMs after the second seal coat application should be coordinated with Technical Services. If RPMs are to be replaced on an upcoming contract, they should be removed and the holes where they were installed should be patched prior to placing the seal coat. Patch the pavement with hot mix asphalt (HMA) in conjunction with a tack coat or aggregate and emulsion used with a durapatcher to ensure a good bond between the patch material and the pavement. Mastic may also be used to patch the pavement. Cold mix should not be used.

6. Spray heated (≈ 150°F) asphalt emulsion (i.e. AE-90S) at the appropriate rate to match the speed of the aggregate spreader. Apply even coverage while avoiding excessive stops as much as possible, to prevent unnecessary joints. Ensure that the nozzles are orientated at the same angle to achieve even application.

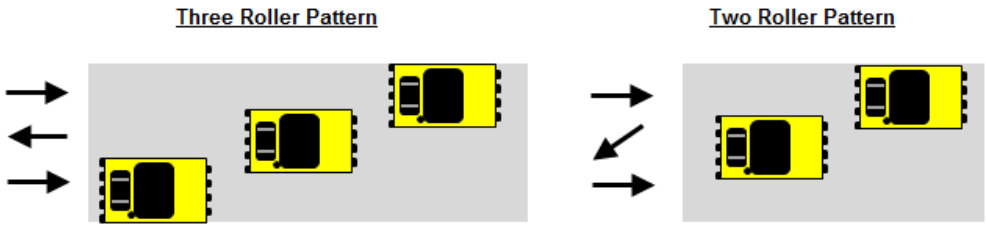



7. **<u>Within 1 minute</u>**, spread a single layer of aggregate onto the asphalt emulsion. Do **<u>NOT</u>** allow the asphalt emulsion to break before the aggregate is spread onto the roadway to allow for proper embedment of the aggregate.

| | Typical Application Rates | |
|---|---|---|
| Material | Aggregate | Asphalt Emulsion |
| SC 11 | 16 - 20 lb/yd² | 0.36 - 0.40 gal/yd² |
| SC 12 | 14 - 17 lb/yd² | 0.29 - 0.33 gal/yd² |
| SC 16 | 18 - 20 lb/yd² | 0.36 - 0.40 gal/yd² |

8. The first pneumatic roller pass should be completed **within 2 minutes** of the aggregate being applied.

9. The pneumatic rollers should make **at least 3 passes** with the final rolling taking place **within 30 minutes** of the aggregate application.




10. **No later than the morning after placement chip seal**, the road surface should be swept to remove excess aggregate from the pavement. Pavement can be swept the same day as the seal coat application is performed, as long as care is taken not to dislodge any aggregate from the pavement. Sweeping should be halted immediately if there is evidence of dislodged aggregate.

11. If the road will be fog sealed, all future work should be reported to Activity 2051 - Fog Seal.

12. After completion of the chip seal, all rpms should be uncovered and cleaned and any lenses that were removed prior to application should be put back into their rpm castings. If RPMs were removed, replacement of the RPMs should be coordinated with District Technical Services

13. Coordinate with Traffic to schedule the painting of the final markings.

14. After the new traffic lines are painted, remove all signs and traffic control devices.

| ACTIVITY | Seal Coat | CODE | 2050 |
|---|---|---|---|

## Silicosis Awareness

All efforts should be made to eliminate/reduce the generation of dust while performing this activity, specifically pavement sweeping. A wet broom should be used, or if not available, manually spray water to control dust. The broom cab must be closed and provide filtered air.

If the generation of dust cannot be eliminated through use of water or other controls, then workers operating the broom or within 20' must wear an approved facepiece respirator that they are fit tested to wear.

## Special Considerations

Calibration of the chip seal equipment is critical to the success of the chip seal operation. The distributors (application rate), aggregate spreader (application rate) and pneumatic rollers (tire pressure and weight) should be properly calibrated **at minimum** at the beginning of the construction season.

When stockpiling SC aggregate, take care to stock the aggregate on hard surfaces away from dust or mud contamination. SC aggregate is a premium material due to it being manufactured cleaner. Loader operators need to ensure they are using proper loading techniques, which include not dipping into underlying dirt, stone or other contamination. Operators should also handle the material a minimal number of times.

CRS-2P has a different chemical composition that is incompatible with our traditional emulsions, such as AE-90S or AE-F. Residual materials **must be thoroughly cleaned** from the distributor tank and spray bar when switching to CRS-2P or from CRS-2P.

Make note of the existing pavement markings including the lane width. Coordinate with Traffic to ensure proper lane widths are striped to prevent edge deterioration.

Ensure that Customer Service, the PIO, Traffic, etc. are notified when the work plans are built, 14 calendar days prior to the start of the job and after completion of the job.

Ensure that the chip seal is entered into CARS for the duration of the job.

If fine milling of the roadway surface is considered due to issues in the application of the seal coat, District Technical Services and the District Pavement Asset Engineer should be contacted for guidance and approval of the fine milling work.

Seal coat applications using size SC12 or SC13 aggregates will require approval from the Director of Pavement Asset Management.

For roads that are going to have a second seal coat application after one seal coat has already been applied, the removal and replacement of RPMs on that roadway should be considered. Because the application of the seal coat layers changes the elevation of the pavement, the RPMs may no longer be effective due to the change in the angle of light from the headlights of vehicles reflecting off the reflective lenses. The replacement of the RPMs after the application of the second seal coat should be coordinated with District Technical Services

### Construction

The pavement must be dry with no rain expected for at least 24 hours.

Seal coat work should not be performed if the ambient temperature at the location of the work is forecast to drop below 45°F in the 48 hours following the completion of the seal coat. The low temperatures can have an adverse effect on the stone adherence of the seal coat. It is especially important to avoid performing seal coat work when low temperatures and rain are forecast in the 48 hours following the completion of the seal coat, as the rain and cold can have a greater adverse effect on the stone adhesion of the seal coat.

The pavement temperature and ambient air temperature should be **above** 60°F.

The pavement should not have wheel path rutting of ¼" or greater. Rutting of ¼" or more can cause the emulsion to bleed through the stone.

The asphalt emulsion **should be delivered** between 140°F and 185°F. The temperature should be taken at the time of delivery from the vendor's tanker. See material specifications for rejection or penalty range.

The haul trucks should stagger their wheel paths when backing to the aggregate spreader. Trucks should always avoid sharp turns on the chip seal and should limit turning around to public roads, not private driveways. The trucks also need to drive at an appropriate speed on the chip seal to minimize possible damage to vehicles. Finally, the driver should check for any aggregate leakage from the tailgate.

Self-propelled brooms should minimize down pressure that can displace embedded aggregate.

The pneumatic rollers should limit their speed to an acceptable speed that is not damaging the chip seal. An acceptable speed should not displace aggregate and includes gradual take offs, avoiding hard stops and any turns that can displace aggregate. They should also be ballasted per the manufacturer's recommendations.

When chip sealing in residential areas, try to minimize loose stone and spillages. Street sweepers are highly recommended instead of self-propelled brooms in these areas to avoid throwing aggregate into yards, sidewalks and roadside landscaping.

In most instances, a seal coat will be constructed with a single pass of the aggregate spreader per direction. If the spreader has sufficient width to cover the shoulders in the same pass, paved shoulders should be sealed 2 feet beyond the mainline edge onto the shoulder. Paved shoulders beyond 2 feet should not be seal coated unless specified by the project's pavement analysis-design as noted below.

In all instances, the entire mainline travel lane width will be chip sealed. If there is a joint between the edge of mainline and the paved shoulder, it should also be sealed.

Traffic should not be allowed on the chip seal until after the final rolling and after the asphalt emulsion has set and sufficiently cured. This is typically 45 minutes to 2 hours which is heavily dependent on the weather conditions.

| Estimated Number of Haul Trucks | |
|---|---|
| Maximum One-way Haul Distance | Number of Trucks Recommended |
| 5 | 6 |
| 10 | 10 |
| 15 | 14 |
| 20 | 19 |
| 25 | 23 |
| 30 | 27 |

**Work Zone Signage**

The following signage is required in addition to any other requirements in the current Work Zone Traffic Control Handbook. The requirements in this section will not apply if construction is done under a full road closure, where the road is not opened until final pavement markings are placed.

1. "Road Work Ahead" (W20-1) signs are to be installed at the beginning of the job in each direction, and on each side of state highway intersections, if within the project limits. Consideration should be given to install signs at other major intersections. These signs should remain in place until the final pavement markings are installed.

2. "No Center Line" (W8-12) signs are to be placed in each direction at approximate 2 mile intervals or, at minimum, both at the beginning of the job in each direction and on both sides of a state highway intersection, if within the project limits. Signs should be placed for the duration of time where no temporary markings are installed.

The following signage is encouraged, but not required:

1. Changeable message signs (CMS) may be used to provide increased emphasis, dates of construction, alternate routes, or other information. CMS messages may replace any of the signs detailed in this policy with the exception of regulatory signs.

2. "Loose Gravel" (W8-7) signs may be installed. If used, they should be placed at minimum, at the beginning of the job in each direction and on either side of a state highway intersection, if within the project limits. Signs should be in place until the final brooming of the chip seal.

3. "Work Zone Speed Limits" or "Continuous Worksite Speed Limits" may be utilized to help control speeds in the work zone. These are legally enforceable and must comply with the requirements set forth in OM 06-01-Use of Worksite Speed Limit Sign Assemblies for Maintenance Activities.

4. An advisory speed limit plaque (W13-1P) may be used, which are typically 10 MPH below the posted speed limit. If used, plaques should be placed on the "Road Work Ahead" signs but may be placed on the "No Center Line" sign. Advisory speeds are not legally enforceable.

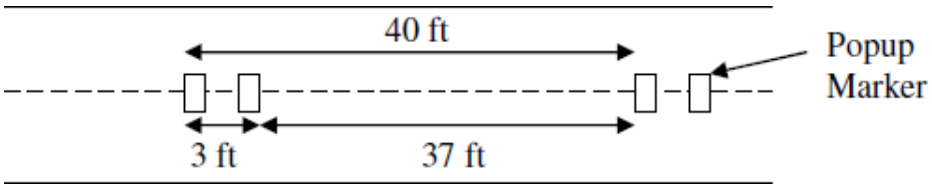
5. Speed display trailers may be used to remind the motoring public of their current speed through the jobsite. If used, they should be placed at minimum, at the beginning of the job in each direction and on either side of a state highway intersection, if within the project limits.

During construction, follow the appropriate traffic control setups as defined in the current Work Zone Traffic Control Handbook.

**Pavement Markings**

Since chip and fog seals cover existing pavement markings, temporary centerline delineation must be provided for roads with an ADT > 3,000 by utilizing one (or a combination) of the following methods. For roads < 3,000 ADT, these methods are encouraged but not required. The requirements in this section will not apply if construction is done under a full road closure, where the road is not open until final pavement markings are installed.

1. Utilize temporary pop-up chip seal markers. These should be placed on the day of construction. Pop-upmarkers shall be placed in a set of 2, spaced 3 ft longitudinally apart. The spacing between each set shall be 40 ft.




2. Provide temporary markings with either paint or removable tape. Such markings should be 4 feet long, centered on 40 foot spacing. Temporary markings should be installed within 2 calendar days of construction.

Permanent pavement markings should be re-established within 30 days of completing seal coat work. Coordinate with district traffic to inform them of the location of the work and the date that the work is finished so that they can schedule re-striping of the roadway.

# Indiana Department of Transportation

## Activity 2050 QA Form - Seal Coat

Asset Inventory #:_____ District/Sub/Unit:_____
Work Order #:_____ Route:_____
Date completed:_____ Intersections:_____
Date inspected:_____ Limits:_____
Inspector:_____ RP Start/End:_____
QA Window: 1-3 months

**Observations:**

1. Is excessive/loose stone present?
   - 0 Loose stone on mainline; significant amount of waste stone on the shoulder
   - 3 No loose stone on mainline; some waste stone on the shoulder
   - 5 No evidence of loose stone

2. Are the raised pavement markers (RPMs) protected?
   - 0 RPMs completely buried/covered
   - 10 RPMs protected but still covered/partially visible
   - 20 RPMs clean and visible; No RPMs

3. Are there permanent pavement markings?
   - 0 No pavement markings
   - 5 Temporary markings or the RPMs are clean
   - 7 Permanent markings with mismatched pattern or centerline only
   - 10 Permanent markings (edgeline, centerline, special) match existing patterns

4. Is there longitudinal bleeding in the wheelpath present?
   - 0 Excessive bleeding > 1000 feet continuous with smooth/slick surface
   - 5 Excessive bleeding < 1000 feet continuous with smooth/slick surface
   - 10 Wheelpaths darker/smoother than the rest of the lane; fair texture
   - 15 No evidence of bleeding; good macrotexture

5. Is tracking present?
   - 0 Significant tracking on side roads, driveways, and/or bridge decks
   - 3 Minor tracking on side roads, driveways, and/or bridge decks
   - 5 No evidence of tracking

6. Is there a full-width seal coat application?
   - 0 > 1 foot of the mainline unsealed
   - 5 < 1 foot of the mainline unsealed
   - 10 Mainline has a full-width seal coat

7. Is aggregate loss present?

0 > 50% aggregate loss for > 1000 feet
10 > 50% aggregate loss for < 1000 feet
15 No evidence of aggregate loss

8. Is Seal Coat Application Rate form attached to the work order?

0 No
10 Yes

9. Is there evidence of transverse joint bleeding?

0 Transverse joints are bleeding
10 Transverse joints are cleaned/neat

**Inspector Comments:**

**Score:**

| | Possible | Actual |
|---|---|---|
| **1** | 5 | |
| **2** | 20 | |
| **3** | 10 | |
| **4** | 15 | |
| **5** | 5 | |
| **6** | 10 | |
| **7** | 15 | |
| **8** | 10 | |
| **9** | 10 | |
| **Total:** | 100 | |

**Final % score (divide Actual by Possible):_____**

Reset Form

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# Seal Coat Application Rate Form

## Activity 2050

District _____ Sub-District _____ Road _____ WO # _____

| | | Weather Conditions | | | | Road Conditions | | | | Material Usage | | | | Application Rate | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | Time | Air Temperature (°F) | Sky Conditions | Wind Speed (mph) | Pavement Temperature (°F) | Lane Width (feet) | From RP | To RP | AM or PM Accomplishment (Lane Miles)[B] | Aggregate Size (#11, #12, #16) | Aggregate Type (Gravel, Limestone, etc.) | Aggregate (Tons) | Asphalt Emulsion (gallons) | Aggregate (lb/yd²) | Asphalt Emulsion (gal/yd²) | Evaluator's Initials |
| | | | | | | (A) | | | (B) | | | (C) | (D) | (E) | (F) | |
| | AM | | | | | | | | | | | | | | | |
| | PM | | | | | | | | | | | | | | | |
| | AM | | | | | | | | | | | | | | | |
| | PM | | | | | | | | | | | | | | | |
| | AM | | | | | | | | | | | | | | | |
| | PM | | | | | | | | | | | | | | | |

Comments

| Sky Conditions | Cloud Cover |
|---|---|
| Cloudy | 90 - 100% |
| Mostly Cloudy | 70 - 90% |
| Partly Cloudy/Partly Sunny | 30 - 70% |
| Mostly Sunny | 10 - 30% |
| Sunny | 0 - 10% |

Rate Calculations

Square Yards Sealed

$SY = (A \times B \times 5280) \div 9$

Aggregate Application Rate

$E = C \times 2000 \div SY$

Asphalt Emulsion Application Rate

$F = D \div SY$

***Notes:*** *A - A separate form is needed for each road unless multiple roads are done on the same work order*

*B - "AM or PM Accomplishment" is the production, in lane miles, during the AM or PM period of the workday during which the application rates are checked. The "AM or PM Accomplishment" for the AM and PM should total the daily production for the given day.*

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Fog Seal | CODE | 2051 |
|---|---|---|---|

**Purpose**

Fog seal mainline, auxiliary lanes, turn lanes, and/or shoulder pavement surface with asphalt emulsion material to remediate aging and oxidation, to lock in loose aggregate on seal coats and to prevent deterioration of the surface.

**Category** Pavement & Shoulders

- ☒ PM
- ☐ QA
- ☒ Plan Location

**Scheduling & Coordination**

Schedule this work in conjunction with supporting operations to be completed prior to fog sealing, such as crack sealing/filling, patching, roadway sweeping, herbicide spraying and seal coating. Wait a minimum of two days after a seal coat before applying the fog seal. The travel lane and auxiliary/turn lanes should not be sealed by a fog seal before May 1 or after October 1. The pavement surface and ambient temperature should be over 60°F. Coordinate the pavement striping with District Traffic.

| Reporting | Asset to Report to | Road Sections | Reporting Units | Square Yards |
|---|---|---|---|---|

Accomplishment is reported in YDK – Square Yards.

Each road should be completed on one work order with multiple day cards.

All work involved in a fog seal is reported to 2051, but the only accomplishment reported is applying the fog seal.

All work completed on the road after the fog seal has started should be reported to 2051 - Fog Seal. This includes but is not limited to the cleaning of the RPMs and removal of signage.

All equipment should be reported for the full amount of time used, which includes 24 hours/day for programmable message boards.

Conversion of asphalt emulsion gallons to Tons is equal to the number of gallons ÷ 236.

For additional work order reporting guidance see the Work Orders section of the Preface

**Crew Size** 7 – 8 Workers

| | QTY |
|---|---|
| Distributor Operator | 2 |
| Dump Truck Driver | 1 |
| Laborer | 4 – 5 |

Note: Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | QTY |
|---|---|
| Distributor | 2 |
| Self-propelled Broom | 2 – 3 |
| Dump Truck | 1 |
| Crew Cab | 1 |

Note: Traffic Control Personnel are NOT shown here

**P.P.E.**

1) Base P.P.E.

2) Approved APF 10 Respirator (See "Silicosis Awareness")

**Materials**

Liquid Bituminous (AE-F) (Gal - Gallons) INDOT Spec Section 902.01(b)

Fine Aggregate (STN - Short Ton) INDOT Spec Section 904.02

Temporary Pop-up Pavement Marker

**Other References**

Treatment Guidelines for Pavement Preservation

INDOT Standard Specification Section 412

Operations Memorandum 16-01 – Asphalt Emulsion Sampling Procedure for Chip/Fog Seal Activities

OM 14-03 - Seal Coat Operational Guidelines

OM 6-01 - Use of Worksite Speed Limit Signs

Silica Exposure Control Plan (WPS Preface)

| Sub Activities | 86- PPI- Pavement Preservation | | |
|---|---|---|---|
| Average Daily Production | 70,000 YDK – Square Yards | EFFECTIVE DATE | 7/12/2023 |

| ACTIVITY | Fog Seal | CODE | 2051 |
|---|---|---|---|

## Work Method

1. Prior to the start of the job, place all necessary signs and traffic control devices for any closures and detours. Coordinate the chip seal schedule from beginning to end with Traffic.

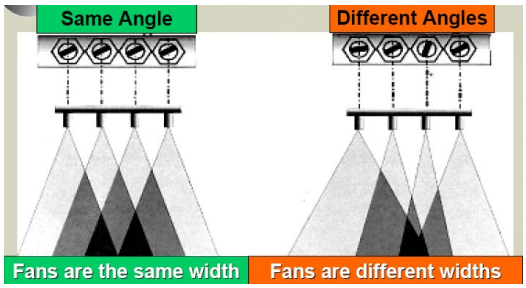
2. Place all necessary signs and traffic control devices for road construction.

3. Close the road/lane to traffic. If the fog seal will be constructed under traffic, the use of a pilot vehicle to control traffic speeds is encouraged.

4. Sweep the roadway surface of any loose debris in front of the distributors.

5. Cover all pop-up reflectors, rpms, castings and detector housings with sand or temporary tape. Reflective lenses can also be removed from rpm castings and replaced after completion of fog seal.

6. Spray heated (≈ 150°F) asphalt emulsion (i.e. AE-F) at a maximum speed of 5 mph. Apply even coverage while avoiding excessive stops as much as possible, to prevent excessive application. Ensure that the nozzles are orientated at the same angle to achieve even application. The emulsion application rate typically ranges from 0.10 gal/yd² to 0.15 gal/yd². The emulsion should be applied uniformly at a rate ± 0.02 gal/yd² of the target application rate.




7. Use sand to avoid tracking when the application coincides with pedestrian crosswalks, driveways or other areas where traffic needs to cross prior to proper curing of the asphalt emulsion.

8. Allow the asphalt emulsion sufficient time to cure before permitting traffic to drive on it. The curing time will depend on environmental factors, such as sunlight and the humidity. However, traffic can typically be released within 30 minutes of application.

9. After completion of the fog seal, all rpms should be uncovered and cleaned, and lenses removed from rpms should be placed back in their castings..

10. Coordinate with Traffic to schedule the painting of the final markings.

11. After the new traffic lines are painted, remove all signs and traffic control devices.

## Silicosis Awareness

All efforts should be made to eliminate/reduce the generation of dust while performing this activity, specifically pavement sweeping. A wet broom should be used, or if not available, manually spray water to control dust. The broom cab must be closed and provide filtered air.

If the generation of dust cannot be eliminated through use of water or other controls, then workers operating the broom or within 20’ must wear an approved facepiece respirator that they are fit tested to wear.

| ACTIVITY | Fog Seal | CODE | 2051 |
|---|---|---|---|

**Special Considerations**

**Planning**

The distributors should be properly calibrated at minimum at the beginning of the construction season.

Make note of the existing pavement markings including the lane width. Coordinate with Traffic to ensure proper lane widths are striped to prevent edge deterioration.

Ensure that Customer Service, the PIO, Traffic, etc. are notified when the work plans are built, 14 calendar days prior to the start of the job and after completion of the job.

Ensure that the fog seal is entered into CARS for the duration of the job.

A **minimum** of 2 days should elapse from the end of the chip seal to the start of the fog seal to allow for proper initial curing of the asphalt emulsion.

If fog sealing shoulders, ensure that no weeds are present in the cracks. If weeds are present, spray with herbicide approximately 30 days prior to the start of the fog seal. This activity should be reported to either Activity 2230 – Herbicide Spot Treatment, Sub-Activity 32 Crack Spraying or Activity 2231 – Herbicide Broadcast Treatment, Sub-Activity 32 Crack Spraying, whichever is appropriate. It is also preferred to sweep the shoulder prior to the fog seal to remove any excess buildup that could possibly slow the operation.

**Construction**

The pavement must be dry with no rain expected for at least 24 hours.

The pavement temperature and ambient air temperature should be **above** 60°F.

The asphalt emulsion **should be delivered** between 140°F and 185°F. The temperature should be taken at the time of delivery from the vendor's tanker. See material specifications for rejection or penalty range.

The overlap application method is recommended on the centerline in both directions.

Fog seal application should span over the entire paved width including paved shoulders.

Paved shoulders beyond this guidance will be fog sealed only. In special cases, the seal coat may be applied full width including the shoulders, when recommended by the District Pavement Engineer with concurrence from the Area Pavement Engineer.

Self-propelled brooms should minimize down pressure that can displace embedded aggregate.

Streaks in the fog seal indicate either clogged nozzles or an improper overlap of spray from adjacent nozzles. Any streaking should be corrected prior to proceeding with the fog seal operation.

Traffic should not be allowed on the fog seal until after the asphalt emulsion no longer tracks. This is typically 30 minutes but is heavily dependent on the weather conditions.

The correct nozzles should be used when fog sealing. (Etnyre Part #3353788)

Pavement should be allowed to cure for a minimum of 5 days before painting final edgeline and centerline markings.

| ACTIVITY | Fog Seal | CODE | 2051 |
|---|---|---|---|

**Work Zone Signage**

The following signage is required in addition to any other requirements in the current Work Zone Traffic Control Handbook. The requirements in this section will not apply if construction is done under a full road closure, where the road is not opened until final pavement markings are placed.

1. "Road Work Ahead" (W20-1) signs are to be installed at the beginning of the job in each direction, and on each side of state highway intersections, if within the project limits. Consideration should be given to install signs at other major intersections. These signs should remain in place until the final pavement markings are installed.

2. "No Center Line" (W8-12) signs are to be placed in each direction at approximate 2 mile intervals or, at minimum, both at the beginning of the job in each direction and on both sides of a state highway intersection, if within the project limits. Signs should be placed for the duration of time where no temporary markings are installed.

The following signage is encouraged, but not required:

1. Changeable message signs (CMS) may be used to provide increased emphasis, dates of construction, alternate routes, or other information. CMS messages may replace any of the signs detailed in this policy with the exception of regulatory signs.

2. "Loose Gravel" (W8-7) signs may be installed. If used, they should be placed at minimum, at the beginning of the job in each direction and on either side of a state highway intersection, if within the project limits. Signs should be in place until the final brooming of the chip seal.

3. "Work Zone Speed Limits" or "Continuous Worksite Speed Limits" may be utilized to help control speeds in the work zone. These are legally enforceable and must comply with the requirements set forth in OM 06-01-Use of Worksite Speed Limit Sign Assemblies for Maintenance Activities.

4. An advisory speed limit plaque (W13-1P) may be used, which are typically 10 MPH below the posted speed limit. If used, plaques should be placed on the "Road Work Ahead" signs but may be placed on the "No Center Line" sign. Advisory speeds are not legally enforceable.

5. Speed display trailers may be used to remind the motoring public of their current speed through the jobsite. If used, they should be placed at minimum, at the beginning of the job in each direction and on either side of a state highway intersection, if within the project limits.

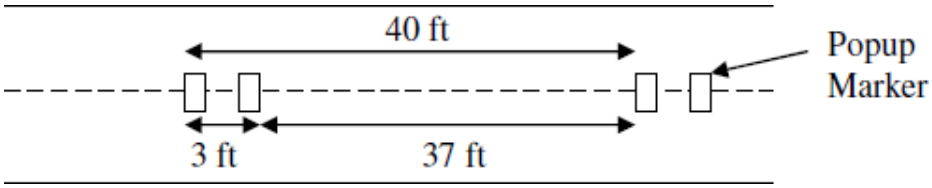
During construction, follow the appropriate traffic control setups as defined in the current Work Zone Traffic Control Handbook.

| ACTIVITY | Fog Seal | CODE | 2051 |
|---|---|---|---|

**Pavement Markings**

Since chip and fog seals cover existing pavement markings, temporary centerline delineation must be provided for roads with an ADT > 3,000 by utilizing one (or a combination) of the following methods. For roads < 3,000 ADT, these methods are encouraged but not required. The requirements in this section will not apply if construction is done under a full road closure, where the road is not open until final pavement markings are installed.

1. Utilize temporary pop-up chip seal markers. These should be placed on the day of construction. Pop-upmarkers shall be placed in a set of 2, spaced 3 ft longitudinally apart. The spacing between each set shall be 40 ft.




2. Provide temporary markings with either paint or removable tape. Such markings should be 4 feet long, centered on 40 foot spacing. Temporary markings should be installed within 2 calendar days of construction.

Permanent pavement markings should be re-established within 30 days of completing seal coat work. Coordinate with district traffic to inform them of the location of the work and the date that the work is finished so that they can schedule re-striping of the roadway.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 70,000 YDK-Square Yards | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Scrub Seal | CODE | 2052 |
|---|---|---|---|

**Purpose**

Scrub seal mainline, auxiliary lanes, turn lanes, and/or shoulder pavement surface with a single application of liquid asphalt emulsion and aggregate to address longitudinal, transverse and block cracking in low to moderate severity level, as well as raveling, low severity bleeding, and prevent moisture infiltration.

**Category** Pavement & Shoulders

- ☒ **PM**
- ☐ **QA**
- ☒ **Plan Location**

**Scheduling & Coordination**

Schedule this work in conjunction with supporting operations to be completed prior to seal coating, such as crack sealing for cracks ≥ ¼ inch or patching. This work should be performed on areas where water is penetrating the surface but not where a structural deficiency exists. The travel lanes and auxiliary/turn lanes should not be sealed by a scrub seal before May 1 or after October 1. The pavement surface and ambient temperature should be over 60°F. Coordinate the pavement striping with District Traffic.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Square Yards |
|---|---|---|---|---|---|

Accomplishment is reported in YDK – Square Yards.

Each road should be completed on one work order with multiple day cards.

All work involved in a scrub seal is reported to 2052, but the only accomplishment reported is placing the scrub seal.

Installing/removing signage (no accomplishment), installing/removing detours and closures (no accomplishment), removing RPMs, covering/ uncovering RPMs (no accomplishment), placing scrub seal (accomplishment), follow-up brooming (no accomplishment)

All equipment should be reported for the full amount of time used, which includes 24 hours/day for programmable message boards.

If the aggregate spreader can expand wide enough to cover two feet beyond the mainline edge onto the shoulder in one pass, then scrub seal beyond mainline onto the paved shoulder. This two foot amount of the shoulder, when completed in conjunction with the mainline, should be reported to this activity.

Record the cost and number of installed pop-up markers to the work order.

Record daily all aggregate and asphalt emulsion application rates on to "Activity 2052 – Scrub Seal Application Rate Form" and attach it to the work order. Rates should be checked and recorded at least twice per day (AM/PM).

Conversion of asphalt emulsion gallons to Tons is equal to the number of gallons ÷ 235.

For additional work order reporting guidance see the Work Orders section of the Preface.

| Average Daily Production | 60,000 YDK – Square Yards | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Scrub Seal | CODE | 2052 |
|---|---|---|---|

**Crew Size** 17 - 28 Workers

| | QTY |
|---|---|
| Distributor Operator | 2 – 3 |
| Aggregate Spreader Operator | 2 |
| Self-propelled Broom Operator | 2 – 3 |
| Pneumatic Roller Operator | 2 – 3 |
| Dump Truck Driver | 6 – 14 |
| Laborer | 3 |

Note: Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | QTY |
|---|---|
| Distributor | 2 – 3 |
| Pavement Scrubber | 1 – 2 |
| Aggregate Spreader | 1 |
| Self-propelled Broom (wet) | 2 – 3 |
| Pneumatic Roller | 2 – 3 |
| Dump Truck | 6 – 14 |

Note: Traffic Control Equipment is NOT shown here

**P.P.E.**

1) Base P.P.E.

2) Approved APF 10 Respirator (See “Silicosis Awareness”)

**Materials**

Asphalt Emulsion (AE-90S/CRS-2P) (Gal - Gallons)
INDOT Spec Section 902.01(b)

Coarse Aggregate (STN - Short Ton)
INDOT Spec Section 904

Temporary Pop-up Pavement Marker

**Other References**

Treatment Guidelines for Pavement Preservation

INDOT Standard Specification Section 404

Operations Memorandum 16-01 – Asphalt Emulsion Sampling Procedure for Chip/Fog Seal Activities

OM 14-03 - Seal Coat Operational Guidelines

OM 6-01 - Use of Worksite Speed Limit Signs

Silica Exposure Control Plan (WPS Preface)

**Sub Activities**

**Work Method**

**Planning**

1. Review Operations Memorandum 14-03 prior to the start of the operation to ensure all guidelines are followed.

2. Place all necessary signs and traffic control devices for any closures and detours. Coordinate the scrub seal schedule from start to finish with District Traffic.

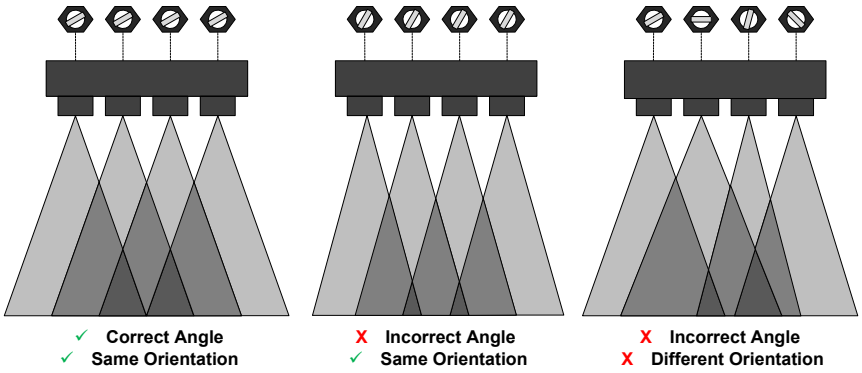
3. If RPMs need to be removed, perform this work within two weeks prior to the start of the scrub seal. Patch the pavement with hot mix asphalt (HMA) in conjunction with a tack coat or aggregate and emulsion used with a Durapatcher to ensure a good bond between the patch material and the pavement. Mastic may also be used to patch the pavement. Cold mix should not be used.

4. Calibrate the distributors, aggregate spreader and pneumatic rollers per the manufacturer’s specifications to ensure proper application rates.

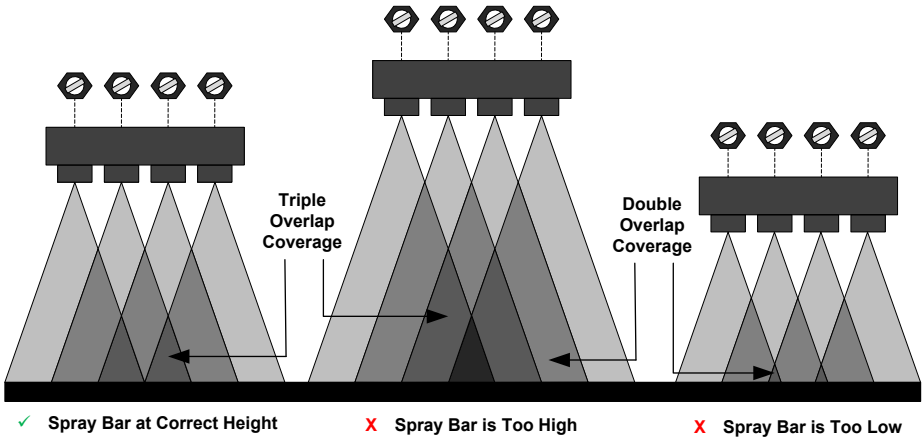
   Distributor
   - Use an approved method to confirm that the distributor is applying emulsion at the correct application rate. Contact the District Pavement Asset Engineer if assistance is needed in the calibration.

**Work Method (continued)**

- Ensure the nozzles are orientated at the correct angle of 30°. If the nozzles are not orientated at the correct angle, the spray pattern will be inconsistent and the coverage will not be triple overlap.




- Ensure the spray bar height is at the correct height of 12 inches above the pavement. If the spray bar is too low or too high, then the application will not be triple overlap coverage.




- If the spray pattern is inconsistent after the calibration procedures listed above, replace the nozzles on the spray bar. The nozzles wear out over time and may need to be replaced periodically but no more than once per construction season.

Aggregate Spreader

- Use an approved method to confirm that the aggregate spreader is applying aggregate at the correct application rate. Contact the District Pavement Asset Engineer if assistance is needed in the calibration.

Pneumatic Roller

- Ensure that all tires are inflated per the manufacturer's recommendation and are within 5 – 7 psi variation. The roller should be ballasted with sand or water to achieve a weight of 6 – 8 tons. The roller weight should achieve a minimum tire contact pressure of 80 psi. Contact the District Pavement Asset Engineer if assistance is needed in the calibration.

## Construction

1. Place all necessary signs and traffic control devices for road construction.

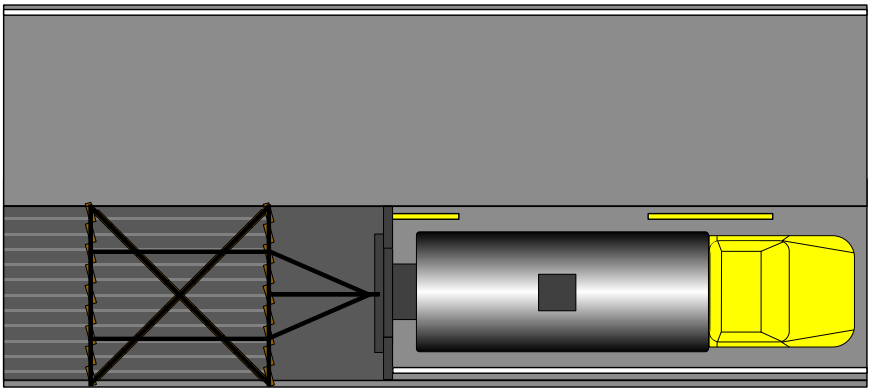
**Work Method (continued)**

2. Close the road/lane to traffic. If the scrub seal will be constructed under traffic, the use of a pilot vehicle to control traffic speeds is encouraged.

3. Sweep the roadway surface of any loose debris in front of the distributors. See “Silicosis Awareness” Section for handling of sweeping operation.

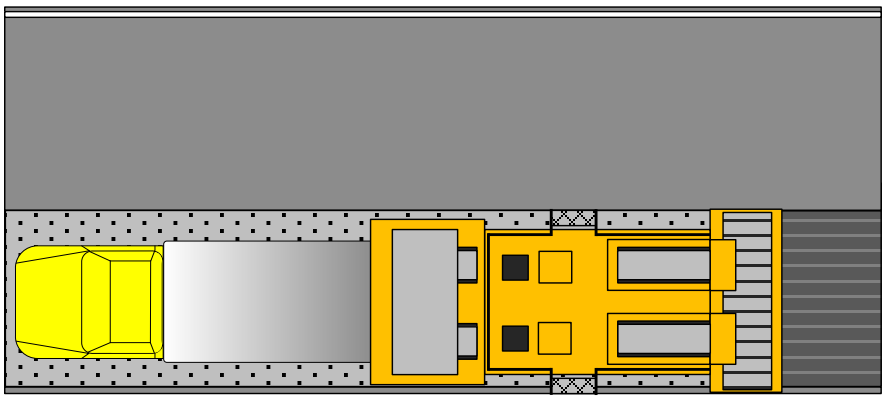
4. Install temporary pop-up pavement markers. Temporary pavement markers are required on roads with an average daily traffic (ADT) greater than 3,000 vehicles. If the ADT is less than 3,000 vehicles, temporary pavement markings are encouraged but not required. Cover all RPMs, castings and detector housings with sand or temporary tape.

5. Attach the pavement scrubber to the back of the distributor and spray the heated (≈ 165°F) asphalt emulsion (AE-90S or CRS-2P) at the design application rate at a speed consistent with the aggregate spreader. Ensure uniform coverage is achieved and avoid excessive stops as much as possible to prevent unnecessary joints.

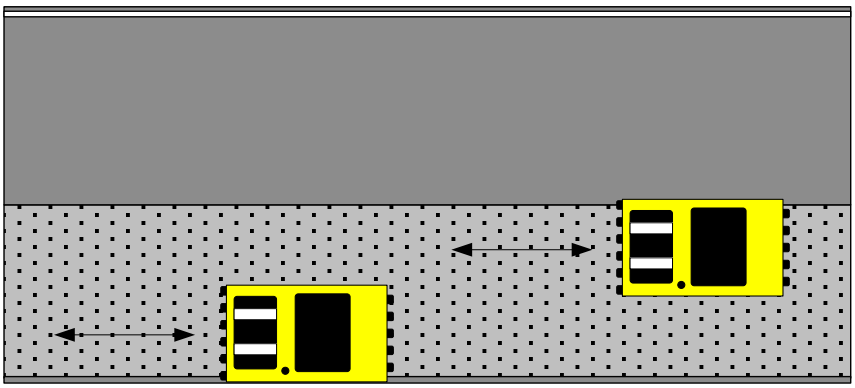


**Note:** There should be a wave of emulsion in front of the pavement scrubber. If a wave is not present, increase the application rate in 0.02 gal/yd² increments until a wave is achieved.

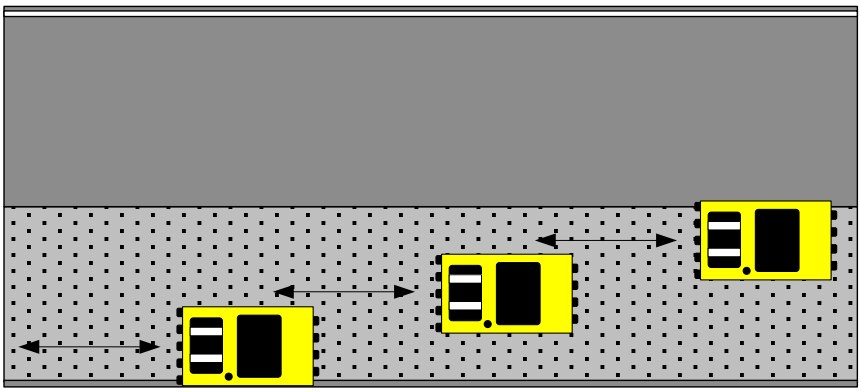
6. **Within 1 minute of the application**, spread a single layer of aggregate onto the asphalt emulsion. Do **NOT** allow the asphalt emulsion to break before the aggregate is spread onto the roadway to allow for proper embedment of the aggregate. Aggregate SC 12 or Aggregate SC 13 should be used. Consultant the District Pavement Asset Engineer for application rates.



7. The first pneumatic roller pass should be completed **within 2 minutes** of the aggregate being applied to allow for proper embedment of the aggregate.



**Medium Duty Rollers**



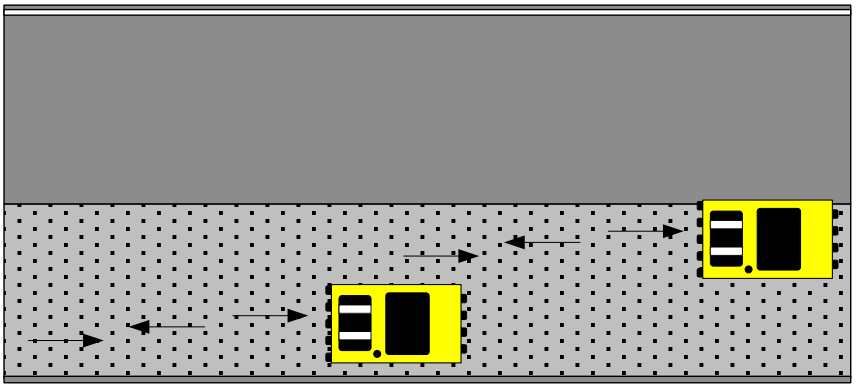
**Light Duty Rollers**

**Note:** If medium-duty rollers are used, two rollers can be used to span the width of a 12 foot lane. If light-duty rollers are used, three rollers must be used to span a 12 foot lane.

| ACTIVITY | Scrub Seal | CODE | 2052 |
|---|---|---|---|

## Work Method (continued)

8. The pneumatic rollers should make **at least 3 passes** with the final rolling taking place **within 30 minutes** of the aggregate application. If there are not enough rollers due to breakdowns to cover the entire lane width in one pass, then offset the passes of the rollers to ensure coverage over the entire lane width.



9. **After completion of each work day**, spray the pavement scrubber with an asphalt emulsion release agent to preserve and prolong the life of the bristles.

10. **No later than the morning after placement scrub seal**, the road surface should be swept to remove excess aggregate from the pavement. See "Silicosis Awareness" Section for handling of sweeping operation.

11. After completion of the scrub seal, all RPMs should be uncovered and cleaned.

12. Coordinate with Traffic to schedule the painting of the permanent pavement markings.

13. After installation of the permanent pavement markings, remove all signs and traffic control devices.

## Silicosis Awareness

All efforts should be made to eliminate/reduce the generation of dust while performing this activity, specifically pavement sweeping. A wet broom should be used, or if not available, manually spray water to control dust. The broom cab must be closed and provide filtered air.

If the generation of dust cannot be eliminated through use of water or other controls, then workers operating the broom or within 20' must wear an approved facepiece respirator that they are fit tested to wear.

## Special Considerations

**Planning**

Calibration of the scrub seal equipment is critical to the success of the scrub seal operation. The distributors (application rate), aggregate spreader (application rate) and pneumatic rollers (tire pressure and weight) should be properly calibrated **at minimum** at the beginning of the construction season.

When stockpiling aggregate, take care to stock the aggregate on hard surfaces away from dust or mud contamination. Loader operators need to ensure they are using proper loading techniques, which include not dipping into underlying dirt, stone or other contamination. Operators should also handle the material a minimal number of times.

CRS-2P has a different chemical composition that is incompatible with our traditional emulsions, such as AE-90S or AE-F. Residual materials **must be thoroughly cleaned** from the distributor tank and spray bar when switching to CRS-2P or from CRS-2P.

**Special Considerations (continued)**

Make note of the existing pavement markings including the lane width. Coordinate with Traffic to ensure proper lane widths are striped to prevent edge deterioration.

Ensure that Customer Service, the PIO, Traffic, etc. are notified when the work plans are built, 14 calendar days prior to the start of the job and after completion of the job.

Ensure that the scrub seal is entered into CARS for the duration of the job.

**Construction**

The pavement must be dry with no rain expected for at least 24 hours.

The pavement temperature and ambient air temperature should be **above** 60°F.

**The asphalt emulsion should be delivered between 140°F and 185°F**. The temperature should be taken at the time of delivery from the vendor's tanker. See the QPA material specifications for rejection or penalty range.

Scrub seal work should not be performed if the ambient temperature at the location of the work is forecast to drop below 45°F in the 48 hours following the completion of the seal coat. The low temperatures can have an adverse effect on the stone adherence of the scrub seal. It is especially important to avoid performing scrub seal work when low temperatures and rain are forecast in the 48 hours following the completion of the scrub seal, as the rain and cold can have a greater adverse effect on the stone adhesion of the scrub seal.

The haul trucks should stagger their wheel paths when backing to the aggregate spreader. Trucks should always avoid sharp turns on the scrub seal and should limit turning around to public roads, not private driveways. The trucks also need to drive at an appropriate speed on the scrub seal to minimize possible damage to vehicles. Finally, the driver should check for any aggregate leakage from the tailgate.

Self-propelled brooms should minimize down pressure that can displace embedded aggregate.

The pneumatic rollers should limit their speed to an acceptable speed that is not damaging the scrub seal. An acceptable speed should not displace aggregate and includes gradual take offs, avoiding hard stops and any turns that can displace aggregate. The rollers should be ballasted per the manufacturer's recommendations to ensure a minimum tire contact pressure of 80 lb/in².

When scrub sealing in residential areas, try to minimize loose aggregate and spillages. Street sweepers are highly recommended instead of self-propelled brooms in these areas to avoid throwing aggregate into yards, sidewalks and roadside landscaping.

Traffic should not be allowed on the scrub seal until after the final rolling and the asphalt emulsion has set and sufficiently cured. This is typically 45 minutes to 2 hours which is heavily dependent on the weather conditions.

| Estimated Number of Haul Trucks | |
|---|---|
| Maximum One-way Haul Distance | Number of Trucks Recommended |
| 5 | 3 |
| 10 | 5 |
| 15 | 7 |
| 20 | 9 |
| 25 | 11 |
| 30 | 13 |

**Work Zone Signage**

The following signage is required in addition to any other requirements in the current Work Zone Traffic Control Handbook. The requirements in this section will not apply if construction is done under a full road closure, where the road is not opened until final pavement markings are placed.

1. "Road Work Ahead" (W20-1) signs are to be installed at the beginning of the job in each direction, and on each side of state highway intersections, if within the project limits. Consideration should be given to install signs at other major intersections. These signs should remain in place until the final pavement markings are installed.

2. "No Center Line" (W8-12) signs are to be placed in each direction at approximate 2 mile intervals or, at minimum, both at the beginning of the job in each direction and on both sides of a state highway intersection, if within the project limits. Signs should be placed for the duration of time where no temporary markings are installed.

The following signage is encouraged, but not required:

1. Changeable message signs (CMS) may be used to provide increased emphasis, dates of construction, alternate routes, or other information. CMS messages may replace any of the signs detailed in this policy with the exception of regulatory signs.

2. "Loose Gravel" (W8-7) signs may be installed. If used, they should be placed at minimum, at the beginning of the job in each direction and on either side of a state highway intersection, if within the project limits. Signs should be in place until the final brooming of the chip seal.

3. "Work Zone Speed Limits" or "Continuous Worksite Speed Limits" may be utilized to help control speeds in the work zone. These are legally enforceable and must comply with the requirements set forth in OM 06-01-Use of Worksite Speed Limit Sign Assemblies for Maintenance Activities.

4. An advisory speed limit plaque (W13-1P) may be used, which are typically 10 MPH below the posted speed limit. If used, plaques should be placed on the "Road Work Ahead" signs but may be placed on the "No Center Line" sign. Advisory speeds are not legally enforceable.

5. Speed display trailers may be used to remind the motoring public of their current speed through the jobsite. If used, they should be placed at minimum, at the beginning of the job in each direction and on either side of a state highway intersection, if within the project limits.

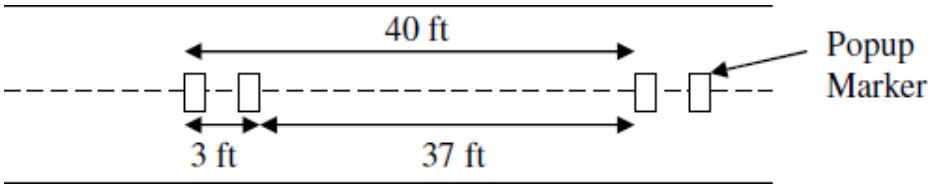
During construction, follow the appropriate traffic control setups as defined in the current Work Zone Traffic Control Handbook.

| ACTIVITY | Scrub Seal | CODE | 2052 |
|---|---|---|---|

**Pavement Markings**

Since scrub seals cover existing pavement markings, temporary centerline delineation must be provided for roads with an ADT > 3,000 by utilizing one (or a combination) of the following methods. For roads < 3,000 ADT, these methods are encouraged but not required. The requirements in this section will not apply if construction is done under a full road closure, where the road is not open until final pavement markings are installed.

1. Utilize temporary pop-up chip seal markers. These should be placed on the day of construction. Pop-upmarkers shall be placed in a set of 2, spaced 3 ft longitudinally apart. The spacing between each set shall be 40 ft.




2. Provide temporary markings with either paint or removable tape. Such markings should be 4 feet long, centered on 40 foot spacing. Temporary markings should be installed within 2 calendar days of construction.

Permanent pavement markings should be re-established within 30 days of completing seal coat work. Coordinate with district traffic to inform them of the location of the work and the date that the work is finished so that they can schedule re-striping of the roadway.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 60,000 YDK – Square Yards | EFFECTIVE DATE | 7/12/2023 |

Reset Form

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# Scrub Seal Application Rate Form

## Activity 2052

District _____ Sub-District _____ Road _____ WO # _____

| | | Weather Conditions | | | | Road Conditions | | | | Material Usage | | | | Application Rate | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | Time | Air Temperature (°F) | Sky Conditions | Wind Speed (mph) | Pavement Temperature (°F) | Lane Width (feet) | From RP | To RP | AM or PM Accomplishment (Lane Miles)[B] | Aggregate Size (#11, #12, #16) | Aggregate Type (Gravel, Limestone, etc.) | Aggregate (Tons) | Asphalt Emulsion (gallons) | Aggregate (lb/yd²) | Asphalt Emulsion (gal/yd²) | Evaluator's Initials |
| | | | | | | (A) | | | (B) | | | (C) | (D) | (E) | (F) | |
| | AM | | | | | | | | | | | | | | | |
| | PM | | | | | | | | | | | | | | | |
| | AM | | | | | | | | | | | | | | | |
| | PM | | | | | | | | | | | | | | | |
| | AM | | | | | | | | | | | | | | | |
| | PM | | | | | | | | | | | | | | | |

Comments

| Sky Conditions | Cloud Cover |
|---|---|
| Cloudy | 90 - 100% |
| Mostly Cloudy | 70 - 90% |
| Partly Cloudy/Partly Sunny | 30 - 70% |
| Mostly Sunny | 10 - 30% |
| Sunny | 0 - 10% |

Rate Calculations

Square Yards Sealed

$SY = (A \times B \times 5280) \div 9$

Aggregate Application Rate

$E = C \times 2000 \div SY$

Asphalt Emulsion Application Rate

$F = D \div SY$

***Notes:*** *A - A separate form is needed for each road unless multiple roads are done on the same work order*

*B - "AM or PM Accomplishment" is the production, in lane miles, during the AM or PM period of the workday during which the application rates are checked. The "AM or PM Accomplishment" for the AM and PM should total the daily production for the given day.*

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Crack Sealing | CODE | 2070 |
|---|---|---|---|

**Purpose**

Clean and seal cracks and open or cracked joints with hot-poured sealant in asphalt pavement to reduce the infiltration of water and prevent incompressible materials from entering the crack. When specifically directed by Technical Services, rout and seal single, transverse cracks with hot-poured sealant in composite pavement. Centerline and edgeline joints that are cracked or open are required to be sealed. Joints between asphalt pavement and concrete pavement and joints between asphalt pavement and concrete curb are also required to be sealed. Crack sealing is often considered a short-term treatment to help preserve the pavement between major maintenance operations or until a scheduled rehabilitation activity.

**Category** Pavement & Shoulders

- ☒ **PM**
- ☒ **QA**
- ☒ **Plan Location**

**Scheduling & Coordination**

Perform on the mainline and/or shoulders in areas where cracks are beginning to develop to prevent the infiltration of water and incompressible materials. Work should be scheduled during months where the temperature is greater than 40°F (March – November) due to temperature constraints with the sealant. If routing is required, work should be scheduled during the spring months (April – June) and fall months (September – November) due to the crack width constraints. Coordinate with District Traffic when pavement markings will be covered.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Lane Miles |
|---|---|---|---|---|---|

Accomplishment is reported in LNM - Lane Miles.

Report roads that require routing to Sub Activity 87 – Crack Routing.

Each road should be completed on one work order with multiple day cards.

Material should be reported in pounds of material used.

All work involved, including routing of cracks, is reported to 2070, but the only accomplishment reported is sealing of the cracks and joints.

All sealing of concrete joints should be reported to Activity 2095 – Resealing Concrete Pavement Joints. (INDOT Standard Spec 507.04(b))

| Average Daily Production | 2-3 LNM – Lane Miles | EFFECTIVE DATE | 2/12/2024 |
|---|---|---|---|

| ACTIVITY | Crack Sealing | CODE | 2070 |
|---|---|---|---|

**Crew Size** 4 – 12 Workers

| | QTY |
|---|---|
| Pavement Router Operator (If Needed) | 1 – 2 |
| Air Compressor Operator | 1 – 2 |
| Hot Air Lance Operator (Optional) | 1 |
| Hot Poured Sealant Melter/ Applicator Operator (Double Boiler) | 2 – 3 |
| Laborer | 1 – 2 |
| Water Sprayer | 1 – 2 |

Note: Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | QTY |
|---|---|
| Pavement Router | 1 – 2 |
| Air Compressor | 1 |
| Hot Air Lance (Optional) | 1 |
| Hot Poured Sealant Melter/ Applicator Operator (Double Boiler) | 1 |
| Dump Truck | 1 – 2 |
| Squeegee (See Special Considerations) | 1 – 2 |
| Water Tank (Optional) | 1 |

Note: Traffic Control Equipment is NOT shown here

**P.P.E.**

1) Base P.P.E.

**Materials**

Hot Poured Sealant/ASTM 6690 Type II (LB - Pound)
INDOT Spec Section 906.02

**Other References**

Treatment Guidelines for Pavement Preservation Section 2.1.1 “Crack Sealing/Routing and Filling”

INDOT Spec Section 408

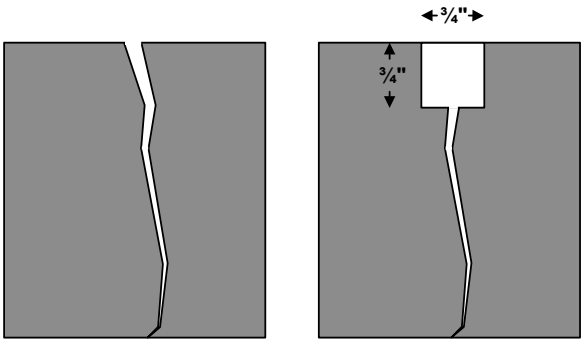
**Sub Activities**

87 – Crack routing

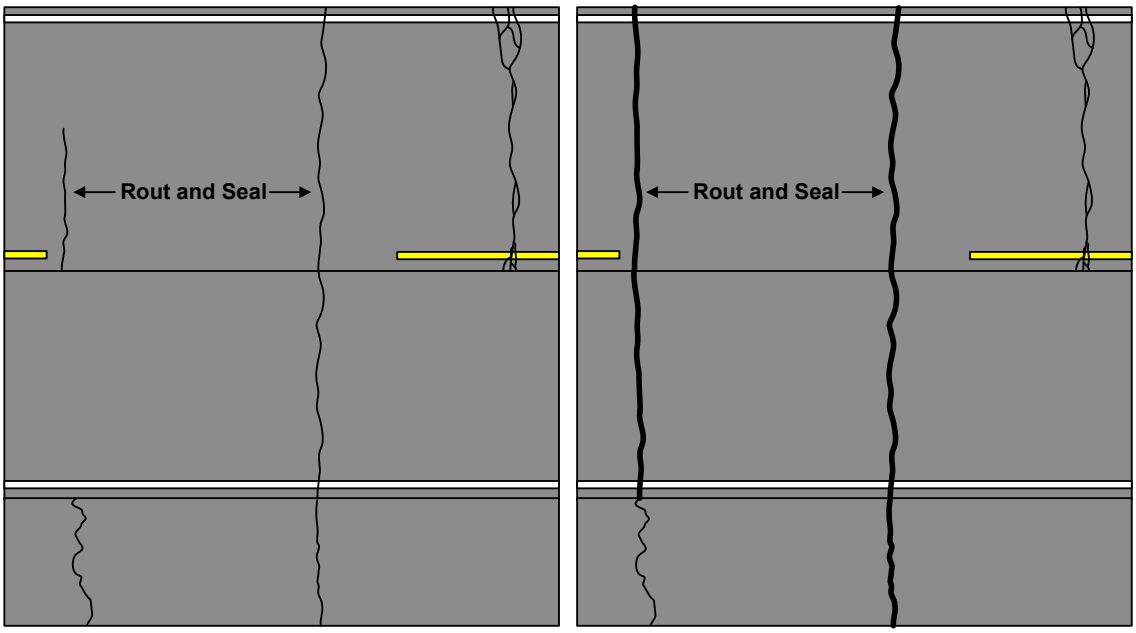
**Work Method**

1. Place signs and safety devices.

2. If routing is required, use a pavement router and rout all single, transverse cracks. These cracks will be over composite pavement, which is an asphalt surface over a concrete base. The reservoir created by the router should be square with dimensions of ¾ " x ¾ ". **<u>If the single, transverse crack is only partially across the traffic lane, continue routing across the entire lane width and shoulder.</u>**

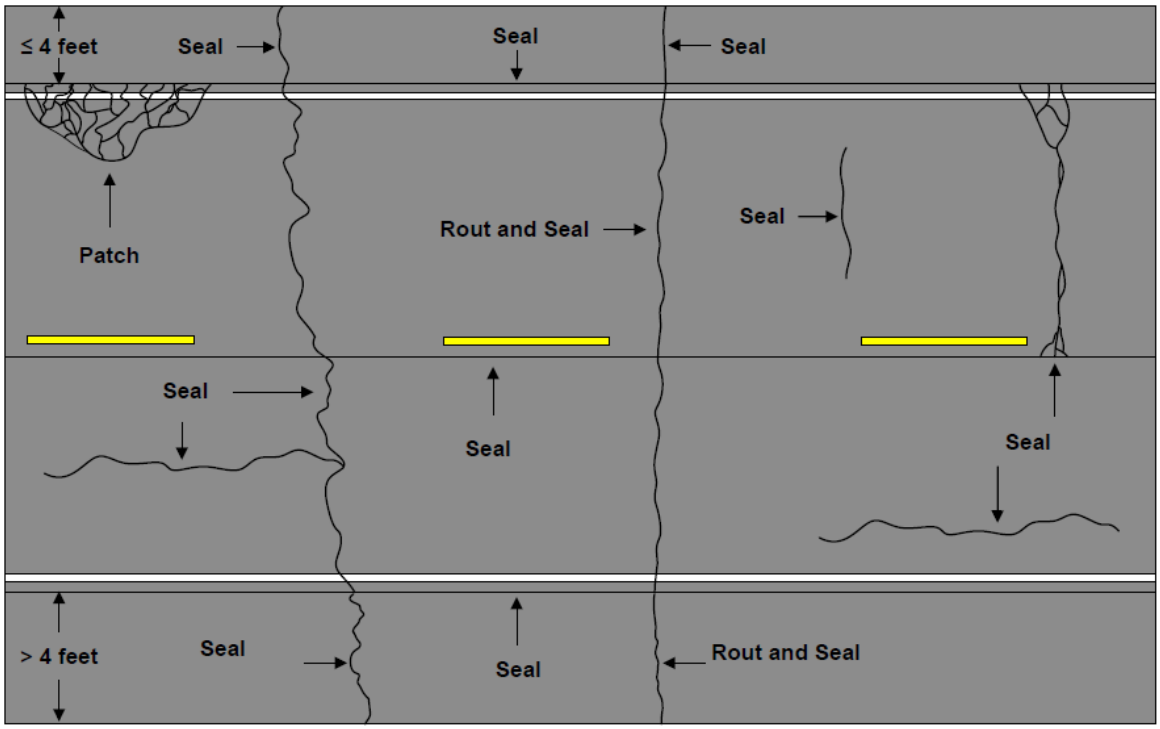



**Before Routing** **After Routing**




**Before Routing** **After Routing**

3. Use an air compressor (or hot air lance) to thoroughly clean the cracks. The cracks and joints should be free of debris and moisture to a depth of at least twice the width of the crack or joint. **Prior to applying the hot poured sealant, all cracks and joints should be clean and dry with ambient and pavement temperatures ≥ 40°F.** This procedure is critical to avoid a loss of adhesion between the sealant and cracks. If moisture is present, it will act as a bond breaker and prevent the sealant from properly adhering.



| ACTIVITY | Crack Sealing | CODE | 2070 |
|---|---|---|---|

## Work Method (continued)

4. Cracks and joints should be filled with sealant from the bottom to avoid trapped air bubbles which will weaken the seal.

5. The sealant should be struck flush with the pavement surface. Avoid using excess material and **limit over banding to < 4 inches**. If material tracking is a concern, lightly spray the sealant with soapy water or an anti-tracking solution to act as a bond breaker between the sealant and vehicle tires.


**Overband Width**

6. Remove all signs and safety devices.

## Special Considerations

**All cracks ≥ 2.5 mm (3/32 inch) should be sealed.** If cracks are < 2.5 mm, sealing is not required. A No. 8 finish nail is approximately 2.5 mm and can be used as a gauge to determine cracks that are not required to be sealed. **If a road will be chip sealed within a calendar year, only cracks ≥ ¼ inch should be sealed.**

**Only longitudinal joints that are cracked or open are required to be sealed.** Longitudinal joints that are not open or cracked are not required to be sealed.. Longitudinal joints include both centerline and edgeline joints.

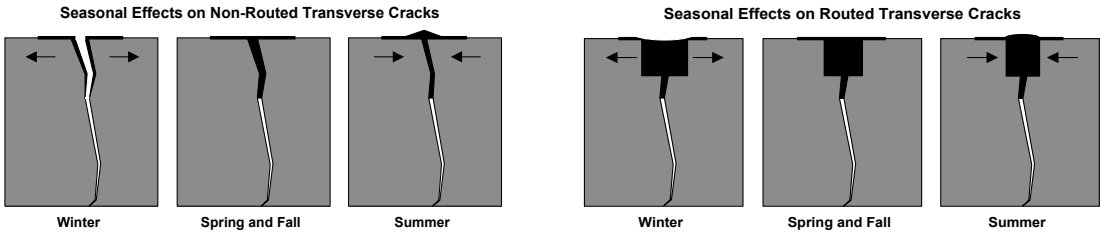
**Cracks on the shoulders should be sealed.** If the shoulders are ≤ 4 feet, it should be reported to Activity 2070 - Crack Sealing and done as part of the mainline operation. If the cracks are sealed on the shoulders only, this is still reported to Activity 2070.

Cracks with low to moderate (less than 50% of crack length) edge deterioration should be sealed. Cracks > 1 ½ inches should be considered for another treatment.

If pavement markings will be affected by the crack seal, coordinate with District Traffic to paint the traffic markings after the crack filling operation is complete.

Only single, transverse cracks on composite pavement, which is an asphalt surface over a concrete base, should be routed. Step #3 of the work method illustrates which type of cracks need to be sealed vs. routed and sealed.

**Routing is not required unless specifically requested by Technical Services**



**Special Considerations (continued)**

**Sealant should be struck flush with the pavement surface** either through an applicator disc or a squeegee. If sealant is left above the pavement surface, it will create an obstruction that may be removed during snow removal operations leaving areas of the pavement unsealed.

**Sealant should not be applied to pavement if there are no cracks present.** Aside from being wasteful, it can reduce the friction of the pavement and create a slick surface during precipitation.

**Before applying sealant, the pavement must be dry and all cracks and joints should be free of moisture.**

**The pavement and air temperature should be at least 40°F. Sealant should never be applied when the temperature is below freezing.**

Cracks should be sealed the same day they are routed. **However, no more than 3 calendar days should pass before cracks that have been routed are sealed.**

Routed cracks should be periodically checked for routed dimension. Routed cracks should have square sides with a flat bottom. If the routed crack is not square but rounded, the carbide cutters should be replaced. Typically, carbide cutters should last for 17,000 to 24,000 LF (linear feet), which will vary depending on the pavement type.

**Sealant should never be heated for more than 12 hours.** Segregation will occur if the material is overheated. **Continuously adding blocks as they are used will eliminate to possibility of segregation.** Plan accordingly based on the workload when adding blocks of sealant to the melter. **When placing blocks of sealant in the melter, the exterior of the blocks should be free of debris, which can damage the pump or plug the wand.**

Periodically check for joint cleanliness and moisture. If the joint is not clean, blow compressed air in the joint again. If the joints have moisture present, use hot air blasting to adequately dry them. If hot air blasting is not available, suspend the operation for a later time when the pavement conditions are acceptable.

Hot air lance usage is optional. A hot air lance will improve the adhesion of the sealant material. However, extra attention should be given to ensure the pavement does not get damaged from the hot air lance. Ideal conditions, which is a dry pavement and the air and pavement above 40°F, are still preferable over using a hot air lance to dry and heat the pavement. Prior to any usage of a hot air lance, ensure there is adequate training for all operators.

Applicator discs are the preferred method to limit over banding. Straight squeegees should not be used due to wide over banding issues. If using squeegees, only “U” shaped and “V” shaped squeegees should be used.

Attachments are available for the hot poured sealant melters, such as the Crafco Brand “Super Shot Drip Stopper”, which can be used to eliminate excess sealant from leaving the applicator wand once the trigger is released. The Crafco Brand “Swivel Adapter” can be used to eliminate the use of a squeegee on the operation.

**Cracks should be cleaned using an air compressor using no less than 70 cfm at 100 psi.** Leaf blowers are not permitted.

**Open or cracked joints between concrete pavement and concrete curbs, or between concrete pavement and asphalt pavement, should be sealed.** The joints need to be sealed to prevent water intrusion.

**Sealant temperature is critical to a successful job.** Sealant should be stored, handled and heated to the manufacturer’s specifications. The application temperature should be between 350°F and 400°F with the recommended temperature between **370°F and 390°F**. The maximum temperature should **never exceed 400°F**. The heat transfer oil should be 500°F to properly melt the sealant but should never exceed 525°F.

The hot poured joint sealant melter/applicator should be kept at least ⅓ full at all times to help maintain temperature uniformity. The hot poured joint sealant should be continuously agitated except when new material is being added.

At the end of the day, the applicator wand should be cleaned and cleared of any residual material.

# Indiana Department of Transportation

## Activity 2070 QA Form - Crack Sealing

Asset Inventory #:_____ District/Sub/Unit:_____
Work Order #:_____ Route:_____
Date completed:_____ Intersections:_____
Date inspected:_____ Limits:_____
Inspector:_____ RP Start/End:_____
QA Window: 0-2 months

**Observations:**

1. What percentage of cracks ≥ 2.5 mm (No. 8 nail) are sealed?
   - 0 < 70%
   - 20 70% - 95%
   - 40 > 95%

2. Are the edgeline joints sealed where open/cracked?
   - N/A
   - 0 < 70%
   - 10 70% - 95%
   - 20 > 95%

3. Is the centerline joint sealed where open/cracked?
   - 0 < 70%
   - 10 70% - 95%
   - 20 > 95%

4. What is the overband width for the majority of the cracks?
   - 0 > 4"
   - 15 < 4"

5. What is the fill depth of the sealant?
   - 0 Material depth 2mm above surface in 2 of 10 locations
   - 10 Material depth 2mm above surface in 1 of 10 locations
   - 20 Sealant is flush or within 1/4" below the surface

6. Is there excess sealant on the pavement?
   - 0 Major excess; widespread areas where sealant wasn't needed
   - 5 Minor excess; isolated areas where sealant wasn't needed
   - 10 No excess; sealant confined to cracks/joints

7. What percentage of material is adhered to the cracks and joint?
   - 0 < 85%
   - 5 85% - 99%
   - 10 99% - 100%

8. Is there excess drippage on the pavement?

0 Excessive drippage

5 No drippage

**Inspector Comments:**

**Score:**

| | **Possible** | **Actual** |
|---|---|---|
| **1** | 40 | |
| **2** | N/A *or* 20 | |
| **3** | 20 | |
| **4** | 15 | |
| **5** | 20 | |
| **6** | 10 | |
| **7** | 10 | |
| **8** | 5 | |
| **Total:** | | |

**Final % score (divide Actual by Possible):_____**

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Resealing Concrete Pavement Joints | CODE | 2095 |
|---|---|---|---|

**Purpose**

Resealing the concrete pavement joints helps to reduce the amount of water infiltrating the pavement as well as prevent incompressible material from filling the joints. Water infiltration can lead to defects such as pumping and faulting, while incompressible material can cause joint spalling and blowups. Resealing the joints should include removal of any backer rod material.

**Category** Pavement & Shoulders

- ☒ **PM**
- ☐ **QA**
- ☒ **Plan Location**

**Scheduling & Coordination**

Perform on mainline areas where the joint filler is broken, brittle or missing that allows entry of water and incompressible materials. This work should be scheduled in the Spring or Fall months. Coordinate with District Traffic when pavement markings will be covered.

| Reporting | Asset to Report to | Pavement Keys | Reporting Units | Lane Miles |
|---|---|---|---|---|

Accomplishment is reported in LNM - Lane Miles.

Material should be reported in pounds of material used.

Removal of the backer rod only should be reported as zero accomplishment.

This activity is for resealing concrete pavement joints only. All sealing of concrete cracks should be reported to Activity 2070 –Crack Sealing. (INDOT Standard Spec 507.03(a))

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** 4 – 5 Workers

| | QTY |
|---|---|
| Air Compressor Operator | 1 |
| Hot Poured Sealant Melter/ Applicator Operator (Double Boiler) | 1 |
| Laborer | 2 – 3 |

Note: Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | QTY |
|---|---|
| Air Compressor | 1 |
| Hot Poured Sealant Melter/ Applicator (Double Boiler) | 1 |
| Backer Rod Removal Tool | 1 – 2 |

Note: Traffic Control Equipment is NOT shown here

**P.P.E.**

1) Base P.P.E.

**Materials**

Hot Poured Joint Sealant (LB – Pound)
INDOT Spec Section 906.02

**Other References**

Treatment Guidelines for Pavement Preservation Section 2.2.2 “PCCP Joint Resealing”

INDOT Standard Specification Section 503.05, 507.04(b)

FHWA-RD-99-137 “Resealing Concrete Pavement Joints”

**Sub Activities**

| Average Daily Production | 3 LNM – Lane Miles | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Resealing Concrete Pavement Joints | CODE | 2095 |
|---|---|---|---|

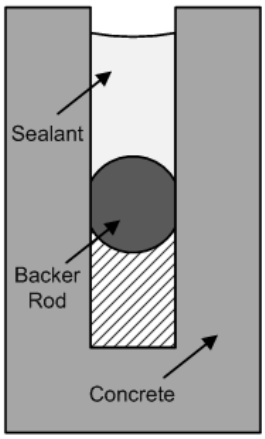
## Work Method

1. Place signs and safety devices.

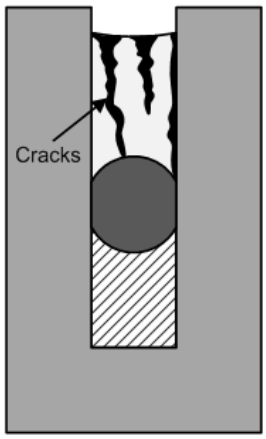
2. Remove the old sealant and backer rod from the joint.

3. Clean the joint with high pressure air from an air compressor or hot air blasting using a hot air lance. Do **NOT** use a leaf blower to clean out the joints. All loose dirt and debris should be blown off the edge of the roadway away from traffic.

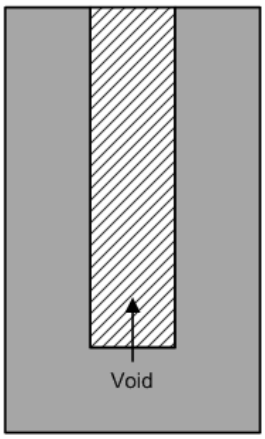
4. Fill the joint using a specialized tip with hot poured joint sealant from the bottom up to avoid any voids due to air bubbles. Fill with sealant to within ¼" of the surface. **DO NOT OVERFILL.**



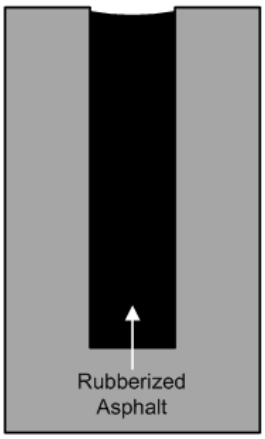

**Joint Filled with Sealant**




**Failed Joint Filled with Sealant**




**Clean Joint Prior to Resealing**




**Joint Resealed with Rubberized Asphalt**

**Elevation View**

5. Spray a water/detergent mixture or anti-tracking solution with a handheld sprayer to minimize tracking of the sealant. Allow sufficient time, typically 15 to 30 minutes, for the sealant to cure before opening to traffic.

6. Remove all signs and safety devices.

## Special Considerations

The pavement must be dry and all joints should be free of moisture.

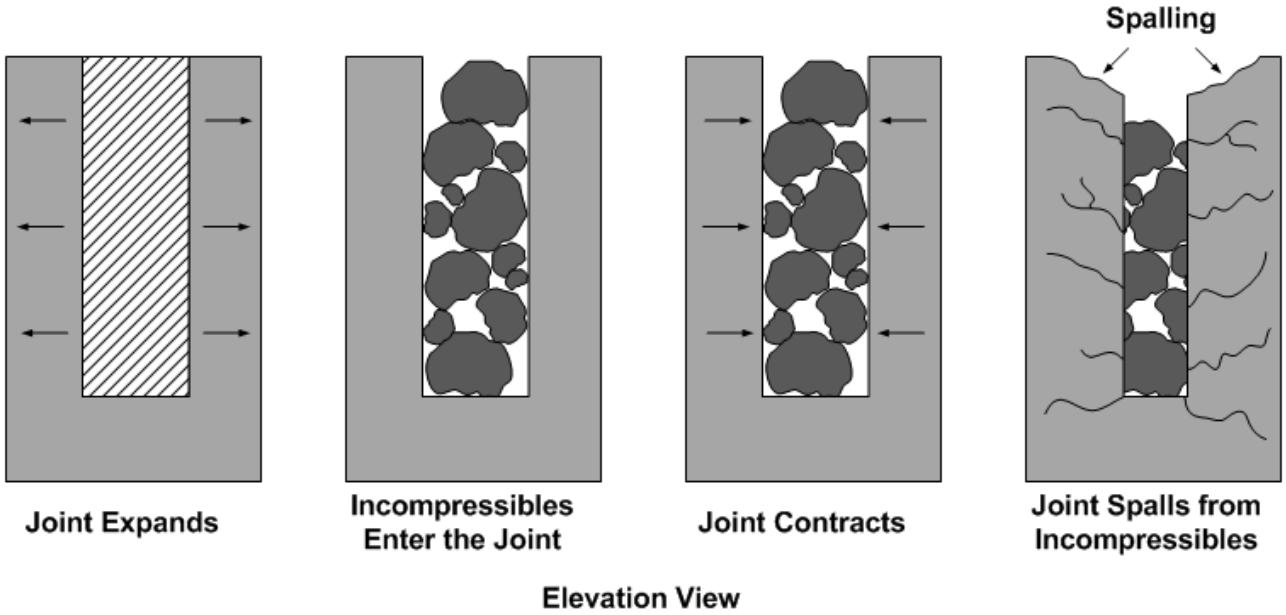
The pavement and air temperature should be at least 40°F and the pavement temperature should not exceed 135°F.

The joint cleaning operation should take place immediately in front of the joint resealing operation to maintain the cleanliness of the joints. If joints are not sealed on the same day the old sealant and backer rod are removed, then the joints should be cleaned again when the operation continues. All joints should be sealed **within 3 days** after the original sealant and backer rod being removed.

Periodically check for joint cleanliness and moisture. If the joint is not clean, blow compressed air in the joint again. If the joints have moisture present, use hot air blasting to adequately dry them. If hot air blasting is not available, suspend the operation for a later date when the pavement conditions are acceptable.

| ACTIVITY | Resealing Concrete Pavement Joints | CODE | 2095 |
|---|---|---|---|

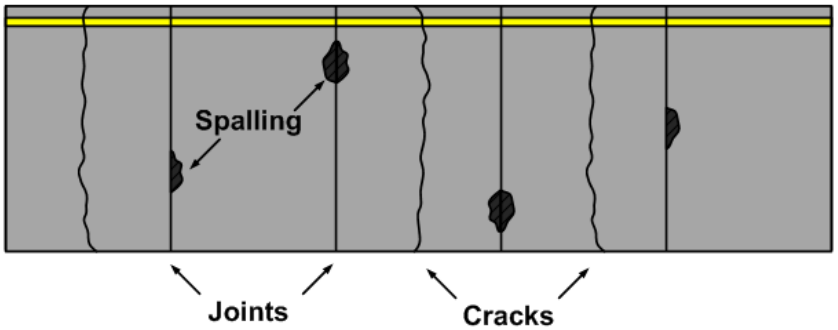
**Special Considerations (continued)**




**Sealant temperature is critical to a successful job.** Sealant should be stored, handled and heated to the manufacturer's specifications. The application temperature should be between 350°F and 400°F with the recommended temperature between **370°F and 390°F**. The maximum temperature should **never exceed 400°F**.

The hot poured joint sealant melter/applicator should always be kept at least ⅓ full to help maintain temperature uniformity. The hot poured joint sealant should be continuously agitated except when new material is being added.

At the end of the day, the applicator wand should be cleaned and cleared of any residual material.




| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 3 LNM – Lane Miles | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Spot Repair of Unpaved Shoulders | CODE | 2100 |
|---|---|---|---|

**Purpose**

Repair small areas of shoulders no larger than one mile, by adding aggregate, reshaping and compacting to correct edge ruts, potholes, and corrugations, and to replace lost material at washouts, around mailboxes, and public road approaches.

Note: This activity is used for reporting work on any aggregate areas adjacent to a paved shoulder.

**Category** Pavement & Shoulders

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule this work throughout the year at locations where hazardous conditions have developed, due to rutting and at places where traffic goes onto the shoulder often. Repair localized edge ruts after they have become 2" deep. Recurring areas should be reported to the District and considered for more permanent repairs.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Short Tons |
|---|---|---|---|---|---|

Accomplishment shall be reported in Tons of aggregate STN (Short Ton)

Minor improvement projects should be reported to Activity 2991. Activity 2991 is used for constructing shoulders where none currently exist.

Repairs to paved shoulders should be reported to Activity 2010 (Shallow Patching) or Activity 2020 (Deep Patching), as appropriate.

If Activity 2100 Spot Repair of Unpaved Shoulders and Activity 2110 Blading shoulders( which is a continuous operation ) are performed at same time, the work should be separated onto two work orders.

Any repairs greater than one mile in length should be reported to Activity 2130 (Recondition Shoulders)

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** 3-5 Workers

| | QTY |
|---|---|
| Tractor Operator | 1 |
| Truck Driver | 1 |
| Truck Driver/Laborer | 1-3 |

*Traffic Control Personnel are NOT shown here

**P.P.E.**

Base PPE

**Materials**

Coarse Aggregate #53 / #73 (STN-Short Ton) INDOT Spec Section 904.03

Salvage material (Millings)

**Job Specific Equipment**

| | QTY |
|---|---|
| Dump Truck | 2 |
| Pickup Truck | 1 |
| Tractor/Blade, Underbody Blade, or Snow Plow | 1 |

*Broom (optional)

*Traffic Control Equipment are NOT shown here

**Other References**

**Sub Activities**

| Average Daily Production | 51 STN – Short Tons | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Spot Repair of Unpaved Shoulders | CODE | 2100 |
|---|---|---|---|

**Work Method**

1. Place signs and safety devices
2. Place additional material in low spots or at intervals along the shoulder
3. Blade material into low spots and shape so that shoulder slope permits drainage to ditch
4. Roll material with truck tires
5. Clean work area
6. Remove signs and safety devices

**Special Considerations**

Do not use bituminous mixture or material for patching unpaved shoulders.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 51 STN – Short Tons | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Blading Shoulders | CODE | 2110 |
|---|---|---|---|

**Purpose**

Blade and reshape shoulders to eliminate edge ruts, ridges, corrugations, and high shoulders to allow for proper road surface drainage. This activity is used to bring shoulder material back up to edge of pavement so very little material should be reported. Typically no material is hauled away or added because existing material is pulled back and reshaped.

**Category** Pavement & Shoulders

- ☒ **PM**
- ☐ **QA**
- ☒ **Plan Location**

**Scheduling & Coordination**

Schedule this work to take advantage of natural moisture, usually in the spring and fall. Report defects on aggregate shoulders for scheduling when the shoulder drop-off is generally more than two inches, when water ponds, or when traffic has rutted or roughened the shoulder.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Shoulder Miles |
|---|---|---|---|---|---|

Accomplishment shall be reported in Shoulder Miles.

Shoulder Miles is equal to the accomplishment in shoulder length (mi) per side of section of road. For example if shoulders are repaired on both sides of a one mile section of road, then two shoulder miles of work has been accomplished

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** 2-4 Workers

| | QTY |
|---|---|
| Grader Operator | 1-2 |
| Equipment Operator | 1-2 |

*Traffic Control Personnel are NOT shown here

**P.P.E.**

1) Base PPE

2) Respiratory Protection (1 strap dust mask - broom sweepers)

**Materials**

**Job Specific Equipment**

| | QTY |
|---|---|
| Power Broom | 1 |
| Grader | 1 |
| Dump Truck/Underbody blade | 1 |
| or | |
| Snow Plow | |
| *Roller (optional) | |

*Traffic Control Equipment are NOT shown here

**Other References**

**Sub Activities**

| Average Daily Production | 20 Shoulder Miles | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Blading Shoulders | CODE | 2110 |
|---|---|---|---|

**Work Method**

1. Place signs and safety devices
2. Cut build-ups with grader—pull material toward roadway to pavement edge
3. Second vehicle blades material back on shoulder, making sure all low spots are filled and that shoulder slope permits drainage to ditch
4. Roll with truck tires or roller as required
5. Clean hazardous debris from road surface
6. Remove signs and other safety devices

**Special Considerations**

| APPROVED BY |
|---|
| Director, Highway Maintenance |

| Average Daily Production | 20 Shoulder Miles | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Clipping Shoulders | CODE | 2120 |
|---|---|---|---|

**Purpose**

Report major clipping of overgrown shoulders to remove excess material and to restore proper slope for adequate drainage, to this activity. Typically no material is added but excess material must be hauled away. Includes clipping of overgrown shoulders adjacent to the driving surface, sod adjacent to paved or aggregate shoulder.

**Category** Pavement & Shoulders

- ☒ **PM**
- ☐ **QA**
- ☒ **Plan Location**

**Scheduling & Coordination**

Perform this work on overgrown shoulders when there is more than one inch difference between the roadway surface and shoulder surface or where excess material blocks drainage from the roadway or shoulder surface. Coordinate this activity with Activity 2050. Schedule this work to take advantage of natural moisture, usually in the spring and early fall.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Shoulder Miles |
|---|---|---|---|---|---|

Accomplishment shall be reported in Shoulder Miles.

Shoulder Miles is equal to the accomplishment in shoulder length (mi) per side of section of road. For example, if shoulders are repaired on both sides of a one mile section of road, then two shoulder miles of work has been accomplished.

Any required ditching should be scheduled and reported to Activity 2310.

For additional work order reporting guidance see the Work Orders section of the Preface

**Crew Size** 5-8 Workers

| | QTY |
|---|---|
| Motor Grader Operator | 1 |
| Loader Operator | 1 |
| Equipment Operator | 1 |
| Truck Driver | 3-6 |

*Traffic Control Personnel are NOT shown here

**P.P.E.**

1) Base PPE

2) Respiratory Protection (1 strap dust mask - broom sweepers)

**Materials**

Grass Seed (LBS – Pounds) INDOT Spec Section 621

Erosion Control Materials

**Job Specific Equipment**

| | QTY |
|---|---|
| Motor Grader | 1 |
| Loader | 1 |
| Dump Truck | 3 |
| Roller/Compactor (>5 Ton) | 3 |
| Power Broom | 1 |
| Water Truck | 1 |

*Traffic Control Equipment are NOT shown here

**Other References**

INDOT Standard Specifications 208.2

**Sub Activities**

| Average Daily Production | 6 Shoulder Miles | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Clipping Shoulders | CODE | 2120 |
|---|---|---|---|

**Work Method**

1. Place signs and safety devices
2. Grade Material:

   First Pass: Cut excess material off shoulder with grader.

   Second Pass: Windrow excess material along pavement edge.

   Third and Fourth Passes: Smooth material to original grade and slope as necessary to obtain proper drainage to ditch.
3. Load excess material into trucks and dump at designated area.
4. Compact loose shoulder material with roller.
5. Prepare seed bed and place grass seed on any areas of bare soil. See Activity 2240 for guidance.
6. Cover all seeded areas with straw or other suitable erosion control materials.4. Sweep loose material off pavement surface with power broom
7. Remove signs and safety devices.

**Special Considerations**

Clipped roadside debris must be removed during the performance of this activity.

When disposing of waste material off of state property, utilize the "Excavation Material Disposal Site" form with Activity 2310.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 6 Shoulder Miles | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Recondition Shoulders | CODE | 2130 |
|---|---|---|---|

**Purpose**

Restore the shoulder grade and surface, through reconditioning continuous shoulder sections by adding aggregate, reshaping, and compacting.

**Category** Pavement & Shoulders

- ☐ PM
- ☐ QA
- ☒ Plan Location

**Scheduling & Coordination**

Rebuild shoulder where the drop off exceeds 2” for extended lengths as a result of repeated grading and loss of material. Take advantage of natural moisture when possible.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Shoulder Miles |
|---|---|---|---|---|---|

Accomplishment shall be reported in Shoulder Miles.

Shoulder Miles is equal to shoulder length (mi) of accomplishment per side of section of road. For example if shoulders are repaired on both sides of a one mile section of road, then two shoulder miles of work has been accomplished

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** 13 Workers

| | QTY |
|---|---|
| Widener Operator | 1 |
| Roller Operator | 1 |
| Truck Driver | 6 |
| Loader Operator | 1 |
| Power Broom Operator | 1 |
| Laborer | 3 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | QTY |
|---|---|
| Widener | 1 |
| Rubber Tired Roller | 1 |
| Dump Truck | 6 |
| Power Broom | 1 |
| Loader | 1 |

*Traffic Control Equipment are NOT shown here

**P.P.E.**

1) Base PPE

2) Respiratory Protection (1 strap dust mask - broom sweepers)

**Materials**

Coarse Aggregate # 73- STN-(Short Ton) INDOT Spec Section 904.03

**Other References**

INDOT Standard Specifications 208.2

**Sub Activities**

| Average Daily Production | 6 Shoulder Miles | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Recondition Shoulders | CODE | 2130 |
|---|---|---|---|

## Work Method

1. Place signs and safety devices
2. Spread material with widener giving a ½" to 1" per foot slope in first pass
3. Shape and smooth material to original design specification
4. Roll as required for proper compaction
5. Clean work area with power broom
6. Remove signs and other safety devices

## Special Considerations

Use this activity for areas larger than one mile that require aggregate usage to fill in drop offs.

Use Activity 2100 Blading Shoulders for areas less than one mile.

# of haul trucks needed:

| Distance from stockpile to jobsite (mi) | # Trucks |
|---|---|
| 5 | 3 |
| 10 | 4 |
| 15 | 5 |
| 20 | 5 |
| 25 | 6 |
| 30 | 7 |

APPROVED BY

Director, Highway Maintenance

| Average Daily Production | 6 Shoulder Miles | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Joint and Bump Repair | CODE | 2140 |
|---|---|---|---|

**Purpose**

Report grinding of bituminous surfaces to remove bumps, ripples, and heaved joints. This activity also includes sealing over ground areas.

**Category** Pavement & Shoulders

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule removal of bumps > 1 in. or heaved joints on surfaces when normal traffic flow is interrupted.

This activity is typically completed in the spring and fall when the bumps are at their midpoint.

Sealing shall be completed within three days after grinding.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Bumps Removed |
|---|---|---|---|---|---|

Accomplishment shall be reported in number of bumps removed.

Rental equipment and operators must be reported to the cost day cards for this activity

Sealing of the ground areas during the job or at a later date should be reported to this activity. Sealing at a later date is zero accomplishment and shall be included on same work order as grinding.

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** 5 Workers

| | QTY |
|---|---|
| Truck Driver | 2 |
| Laborer | 2 |
| Skid Loader Operator | 1 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | QTY |
|---|---|
| Grinder/Skidsteer Loader | 1 |
| Tar Kettle | 1 |
| Grader (as required) | 1 |
| Dump Truck | 1 |
| Water Truck | 1 |
| Self-propelled Broom (Wet) | 1 |

*Traffic Control Equipment are NOT shown here

**P.P.E.**

1) Base PPE

2) Approved APF 10 Respirator (See “Silicosis Awareness”)

**Materials**

Liquid Bituminous (AE-90S) (Gal-Gallons) INDOT Spec Section 902.01(b)

Bituminous Mix (STN-Short Ton) INDOT Spec Section 902.01

Sand (STN-Short Ton) INDOT Spec Section 904.03

**Other References**

Silica Exposure Control Plan (WPS Preface)

**Sub Activities**

| Average Daily Production | 20 Bumps Removed | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Joint and Bump Repair | CODE | 2140 |
|---|---|---|---|

**Work Method**

1. Place signs and safety devices
2. Mark limits of area for grinding
3. Grind bumps to be repaired

   Where material is excessively deep, use multiple passes

   Use hand brooms or power sweeper to collect or remove all material
4. Haul material to storage or use on site to reshape on to shoulder
4. Patch area as required
5. Seal area with liquid bituminous AE-90S and sand (during job or no later than 3 days following)
6. Clean work site
7. Remove signs and safety devices

**Silicosis Awareness**

All efforts should be made to eliminate/reduce the generation of dust while performing this activity, specifically pavement grinding. If the grinder is equipped with a water system it must be used. If not, manually spray water to control dust during grinding.

If the generation of dust cannot be eliminated through use of water or other controls, then workers operating the grinder or within 20’ must wear an approved facepiece respirator that they are fit tested to wear.

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 20 Bumps Removed | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Expansion Foam Injection | CODE | 2150 |
|---|---|---|---|

| Purpose | Category | Pavement & Shoulders |
|---|---|---|

Inject two-part polyurethane foam material underneath sunken concrete slabs to fill voids and lift slabs so that the surface elevation matches the surface elevation of adjacent surfaces, in locations such as concrete pavement and sidewalks. Inject material to fill deep voids that have developed underneath concrete pavement, asphalt pavement, or slopewalls.

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

## Scheduling & Coordination

Expansion foam trailer must be reserved using the Central Equipment yard online reservation system. The system can be found at the following link:
https://centralequipmentyard.myturn.com/library/inventory/browse?requestedFormat=&offset=0&max=15

Pavement surface temperature must be above 40 degrees Fahrenheit for this activity to be performed. The subgrade shouldn't be frozen and standing water shouldn't be present.

PRIOR TO BEGINNING THIS WORK COORDINATE WITH TECHNICAL SERVICES TO ENSURE THIS ACTIVITY IS BEING PERFORMED AT AN APPROPRIATE SITE AND THEY ARE AWARE OF THE WORK BEING PERFORMED.

| Reporting | Asset to Report to | Various* | Reporting Units | Gallons |
|---|---|---|---|---|

Accomplishment is total gallons of both parts (Component A + Component B) of foam material used.

For additional work order reporting guidance see the Work Orders section of the Preface.

*Reporting Options:

- If activity is performed on a bridge approach or sidewalk adjacent to a bridge, report to the Bridge Asset.
- If activity is performed on a road surface or sidewalk adjacent to a roadway, report to the Pavement Key.

## Crew Size — 4-6 Workers

| | QTY |
|---|---|
| Supervisor | 1 |
| Laborer | 3-5 |

*Traffic Control Personnel are NOT shown here

## P.P.E.

1) Base PPE
2) Eye protection
3) Rubber gloves

## Materials

- Expansion foam material (hydrophobic, closed cell, high-density, two-part polyurethane system)

## Job Specific Equipment

- Expansion Foam Trailer (following equipment is included on trailer)
  - Foam injection gun
  - Hammer drill
  - Dial indicators (4)
  - Generator
  - Gas-powered air Compressor
  - Electric water pump

*Traffic Control Equipment is NOT shown here

## Other References

- ASTM D 1621 (Foam minimum compressive strength)
- ASTM D 1622 (Foam minimum density)
- ASTM D 638 (Foam minimum tensile strength)
- ASTM D 1042 and D 756 (Foam shrinkage)
- NSF/ANSI 61-5 (Foam drinking water safety certification)

## Sub Activities

Overview Video: A video detailing the slab lifting process can be found at the following link: https://web.microsoftstream.com/video/62fa3ea0-b36f-4d6d-a4c8-e75af17ac1ba

## General Instructions for Expansion Foam Injection Work

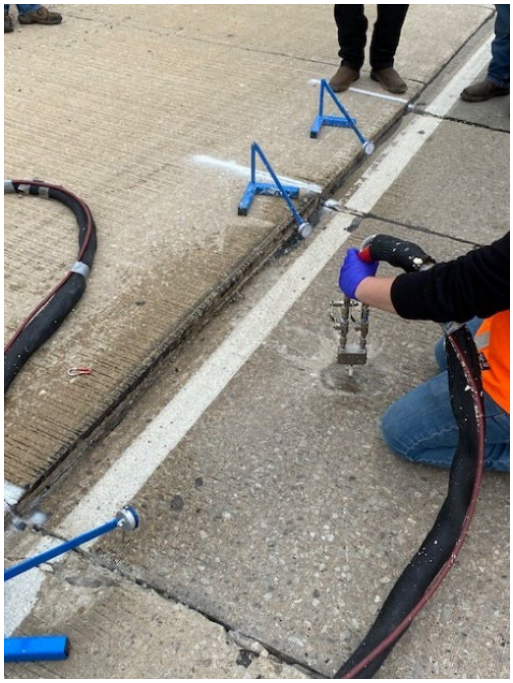
1. Planning for expansion foam injection work
    a. Consult with Technical Services to select locations that are acceptable for expansion foam injection
    b. Plan the amount of expansion foam material that will need to be purchased and used. The foam material fills voids of approximately 2 cubic feet per gallon of material used (A and B combined). If the approximate size of the void is known, monitor the amount of material used when injecting foam to determine if overfilling or loss of foam into another location is occurring.
2. Preparing for use of expansion foam injection equipment
    a. The following steps need to be taken to set up the foam injection trailer. Refer to the attached Start-Up guide for specific instructions for each step:
        i. Starting up generator, air compressor, and water pump
        ii. Starting up proportioner pump
        iii. Setting up stick pumps on Side A and Side B drums
        iv. Attaching gun to Side A and Side B hoses

## Instructions for Lifting Concrete Slabs Using Expansion Foam Injection

1. Before drilling holes, cut slab away from adjacent slabs at joints or large cracks using a concrete saw. The cuts will keep the slab being lifted from binding to the adjacent slabs and ensure that the only the slab undergoing the injection will lift during the foam injection process.
2. All joints and cracks should be sprayed with AP 125 flush solution using the provided garden sprayer. The sprayer should be filled with a mixture of 4 parts water and 1 part AP Flush 125 material. Spraying the pavement surface with this material will prevent any foam material that seeps up from cracks or joints from adhering to the pavement.
3. For lifting large slabs (ex. bridge approach slabs that are width of one or more lanes):
    a. Begin at the lowest point of the slab that needs to be lifted and drill a 5/8 inch hole 12-18 inches from any joints or edges of the slab. Drill subsequent holes at 6-foot intervals parallel to the edge of the slab that needs to be lifted. Make sure that the holes are 12-18 inches from the joint or edge of the slab.
    b. Holes should also be drilled in another row behind, further away from, the edge of the slab that needs to be lifted to fill in any voids created by lifting the edge of the slab; these holes should be approximately 6 feet from any adjacent holes.
4. For lifting small slabs (ex. sidewalks, concrete pavement slabs)
    a. Drill an initial hole in the center of the slab and begin filling material in this hole. It may be possible to raise the slab using just this hole. If a particular location on the slab is not lifting, a hole can be drilled and injected into near that location. Any holes drilled should be approximately 12-18 inches from the edge of the slab or any previously drilled holes.
5. Begin by inserting the tip of the injection gun into the drilled hole at the lowest point of the slab for large slabs, or the initial center hole for small slabs. Before injecting foam material into the hole,

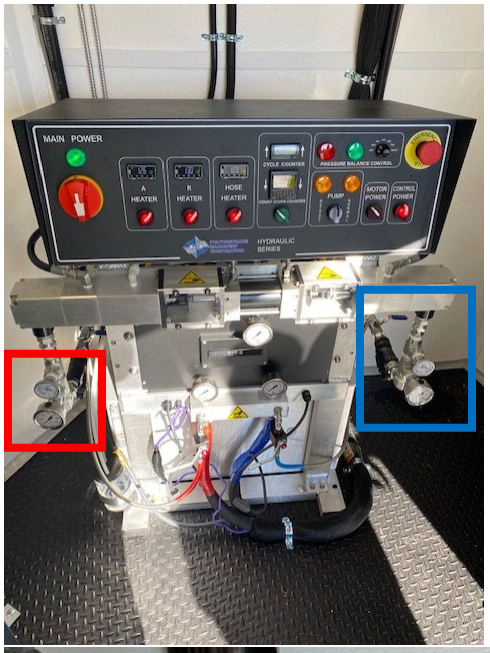
first inject a small amount of water into the hole to make sure that the hole has been successfully drilled into a void. If the water splashes back out of the hole, the hole has not been drilled deep enough and will need to be drilled deeper into the void. If the water can be injected into the hole, the foam material can then be injected into the drilled hole using the injection gun.

6. Inject the foam material into the hole at the lowest point of the slab for large slabs or the center hole for small slabs. Inject foam into the hole in 6-8 second bursts, making sure to always monitor the movement of the slab while injecting. Water should be injected into the hole periodically to make sure that the hole is clear for injecting. If the water cannot be injected into the hole and splashes back out, the foam material may have set at the top of the void and will need to be drilled through. Re-drill the injection hole to create a hole in the set foam material, then inject with water to make sure the injection hole is clear. If the water can be injected, continue injecting foam into the hole in 6-8 second bursts.
7. When injecting the foam material into a void, the dial gauge device can be used to monitor that the slab is rising (see the images at the end of this section of the setup of the dial gauges). To use this device, place the tip of the gauge on the slab that is being lifted near the hole that the material is being injected in, and the base on an adjacent slab or adjacent surface, THE TIP OF GAUGE AND BASE OF GAUGE SHOULD NOT BE ON THE SAME SLAB. While injecting the foam material, watch the dial to see if it is moving in a clockwise direction. If the dial is rotating clockwise, it means that the foam is lifting the slab. If the slab is being lifted follow the procedure detailed in point “9” below to avoid over-lifting the slab. If the dial gauge begins to spin in a counterclockwise direction, it likely means that the foam is entering a void under the adjacent slab and is causing it to be lifted. If this happens, stop injecting into the current injection hole and move to a hole at a new location and begin injecting there. WHEN INJECTING FOAM BE SURE TO MONITOR SURROUNDING AREA. THE FOAM MAY BE RAISING ADJACENT SLABS OR FILLING ITEMS (CULVERTS/INLETS/ETC.) THAT SHOULDN’T BE FILLED. BE ESPECIALLY AWARE OF THIS IF A LARGE VOLUME OF FOAM HAS BEEN PUMPED AND SLAB HASN’T RAISED.
8. If the approximate size of the void is known, monitor the amount of material used when injecting foam to determine if overfilling or loss of foam into another location is occurring.

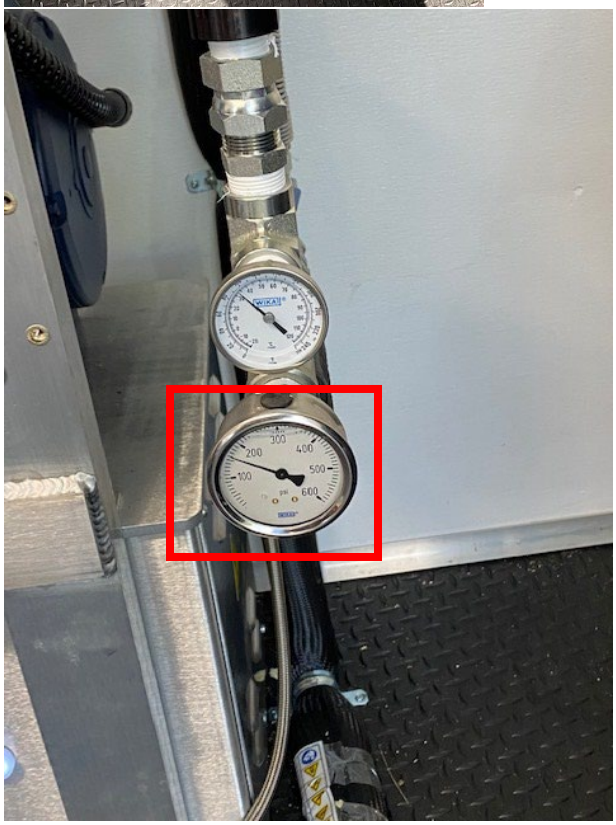


9. Lift the slab in increments of approximately ¼ inch. After the slab has been lifted approximately ¼ inch, stop injecting briefly to allow for the foam to rise and set, then check the level of the slab compared to the adjacent slab. If the slab needs to be lifted further, continue with the process of injecting foam into the hole.
10. While injection is being performed, someone from the crew should remain inside the trailer to monitor the pressure gauges for the A and B sides of material on the proportioner pump (see images below for location of A and B side pressure gauges). The pressures of each side should be within approximately 100 psi of each other.
    a. If the difference between the two sides is greater than 100 psi, the foam will not mix correctly and will not function as intended. If there is a difference in pressure, stop injecting and check ends of the A and B side hoses for blockages and remove the injectors from the gun and clean them before resuming injection process.

A Side Pressure Gauge




B Side Pressure Gauge




11. If the slab hasn't been raised to the desired level, you may need to inject foam into holes that you have already injected foam into. Holes that have already been injected with foam material may need to be re-drilled to create a hole in foam material that has set. Continue the process of injecting foam into each of the holes and raising them ¼ inch at a time until the slab is level and even with the adjacent slab.

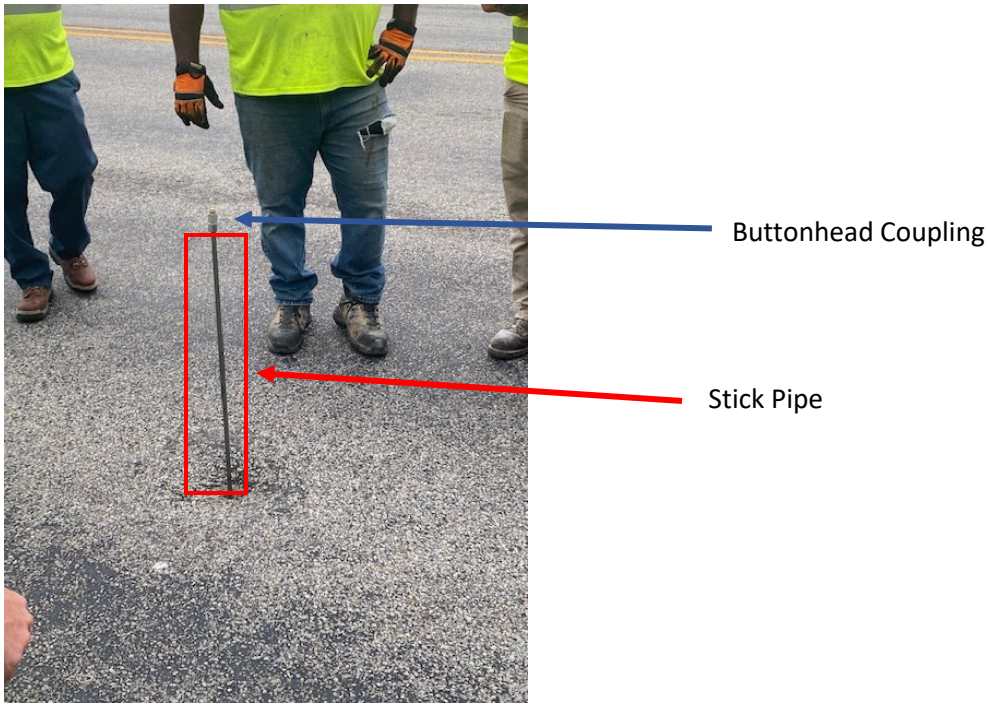
12. During foam injection process, foam may escape through cracks or joints and bubble up above the surface of the pavement. This is normal and not an issue for concern; if this happens, pause injection and spray the bubble and pavement around it the AP 125 solution. After spraying, the foam bubble can be easily pulled up and the residue can be scraped off the pavement. The foam injection can then be resumed; the locations where the foam bubbled up above the pavement will be sealed by the foam and create a dam to hold the foam in the void under the slab.

13. After slab has been raised at edge fill voids formed, at holes further from edge, by the raising of the slab.

**<u>Instructions for Deep Injection of Large Voids</u>**

1. Determine location of voids by sounding pavement surface with a hammer, rod, or other tool, looking for hollow sounds produced by tapping the pavement.
2. Drill into pavement surface at the approximate site of the center of the void, making sure to drill deep enough to access the void area.
3. Determine depth of void by inserting provided orange fiberglass rod into void and noting the height of the rod above the pavement when it reaches the bottom of the void.

4. Cut stick pipe to the length required for injection into the void. The stick pipe should reach the bottom of the void and have approximately 3 feet of pipe above the surface of the pavement. Use the measurement of the fiberglass rod as a reference to determine the length of pipe needed.




5. Insert provided carriage bolt fastener into one end of stick pipe and tape to pipe with painter's tape. The bolt will keep the pipe from clogging with soil when it is inserted into hole for injection and will be forced off the end of the pipe when the foam injection is started.
6. Insert the stick pipe into the drilled hole, with the end of the pipe that has the bolt attached going down into the hole and the open end of the pipe above the pavement surface.
7. Attach a buttonhead coupling onto the open end of the stick pipe, and the deep injection attachment onto the tip of the gun.

8. Slide the deep injection attachment onto the buttonhead coupling and begin injecting foam. The foam can be injected in long 30-40 second bursts. It is recommended to keep the pauses between injection bursts at a minimum (5 seconds or less) to keep the foam from expanding and seeping up the injection pipe.

MixMaster deep injection attachment

9. Check the filling of the void by sounding the pavement surface with a hammer, rod, etc. When the sound produced by tapping the pavement is no longer hollow sounding, the void is filling up with foam.
10. If the approximate size of the void is known, monitor the amount of material used when injecting foam to determine if overfilling or loss of foam into another location is occurring.
11. Sound other locations around the area of the void you have injected into to search for other voids, and drill and inject in these locations using the above steps.

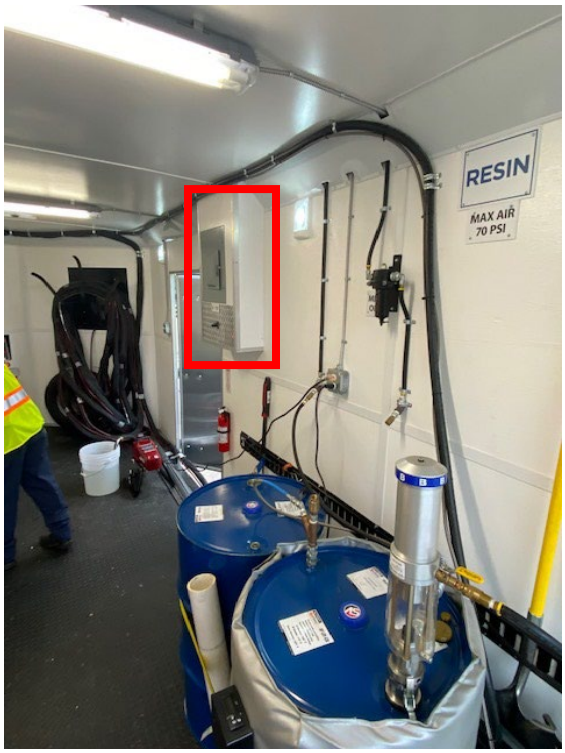
## General Instructions for Expansion Foam Equipment Shut Down and Site Clean Up

1. The following steps need to be taken to shut down the foam injection trailer. Refer to the attached Start-Up Guide for specific instructions for these steps:
    a. Shut down proportioner pump and stick pumps
    b. Put proportioner into retract mode
    c. Shut off and put away generator and air compressor
    d. Remove and clean foam injection gun
2. Sweep roadway clean of debris before it is opened to traffic.
3. The roadway can be opened to traffic 30 minutes after the final injection of foam material has occurred.

# Expansion Foam Injection Trailer Start-Up and Shut Down Guide

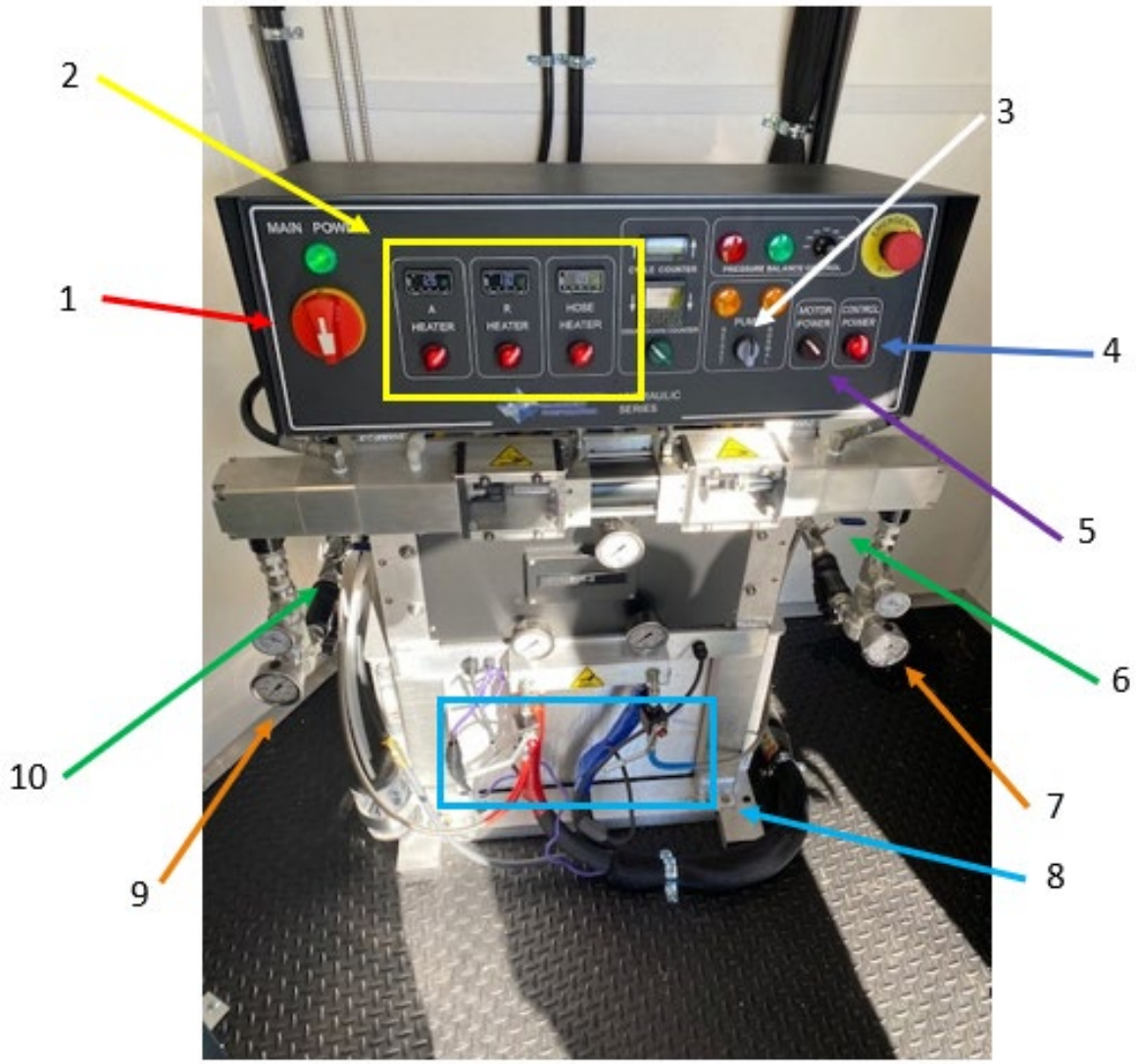
## Start-Up Steps

- Rig Start up
  - Check fuel levels in air compressor and generator
  - Check oil levels in air compressor, generator, and water pump
  - Make sure all breakers are off on the panel. The breaker panel is located on the wall of the trailer next to the side door (see red box in image below).
  - Start the generator.
  - Unlock the slide, insert the locking pin.
  - Turn on the air compressor.
  - Turn on all breakers in panel.



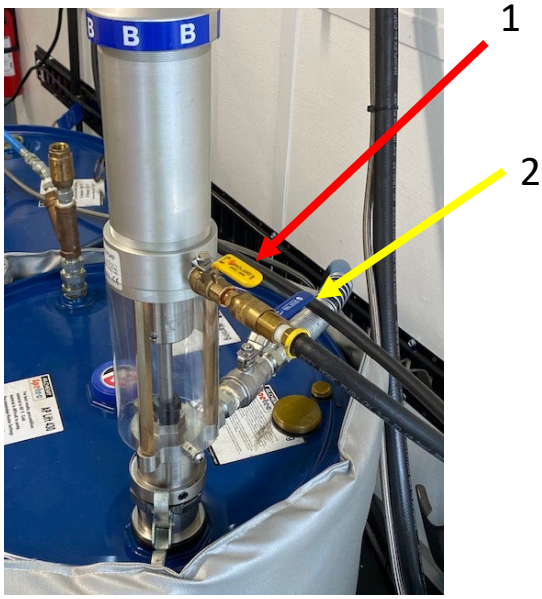
- Proportioner Set Up
  - Turn on Main power (see red arrow #1 on “Proportioner Components” diagram below)
  - Turn on Control power (see blue arrow #4 on “Proportioner Components” diagram below)
  - Slowly turn on the three heaters: Turn on "A Heater," wait 10-15 seconds; turn on "R Heater,” wait 10-15 seconds; Turn on "Hose Heater” and wait 10-15 seconds (see yellow box and arrow #2 on “Proportioner Components” diagram below).
  - Open recirculation valves on A and B sides (see light blue box and arrow # 8 on “Proportioner Components” diagram below). On the valve handles, up is open and down is closed (recirculating back to drums).
  - Open in-line valve on A and B sides (see green arrows #6 and #10 on “Proportioner Components” diagram below).

## Proportioner Components



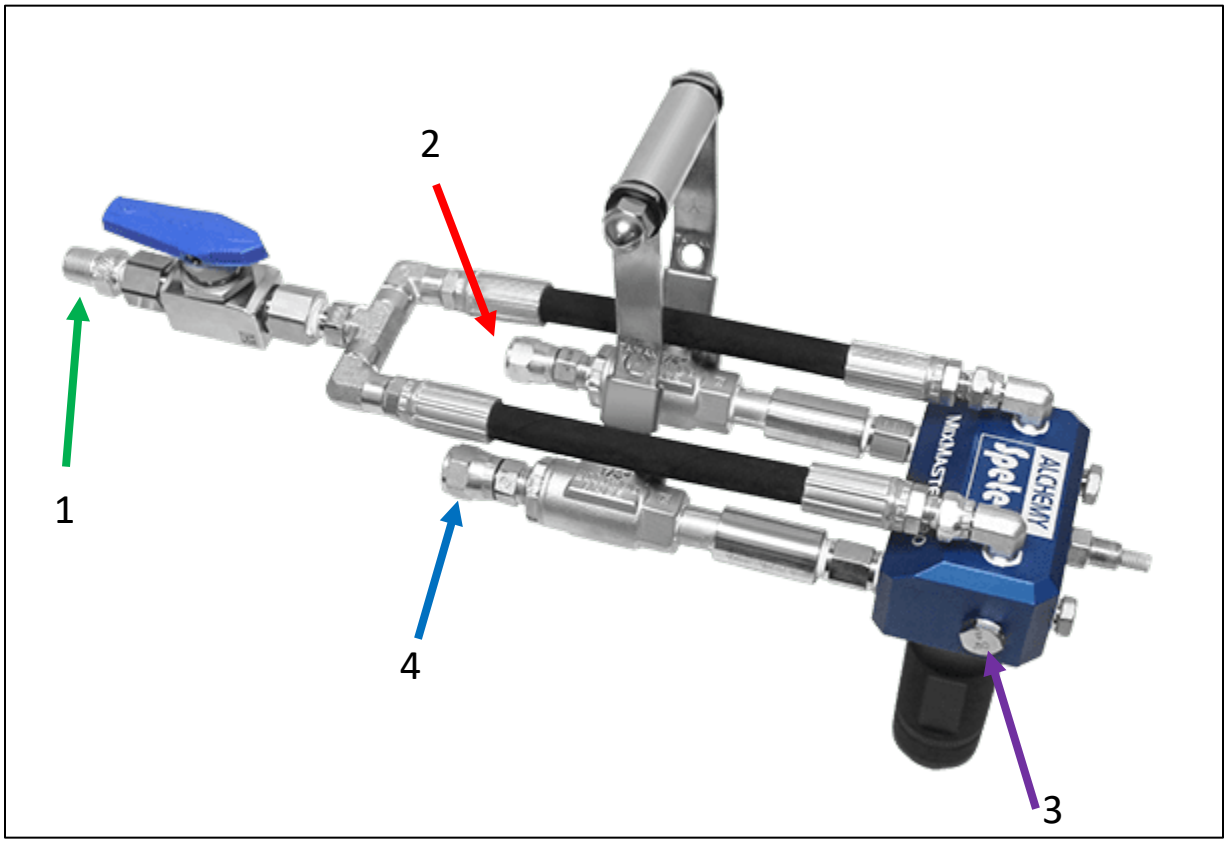
- Open the air valve on each of the stick pumps (see red arrow #1 on "Stick Pump" diagram below).
  - Once the air valves are open, you should hear the stick pumps starting to pump (this is recirculation mode for warming up the machine and product)
  - Opening the air valves should be done before putting gun on.
- Open the valve to the material hoses on each of the stick pumps (see yellow arrow #2 on "Stick Pump" diagram below).

**Stick Pump**




- Attaching Gun to Hoses
  - If you are touching the working end of the hose, pressure gauges need to be at zero (see orange arrows #7 and #9 on "Proportioner Components" diagram above for pressure gauge location) and the air supply needs to be off.
  - Shut both A and B inlet valves on backside of machine.
  - To bleed the pressure off the system you must open the circulation valves on the A and B sides.
  - Secure the hoses via the vice clamps.
  - Make sure the water line is attached to the gun first (see green arrow #1 on "Gun Components" diagram below).
  - Turn on the water pump.
  - Remove A and B caps from the end of the hose and attach the gun (see red arrow #2 for A side attachment location and blue arrow #4 for B side attachment location on the "Gun Components" diagram below).
  - Do not over-tighten the A and B fitting to gun.
  - Check that injectors are clean and install in gun block (see "Injectors" image below for picture of injectors and the purple arrow #3 on the "Gun Components" diagram below for the location of the B side injector on the gun; the A side injector goes in the same location on the other side of the gun block).

## Gun Components




## Injectors

- Powering Up Machine After Attaching Gun
  - Close recirculation valves on A and B sides.
  - Open both A and B inlet valves on back of machine
  - Turn the pump to normal (see white arrow #3 in “Proportioner Components” diagram above).
  - Turn on motor power (see purple arrow #5 in “Proportioner Components” diagram above).
    - Once motor power is on, the machine will start to stroke and build pressure.
  - You are ready to pump.

- Notes on Operating MixMaster Gun
  - Always flush the gun immediately.
  - When in operation, the handle of the gun needs to be fully opened.
  - If the chemical pressures are off ratio while pumping, always check your high-pressure side for blockage in the injectors. The chemical pressures (A and B sides) should always be within 100 psi of each other.

**Shut Down Steps**

- Begin Shut Down Process
  - Turn motor power off.
  - Turn all three heaters off.
  - Open recirculation valves.
  - Shut the inlet valves.
- Removing Gun After Completing Injection Process
  - Clamp the handle of gun in the vise.
  - Double check that all pressure gauges read zero.
  - Remove the supply lines.
  - Cap the supply lines.
- Cleaning the Gun
  - Open the supply handle.
  - Flush the gun with water.
  - Remove the injectors on the side of the gun.
  - Clean thoroughly with brake cleaner.
  - A video detailing cleaning instructions can be found here: https://web.microsoftstream.com/video/eea36c1e-9825-4fbb-b453-d32f8e3cd365
- Putting Machine in Retract
  - Open inlet valves.
  - Close recirculation valves.
  - Turn motor power on
  - Put machine in "retract" quickly (see white arrow on “Proportioner Components” diagram above).
  - Turn motor power off.
  - Turn control power off.
  - Turn main power off.
- Final Shut Down Steps
  - Complete these steps before shutting generator down:
    - Drain air regulator.
    - Flip all breakers to “Off.”
    - Shut fluid valve at stick pump (see yellow arrow on “Stick Pump” diagram above).
    - Drain air tanks on air compressor
  - Shut down generator
  - Put generator and air compressor back in their places on the trailer and strap each down.

**Additional Items to Consider**

- Do not thread the stick pumps all the way into drums.
- Be careful with the rubber washers on the stick pumps.
- Desiccant filter on the A side is good for approximately a year, but there is a window indicator that will turn red when it is time to change it out. If the filter is in need of changing out, notify the Central Equipment Yard fleet personnel of this when the foam trailer is returned.
- Do not pinch the hoses coming from the stick pumps between drums.
- Pump lube for the A side needs to be changed once it becomes yellow-ish.
- Clean the jar with brake cleaner.
- Ensure pressure gauges are within +/-100 psi of each other.
- Pump pressure should be approximately 100 psi; the pressure is adjusted with a knob located on the back of the motor.

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Other Roadway & Shoulder Maintenance | CODE | 2190 |
|---|---|---|---|

**Purpose**

Perform other work activities on the roadway and shoulder that are not specifically identified as separate work activities. This activity does not include preparation and clean-up work directly related to another activity.

**Category** Pavement & Shoulders

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule throughout the year, as required, observing temperature and weather limitations for individual activities. If excavation equipment is needed, then a utility locate is needed with Indiana811.

| Reporting | Asset to Report to | Pavement Keys | Reporting Units | Person Hours |
|---|---|---|---|---|

Accomplishment is reported in person hours.

For additional work order reporting guidance see the Work Orders section of the Preface.

| Crew Size | Workers QTY |
|---|---|
| Determined by the specific work activity to be performed | |

**Job Specific Equipment**

| | QTY |
|---|---|
| Determined by the specific work activity to be performed. | |

**P.P.E.**

1) Base P.P.E.

**Materials**

Determined by the specific work activity to be performed.

**Other References**

**Sub Activities**

2106 – Wide Crack Seal
2107 – Crack Filling with emulsion
2110 – Repair of bleeding pavement
2125 – Installation or repair of concrete curb ramps
2130 – Repair of concrete curbs
2135 – Repair of concrete sidewalks

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Other Roadway & Shoulder Maintenance | CODE | 2190 |
|---|---|---|---|

## Work Method

This activity is only to be used for work that is not specifically covered by another activity and should have seldom use. If unable to find another activity to use, reach out to Central Office Maintenance Support or WMS team to ask what activity is a more appropriate option to 2190.

VALID EXAMPLES:

- Sealing wide cracks. Use of sealant such as CRAFCO Mastic One for cracks and longitudinal joints that are too wide (> 1.5") to seal with crumb rubber under Activity 2070 - Crack Sealing.
- Crack filling with emulsion, such as AE-90S. This activity may be done as directed by Technical Services. An example for applying this treatment is to hold together a failing road temporarily prior to a rehabilitation project. It is preferable to seal cracks with crumb rubber, which has been shown to be a superior material. Note that temperatures should be over 40 degrees when performing this treatment.
- Repair of a bleeding pavement surface with aggregate
- Installation or repair of curb ramps
- Repair of concrete curbs
- Repair of concrete sidewalks
- Hand removal of small areas of sod from the edge of pavement or from under sections of guardrail 60 feet and less in length. If work is done over a section longer than 60 feet in length, report to 2120 - Clipping Shoulders. Ensure that comments on Work Order include: “Hand Clipping Shoulders for (insert number of feet) feet.”

INAPPROPRIATE EXAMPLES:

- Work at Crossovers. Reference the Activity that was performed and note in the comments that the location was at a crossover.
- Spot Sealing. Can be reported to 2030 - Spot Paving, 2050 - Seal Coat, 2051 - Fog Seal or 2140- Bump Grinding.
- Surface Milling. Report to 2030 - Spot Paving or 2140 - Bump Grinding.
- All repairs of pavement, including potholes, washouts, mailbox approaches and public road approaches, should be reported to Activity 2010 – Permanent Shallow Patching, Activity 2011 – Temporary Shallow Patching or Activity 2020 – Deep Patching, whichever is appropriate.
- All repairs of unpaved shoulders, including potholes, washouts, drop-offs, mailbox approaches and public road approaches, should be reported to Activity 2100 – Spot Repair of Unpaved Shoulders.

## Special Considerations

| | APPROVED BY |
|---|---|
| | Director, Highway Maintenance |

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Mowing | CODE | 2210 |
|---|---|---|---|

**Purpose**

Mowing roadsides maintains safe sight distance, also temporary controls woody vegetation, invasive/noxious plants.

**Category** Vegetation

- ☒ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

This activity must be scheduled after seed heads have started to bolt on cool-season grasses to be cost effective. Generally, this seed head production happens in southern Indiana in mid-May and northern Indiana in late May, to early June. Spot Mowing (Activity 2270) may be needed to maintain line of sight at interchanges and median crossovers.

Mowing needs to be coordinated with herbicide treatments both contracted and in-house (Activities 2230 and 2231).

All mowing must be performed in accordance with the current Vegetation Management Policy - Operation Memorandum 14-05.

Coordination of mowing needs to be made with Construction in advance of contracts that would need to have area mowed prior to beginning, i.e. resurfacing, herbicide contracts.

| Reporting | Asset to Report to | Pavement Keys | Reporting Units | Swath Miles |
|---|---|---|---|---|

Accomplishment is total swath miles mowed. A swath mile is 4 feet X 1 mile (5280 ft.) = 1 swath mile

All sign and guardrail trimming will be recorded on this activity.

Additional special spot mowing efforts to control noxious/invasive plants or sight distance corrections should be reported to Spot Mowing (Activity 2270).

For additional work order reporting guidance see the Work Orders section of the Preface

**Crew Size** 2-5 Workers

| | QTY |
|---|---|
| Tractor/Mower Operators | 1-4 |
| Truck Driver/Laborer/Trimmer | 1 |

*Traffic Control Personnel are NOT shown here

**P.P.E.**

1) Base PPE
2) Face Protection recommended when using Trimmer (Weed Eater).

NOTE: If hand-mowing wild parsnip, poison hemlock, poison ivy, or giant hogweed is required - long-sleeved shirt & soap /water are required.

**Materials**

None

**Job Specific Equipment**

| | |
|---|---|
| 50 to 100 horsepower tractor | 1-4 |
| 5 to 15 foot rotary mower | 1-4 |
| Crew Cab with portable fuel tank | 1 |
| Weed Eater | 1-2 |
| Hand Broom | 1-2 |
| Leaf Blower | 1-2 |

*Traffic Control Equipment is NOT shown here

**Other References**

**Sub Activities**

2205 – Maintenance Mowing of Native/Wildflower Planting

| Average Daily Production | 40- 55 Swath Miles | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Mowing | CODE | 2210 |
|---|---|---|---|

**Work Method**

1. Place safety devices.
2. Check safety equipment on tractor, fill equipment with fuel while engine is cool and not running.
3. Check safety equipment on mower, ensure all guards are in place and working properly.
4. Check and adjust mower height to the correct mowing height to between 6 to 8 inches. This is the most important work method the operator has control over, if mowed less than 6 inches the grass root system is damaged allowing weeds to fill in areas covered by grass. When a mower scalps or digs into ground, the area is prone to invasive species to fill in the area. Proper mowing height will also extend the life of all equipment used to mow and reduce the cost to maintain.
5. Lubricate all grease fittings daily or as recommended by manufacturer.
6. Start all mowing next to the shoulder and work your way out to the designated mowing limit. To be most efficient match the mower width to the area to be mowed, if mowing limited width on a wide R/W, one Batwing Mower should be used. On roads with narrow R/W's that only requires one pass, use a five or six foot mower to complete the limited width. Mower may mow either with or against traffic or in any combination. When mowing with tractors on both sides of the road, mowers must be separated by a minimum 500 feet. Tractors must not have any part of mowing equipment on the travel portion of the roadway.
7. Overlap each pass by 10% -15% to pick up any vegetation missed on first pass.
8. Stop tractor/mower and remove any debris/trash that may be thrown by the mower, damage equipment or look unsightly after being cut.
9. Care should always be taken when mowing close to fixed objects (signs, guardrail and other safety devices) so as not to damage or hit them.
10. Trimmers should cut broadleaf plants and the seed heads off of grass species around signs and guardrail. Trimmers will also need to load debris/trash that mowers moved to side in trim vehicle for disposal.
11. Clean equipment by sweeping with kitchen broom or leaf blower within the mowed area immediately after cutting any invasive or noxious plants. This will reduce the spread and cost to control these species.
12. Park equipment in a secure location that is out of the clear zone and that will discourage vandalism. Always get permission to park on private property and never re-fuel equipment on private property.
13. Equipment should be cleaned of any vegetative debris and dirt at the end of each work day.
14. Remove safety devices.

| ACTIVITY | Mowing | CODE | 2210 |
|---|---|---|---|

**Work Method (cont.)**

**Mowing Swath Mile Chart**

| Average Width of Cut (feet) | Length (Miles) 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 0.3 | 0.5 | 0.8 | 1.0 | 1.3 | 1.5 | 1.8 | 2.0 | 2.3 | 2.5 |
| **2** | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 |
| **3** | 0.8 | 1.5 | 2.3 | 3.0 | 3.8 | 4.5 | 5.3 | 6.0 | 6.8 | 7.5 |
| **4** | 1.0 | 2.0 | 3.0 | 4.0 | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 |
| **8** | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 | 12.0 | 14.0 | 16.0 | 18.0 | 20.0 |
| **12** | 3.0 | 6.0 | 9.0 | 12.0 | 15.0 | 18.0 | 21.0 | 24.0 | 27.0 | 30.0 |
| **16** | 4.0 | 8.0 | 12.0 | 16.0 | 20.0 | 24.0 | 28.0 | 32.0 | 36.0 | 40.0 |
| **20** | 5.0 | 10.0 | 15.0 | 20.0 | 25.0 | 30.0 | 35.0 | 40.0 | 45.0 | 50.0 |
| **24** | 6.0 | 12.0 | 18.0 | 24.0 | 30.0 | 36.0 | 42.0 | 48.0 | 54.0 | 60.0 |
| **28** | 7.0 | 14.0 | 21.0 | 28.0 | 35.0 | 42.0 | 49.0 | 56.0 | 63.0 | 70.0 |
| **32** | 8.0 | 16.0 | 24.0 | 32.0 | 40.0 | 48.0 | 56.0 | 64.0 | 72.0 | 80.0 |
| **36** | 9.0 | 18.0 | 27.0 | 36.0 | 45.0 | 54.0 | 63.0 | 72.0 | 81.0 | 90.0 |
| **40** | 10.0 | 20.0 | 30.0 | 40.0 | 50.0 | 60.0 | 70.0 | 80.0 | 90.0 | 100.0 |
| **44** | 11.0 | 22.0 | 33.0 | 44.0 | 55.0 | 66.0 | 77.0 | 88.0 | 99.0 | 110.0 |
| **48** | 12.0 | 24.0 | 36.0 | 48.0 | 60.0 | 72.0 | 84.0 | 96.0 | 108.0 | 120.0 |
| **52** | 13.0 | 26.0 | 39.0 | 52.0 | 65.0 | 78.0 | 91.0 | 104.0 | 117.0 | 130.0 |
| **56** | 14.0 | 28.0 | 42.0 | 56.0 | 70.0 | 84.0 | 98.0 | 112.0 | 126.0 | 140.0 |
| **60** | 15.0 | 30.0 | 45.0 | 60.0 | 75.0 | 90.0 | 105.0 | 120.0 | 135.0 | 150.0 |
| **64** | 16.0 | 32.0 | 48.0 | 64.0 | 80.0 | 96.0 | 112.0 | 128.0 | 144.0 | 160.0 |
| **68** | 17.0 | 34.0 | 51.0 | 68.0 | 85.0 | 102.0 | 119.0 | 136.0 | 153.0 | 170.0 |
| **72** | 18.0 | 36.0 | 54.0 | 72.0 | 90.0 | 108.0 | 126.0 | 144.0 | 162.0 | 180.0 |
| **76** | 19.0 | 38.0 | 57.0 | 76.0 | 95.0 | 114.0 | 133.0 | 152.0 | 171.0 | 190.0 |
| **80** | 20.0 | 40.0 | 60.0 | 80.0 | 100.0 | 120.0 | 140.0 | 160.0 | 180.0 | 200.0 |
| **84** | 21.0 | 42.0 | 63.0 | 84.0 | 105.0 | 126.0 | 147.0 | 168.0 | 189.0 | 210.0 |
| **88** | 22.0 | 44.0 | 66.0 | 88.0 | 110.0 | 132.0 | 154.0 | 176.0 | 198.0 | 220.0 |
| **92** | 23.0 | 46.0 | 69.0 | 92.0 | 115.0 | 138.0 | 161.0 | 184.0 | 207.0 | 230.0 |
| **96** | 24.0 | 48.0 | 72.0 | 96.0 | 120.0 | 144.0 | 168.0 | 192.0 | 216.0 | 240.0 |
| **100** | 25.0 | 50.0 | 75.0 | 100.0 | 125.0 | 150.0 | 175.0 | 200.0 | 225.0 | 250.0 |

**Special Considerations**

Equipment should have vegetative debris removed periodically during the work day to minimize the spread of invasive species.

Crews should carry water and medicated soap to wash off any body part that might come in contact with plant borne allergens such as poison ivy.

**APPROVED BY**

Director, Highway Maintenance

| Average Daily Production | 40- 55 Swath Miles | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Manual Brush Cutting | CODE | 2220 |
|---|---|---|---|

**Purpose**

This activity is used where mechanical brush cutting is not feasible or there are accessibility constraints. Examples are under and around bridges and in communities that are sensitive to other methods of brush cutting.

**Category** Vegetation

- ☐ PM
- ☐ QA
- ☐ Plan Location

**Scheduling & Coordination**

This work will be scheduled 1 October through 1 April, after leaves have fallen. Brush is defined to be any tree or shrub species less than 3 inches in diameter at a height of 4½ feet from the ground. This is called "Diameter at Breast Height" (DBH). If you see any bat in any tree in the work area, stop all work and contact Central Office Environmental Services.

Work on trees greater than 3" DBH should be reported to Tree Trimming (Activity 2250) or Tree Removal (Activity 2251).

Removal of downed limbs, or other storm debris, should be reported to Storm Debris Removal (Activity 2611).

Work should be coordinated with the addressing of bridge deficiencies and Herbicide Spot Treatment (Activity 2230).

Only trained personnel may operate chainsaws.

Only licensed applicators may apply herbicides.

| Reporting | | Asset to Report to | Various* | Reporting Units | Square Feet |
|---|---|---|---|---|---|

Accomplishment is the number of square feet cleared. Measure the length and multiply by the width (in feet) to determine the area cleared for reporting purposes.

A scanned copy of the completed Job Hazard Analysis and Herbicide Record Sheet must be attached to the Work Order in WMS.

Report work on bridge cones to the bridge asset, not the pavement key.

For additional work order reporting guidance see the Work Orders section of the Preface

*Report to bridge structures or large culverts when the work performed is to address a work request for a bridge structure or large culvert.

Reporting Options:

- Pavement Keys
- Bridge Structures
- Large Culverts

**Crew Size** 3 Workers

| | QTY |
|---|---|
| Laborer | 3 |

*Traffic Control Personnel are NOT shown here

**P.P.E.**

1) Base PPE
2) Face Protection
3) Chainsaw Chaps
4) OSHA Logger's First-Aid Kit
Additional PPE as required by Herbicide Product Label and Safety Data Sheet
No Loose Fitting Clothing or Jewelry

**Materials**

Herbicide and Basal Oil

or

Ready-To-Use Herbicide labeled for cut surface/stump treatments.

**Job Specific Equipment**

Chipper
Chainsaw
Herbicide application equipment
Chainsaw tools
*Traffic Control Equipment is NOT shown here

**Other References**

Chainsaw Safety Instructions
Herbicide Product Labels and Safety Data Sheets

**Sub Activities**

| Average Daily Production | 10,000 - 15,000 Sq. Ft. | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

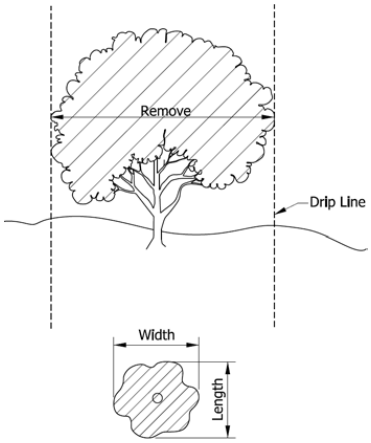
| ACTIVITY | Manual Brush Cutting | CODE | 2220 |
|---|---|---|---|

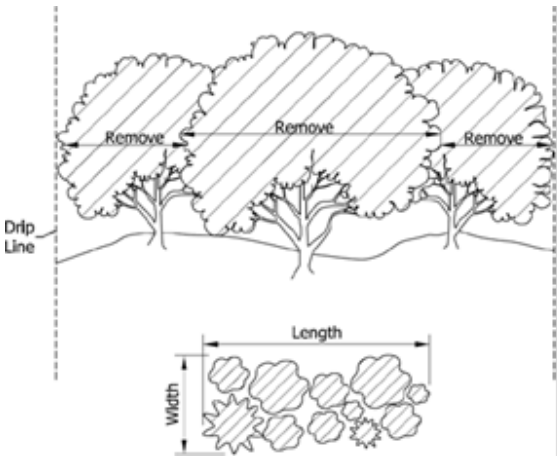
**Work Method**

Manual brush cutting using a chainsaw:

1. Place all Safety Devices.
2. Complete Job Hazard Analysis form and review all safety procedures as covered in Chainsaw Safety Instructions.
3. Put on all of your proper safety equipment, as injury and death may occur from chainsaw operation. Tie back long hair and remove any jewelry from your body.
4. Set the chainsaw on a flat area. Ensure that chain brake is engaged. Place your left hand on the front handle and your right foot inside the rear handle. Grab the starter rope with your right hand and start the chainsaw according to your model's starting instructions.
5. Walk up to the first bush to be cut. Release chain brake. Depress the throttle completely and move the tip across the branches of the bush. Work from the top down and cut slowly to the desired depth.
6. Cut as much as possible with the tip and the underside of the bar, where most of the power comes from, giving it a cleaner cut. Move the tip slowly and always keep an eye on the tip. All other personnel should be at least 10 yards away at all times. All stumps shall be cut to a level not to exceed 2 inches from ground level.
7. Turn the chainsaw off if any pieces of the bush become trapped between the chain and the bar. Lock the safety brake when you're walking with the chainsaw. Keep both hands on the chainsaw at all times when it is running.
8. If under a bridge, debris should be stacked on the edge of R/W. Never stack debris under a bridge deck or where high water will carry it downstream. If on the roadside, debris should be processed through a brush chipper and dispersed on R/W or loaded into a truck and dumped at an approved location.
9. A licensed pesticide applicator shall apply an approved cut surface/stump treatment to all stumps within 1 hour of cutting.
10. Remove all Safety Devices.

Guide to measuring square footage:




Notes:

1. When drip line/limbs are touching, the area to be measured is from the outer limits of the end bushes.
2. When isolated brush is removed, instead of calculating the area as a circle, square the area off.
3. Square Footage = Length x Width
4. This activity is for brush cutting. Brush is woody vegetation that is less than 3" DBH.

Woody vegetation that is over 3" DBH is considered a tree and work on trees should be reported to Tree Trimming (Activity 2250) or Tree Removal (Activity 2251).

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Manual Brush Cutting | CODE | 2220 |
|---|---|---|---|

**Special Considerations**

The goal for this activity is to completely remove/control the brush, not to trim it. Trimming shrubs species will result in return visits to the same site in as little as one year. If an entire shrub cannot be cut off at the ground level, consider scheduling a foliar herbicide to deaden problematic portion of the shrub or reduce its growth. Communicate with the adjacent landowner regarding the reasons for the need for control.

Crews should carry water and medicated soap to wash off any body part that might come in contact with plant borne allergens such as poison ivy.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 10,000-15,000 Sq Ft | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# CHAINSAW SAFETY INSTRUCTIONS

**Activities 2220, 2250, 2251, 2260, 2280**

This is the general instructions for the use of a chainsaw for all activities. Each activity is required to use a chainsaw and work methods vary only slightly but all can be dangerous if precautions are not followed.

GENERAL:

Only personnel trained in Basic Chain Saw Safety shall operate a chain saw to perform brush cutting, tree trimming and tree removal operations.

There are many hazards associated with operating a chain saw and the types of injuries that could occur require that it never be a one person operation.

1. Personal Protective Equipment

   An OSHA approved Logger First Aid Kit shall be present and available at all times.

   Following Personal Protection Equipment shall be worn by the Chainsaw and Chipper Operators

   - Hardhat
   - Chain Saw Chaps
   - Eye Protection
   - Face Protection
   - Hearing Protection
   - Protective Foot Wear
   - Hand Protection - Should have slip resistant palm
   - Assistant (Safety Observer)
   - Hardhat
   - Eye Protection
   - Hearing Protection
   - Protective Foot Wear
   - Hand Protection - Should have slip resistant palm

   In addition to above PPE, the Assistant (Safety Observer) shall have a whistle for warning others. If worn around neck, it must be tucked inside clothing to prevent becoming a hazard. Whistle shall be readily accessible but shall not be worn in a manner to become a personal safety hazard. Do not allow whistle to hang freely and become a “snag” hazard.

2. Communications:

   Crew shall have properly operating employer provided communication equipment capable of maintaining continuous communications with the local Sub District Office and develop backup procedures in the event of loss of communications.

3. Emergency Plan:

   Sub District:

   - Shall know the location of the work site
   - Provide routing directions to local emergency authorities.
   - Notify crew of all Weather Warnings for their area

   Work Crew:

   - Provide local Sub District with current work site location or relocation.

- Provide the Sub District with emergency routing directions. (Example: For a work site that is located in a remote location off the roadway.)
- If needed, when working off the roadway, identify emergency route by marking with cones, flags or other identifiable means.
- Be alert of changing weather conditions and request updates from the sub district as necessary. (All work shall cease and employees shall move to a safe place during electrical storms, periods of high winds or other weather conditions that may be dangerous to personnel.)

4. Work Site Hazards

There are many hazards associated with operating a chain saw and the types of injuries that could occur require that it never be a one person operation. All Chain Saw Operations, at a minimal, shall consist of a Chain Saw Operator and an Assistant (Safety Observer)

A work site hazard assessment shall be conducted prior to all operations and hazards identified.

A. Hazard Identification:

All hazards and obstruction shall be identified and addressed prior to commencement of work.

Areas that may be of concern but not limited to are:

- Fences – to include Property Lines
- All utilities – such as pipe line markers, valve stations, overhead lines, etc.
- All buildings and structures
- Sidewalks, Bike Paths, Roadways. etc.
- Vehicles
- Pedestrian traffic
- Other trees or brush

5. Tree Felling

Proper tree felling procedures shall be developed and only personnel trained and qualified in tree felling shall perform this type of operation.

Types of Hazards:

Every tree is unique and must be approached with extreme caution. Trees shall be identified and a hazard assessment shall be conducted prior to all cutting operations.

Some of these hazards are:

- Dead Limbs and tops
- Excessive lean
- Fungus
- Rot and cavities
- Loose bark (could indicate hidden tree rot)
- Conks (signs of physical distress)

A. Planning and Assessment:
- Determine the lean of the tree
- Direction for the fall of tree.
- Clear an area around the tree before starting to cut.
- Fell with lean of tree whenever possible

B. Preparation:

Always ensure a “clear area” is established prior to cutting operations.

- Cut/remove all dead snags or stubs first,
- Prepare two escape routes 45-degrees away from the direction of fall.
- Be sure your escape routes are not obstructed with underbrush or objects.
- Before starting to cut, make sure no one is closer than two tree lengths away from felling operations.

C. Cutting:
- Make a notch on all trees no matter how small the diameter.
- Prevent “kick back” by leaving sufficient wood between the notch and the “back cut” to allow a hinge. (Never cut a standing tree completely through)
- Give a timely yell understood by all employees, just before the “back cut”.
- Retreat by using “escape routes” to a safe distance of at least 20 feet from tree. If possible, stand behind another tree at the end of your retreat path.

6. Chain Saw Operations Using A Bucket Truck (Aerial Lift Equipment)

All Bucket Truck operations shall be conducted by a qualified operator and shall follow all safety rules associated with chain saw and aerial lift equipment. Operations in or alongside roadways shall adhere to the Work Zone Safety Manual. All personnel associated with this type of operation shall wear Hard Hats at all times when outside of a vehicle.

A. Danger Zone:

- That area around the Bucket Truck and the cutting zone where there is operating equipment and or falling limbs or other debris.
- Danger Area: The supervisor shall evaluate the area around the cutting zone and equipment and establish a Danger Zone. No one shall be allowed in this area without the Safety Observers permission.

B. Safety Observer:
- A person designated by the supervisor to observe all ground activity and coordinate with the Bucket Operator entry of workers into the Danger Zone. At no time will personnel be allowed in the Danger Zone without the permission of the Safety Observer. The Safety Observer shall have permission from the Bucket Operator before allowing personnel entry to the Danger Zone. No one is allowed inside the Danger Zone while equipment or chain saw is in operation.

C. Bucket Truck (Aerial Lift Equipment) Operator
- The operator shall be qualified to operator all associated equipment and shall maintain visual and or oral communications with the Safety Observer to ensure no unauthorized entries within the Danger Zone. No one is allowed inside the Danger Zone while equipment or chain saw is in operation.
- A two person operation where there is a chain saw operator and an aerial lift operator occupying the same platform, both persons must wear all PPE required for operating a chain saw.

D. Other Equipment
- All other vehicles, trailers, chippers, etc. shall not be parked inside the Danger Area.

7. Warning Signals & Briefings

A. Emergency or Danger Warning Signal:
- The Assistant (Safety Observer) shall use a whistle to sound a warning and all work shall cease immediately and an assessment shall be performed before work recommences. Whistle shall be readily accessible but shall not be worn in a manner to become a personal safety hazard. Do not allow whistle to hang freely and become a “snag” hazard.

B. Emergency or Danger Warning Signal:
   - The Assistant (Safety Observer) shall use a whistle to sound a warning and all work shall cease immediately and an assessment shall be performed before work recommences.

C. Daily Safety Brief:
   - It is vital that a Daily Safety Brief is conducted and all parties understand their assigned jobs/duties, special warning signals and their emergency actions. The supervisor will ensure the Operator and Assistant (Safety Observer) have discussed and clearly understand all communication signals. To aid in documenting this, a Job Hazard Analysis form is to be completed and signed by each person in the work crew.

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Mechanical Brush Cutting | CODE | 2221 |
|---|---|---|---|

**Purpose**

This activity is used for mechanical reduction of woody biomass in lieu of manually implemented efforts. Mechanical reduction of woody biomass serves to keep shoulders clear of woody vegetation for emergency egress from the road surface; maintains clear lines of sight along road bends, at intersections and to signs; and also reduces damage to infrastructure.

**Category** Vegetation

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

This work will be scheduled 1 October through 1 April, after leaves have fallen but before leaf out. Brush is defined to be any tree or shrub species less than 3 inches in diameter at a height of 4½ feet from the ground. This is called "Diameter at Breast Height" (DBH).

Work on trees greater than 3" DBH should be reported to Tree Trimming (Activity 2250) or Tree Removal (Activity 2251).

If work is being performed to trim branches, also known as side trimming, the work should be reported to Tree Trimming (Activity 2250).

Rotary deck mowers (e.g. boom mowers) shall not be used to cut woody vegetation greater than 3" in diameter, forestry mulchers are the appropriate tool for this type of work. Failure to adhere to this guideline will result in damage to equipment.

| Reporting | | Asset to Report to | Various* | Reporting Units | Square Feet |
|---|---|---|---|---|---|

Accomplishment is the number of square feet cleared. This is the area that can be measured on the ground.

For additional work order reporting guidance see the Work Orders section of the Preface

*Report to bridge structures or large culverts when the work performed is to address a work requests for a bridge structure or large culvert.

Reporting Options:

- Pavement Keys
- Bridge Structures
- Large Culverts

**Crew Size** 2-4 Workers

| | QTY |
|---|---|
| Truck driver/Laborer | 1-3 |
| Equipment Operator | 1 |

*Traffic Control Personnel are NOT shown here

**P.P.E.**

1) Base PPE

**Materials**

**Job Specific Equipment**

Chipper
Boom Mower
Forestry Mulcher
*Traffic Control Equipment is NOT shown here

**Other References**

**Sub Activities**

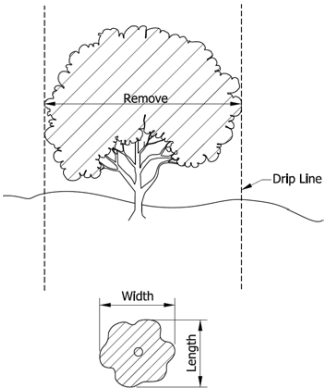
| Average Daily Production | 43,560 Sq Ft | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

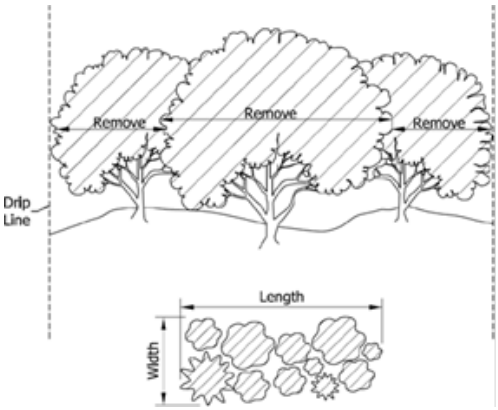
| ACTIVITY | Mechanical Brush Cutting | CODE | 2221 |
|---|---|---|---|

## Work Method

1. Place Safety Devices
2. Begin on the outside of the brush being cut, making small swath no more than twelve (12) inches. This will help reduce the likelihood of throwing large debris out of work area.
3. After the first pass, make a second pass over the debris on the ground. This will make the debris smaller and eliminate the need to manually collect/chip.
4. Repeat Step 2 and Step 3, continue to make swath on brush until goal is met or the limb/tree is too large for machine. The maximum diameter woody vegetation that can be cut with a boom mower is 3 inches. Inexperienced operators often try to cut heavier wood, thereby damaging the mower.
5. If debris is too large to leave on-site, using the 500 minimum work distance rule. Pick up all large pieces and process through a wood chipper, it may be wasted/ scatter back on the R/W where removed.
6. Remove Safety Devices.
7. Schedule Herbicide Spot Treatment (Activity 2230) to be completed after significant regrowth occurs following the mechanical biomass reduction. This regrowth will typically occur after the majority of one growing season and should occur August through October.

Guide to measuring square footage:




Notes:

1. When drip line/limbs are touching, the area to be measured is from the outer limits of the end bushes.
2. When isolated brush is removed, instead of calculating the area as a circle, square the area off.
3. Square Footage = Length x Width
4. This activity is for brush cutting. Brush is woody vegetation that is less than 3” DBH.

## Special Considerations

Special consideration should be given to the location of this type of clearing if in a sensitive area. If this work is necessary to be conducted in sensitive areas, District personnel should coordinate with Public Information Officers to assist in communication of their plans with the public.

The need to regularly trim small branches of trees and shrubs can be minimized by periodic utilization of appropriately selected and applied herbicides. This method can be accomplished much more efficiently than mechanical means, if done on a regular cycle.

Crews should carry water and medicated soap to wash off any body part that might come in contact with plant borne allergens such as poison ivy.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 43,560 Sq Ft | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Herbicide Spot Treatment | CODE | 2230 |
|---|---|---|---|
| Purpose | | Category | Vegetation |

To control undesirable vegetation and noxious weeds by applying herbicides to isolated locations along R/W's. The primary objective for Herbicide Spot Treatment is to comply with legal regulations for control of noxious weeds and protection of the environment.

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

## Scheduling & Coordination

This activity may be scheduled throughout the growing season depending on the species that is being treated. Always coordinate with mowing activities.

General guidelines are as follows:
Sub Activity 21: Bridge Cones- Late Summer until frost
Sub Activity 22: Cut Stump- Fall, Winter, less than one (1) hour after cutting
Sub Activity 23:Guardrail & Signs- Spring, before weeds are 12 inches tall, summer after weeds have been cut
Sub Activity 24: Johnson Grass- Summer, when plant is actively growing
Sub Activity 26: Thistle- Throughout the growing season but prior to seed setting on biennial plants
Sub Activity 27: Cattails- Summer prior to seed setting
Sub Activity 29: Other Invasive Species- Various
Sub Activity 32: Crack Spraying- 30 days prior to sealing crew
Sub Activity 34: Rip Rap- Late summer to fall
Sub Activity 35: Native Plant- Late fall to early Spring
Sub Activity 36: Phragmites- August & September
Sub Activity 39: Wetland Maintenance- During times of low water levels
Sub Activity 97: Basal Bark- Fall to Spring (before bud break)
Sub Activity 128: Knapweed- Spring through Fall
Sub Activity 130: Kudzu- From green up to Fall
Sub Activity 131: Facilities- Throughout growing season.
Sub Activity 133: Barrier Wall- throughout growing season, prior to plants reaching ten (10) inches, for aesthetic reasons.
Sub Activity 137: Purple Loosestrife- June & July, bud to flowering stages.
Sub Activity 181: Poison Hemlock- Fall through flowering stage, when rosettes present
Sub Activity 182: Bur Cucumber- May through fall
Sub Activity 183: Columbus grass- Summer, when plant is actively growing
Sub Activity 184: Shattercane- emergence through early August, prior to seed production
Sub Activity 186: Marestail/Horseweed- Fall through early summer, prior to bolting
Sub Activity 187: Pigweed/Waterhemp- Early spring through summer
Sub Activity 190: Woody Vegetation: Late spring to early winter, depending on application equipment and product used.

These general guidelines are for spot treatments, if you have questions, please contact the Roadside Maintenance Specialist.

| Reporting | | Asset to Report to | Various* | Reporting Units | Acres |
|---|---|---|---|---|---|

Accomplishment is the total acres treated. Report work to the appropriate sub activity.

Attach a scanned copy of the completed Herbicide Record Sheet to the work order in WMS.

For additional work order reporting guidance see the Work Orders section of the Preface.

*Reporting Options:
- Pavement Keys
- Bridge Structures
- Large Culverts
- Guardrail
- Unit Structure - Use the four-digit unit code for the unit at which the activity was performed.
  Example: **3101** – Brookville Unit

| Average Daily Production | 2-10 Acres | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Herbicide Spot Treatment | CODE | 2230 |
|---|---|---|---|

**Crew Size** 2 Workers

| | QTY |
|---|---|
| Licensed Herbicide Applicator | 1 |
| Truck Driver | 1 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

Herbicide Spray unit

*Traffic Control Equipment is NOT shown here

**P.P.E.**

Base PPE

Additional PPE per Safety Data Sheet and Pesticide Label

**Materials**

Choose correct herbicide formulation for the plants being targeted.

Drift reduction agent

Surfactant

**Other References**

www.driftwatch.org
Herbicide Product Labels & Safety Data Sheets

**Sub Activities** See Scheduling & Coordination section.

**Work Method**

1. Read herbicide product label. Handle, mix and apply only as label specifies for the intended use. If label is not specific about a certain area, contact the Roadside Maintenance Specialist.
2. All herbicide must be applied by a licensed applicator.
3. Avoid mixing/loading on gravel driveways or other surfaces that allow spills to sink quickly through the soil. Install an anti-backflow device on the well or hydrants to prevent reverse flow of liquids into the water supply. Never put the hose in the sprayer tank. Provide an air gap of 6 inches between the hose and the top of the sprayer tank.
4. Mix chemical. Spray mixture must be mixed correctly and in the correct order.
   - Fill the tank ½ to ¾ of top with water and begin agitation.
   - Add water conditioners (for example, pH adjusters, ammonium sulfate).
   - Add granules / flowables / powdered herbicides and mix well.
   - Add water soluble herbicides.
   - Add stickers, spreaders, surfactants.
   - Add drift reduction agent. Drift reduction agents must be used at labeled rates for every tank.
   - Fill the remaining portion of the tank with continued agitation.
5. Place signs and safety devices.
6. Apply mix to designated areas using methods as instructed. If weather or wind changes and causes the potential for drift, then change locations or cease work and notify supervisor.

   -Document all required information on Herbicide Record Sheet.
7. Remove signs and safety devices.
8. Clean and maintain clothing and protective equipment.
9. Herbicide spray mixtures should remain in the tank for short durations only. Take proper measures to clean out sprayers at the conclusion of the application.\

## Special Considerations

Document necessary information and comply with pesticide laws (i.e. labels of all chemicals in tank + SDS sheets should be readily available.).

A pesticide spill can happen to anyone — even to those individuals who exercise safety procedures to minimize the possibility. Your degree of emergency preparedness will have a direct impact on the severity of the situation if a spill occurs.

PLAN AHEAD- HAVE EQUIPMENT AVAILABLE FOR THE SPILL EMERGENCY

Be prepared. Missing, unavailable, and nonfunctional equipment is of no help in an emergency.

- Protective equipment for all products handled.
- Absorbent material to contain a spill (Granular absorbent, absorbent pads and boom, as appropriate).
- Tools for constructing temporary earthen dikes (i.e. a shovel)

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| **Average Daily Production** | **2-10 Acres** | **EFFECTIVE DATE** | **7/12/2023** |

RESET FORM

**INDOT Chainsaw & Felling Job Hazard Analysis**
**Statewide Safety**
**Last Updated: 2017**

# JOB HAZARD ANALYSIS

INSTRUCTIONS ON REVERSE SIDE

| | | |
|---|---|---|
| **DATE:** | **NAME of CERTIFIED CHAINSAW OPERATOR(S):** | |
| **JOB LOCATION:** | **UNIT:** | **SUPERVISOR:** |
| **REQUIRED PPE:** | | |

# JOB HAZARD ANALYSIS: CHAINSAW/FELLING

| *1. SEQUENCE OF BASIC JOB STEPS* | *2.POTENTIAL HAZARDS* | *3. RECOMMENDED ACTION OR PROCEDURE* |
|---|---|---|
| | | |
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**INDOT Chainsaw & Felling Job Hazard Analysis**
**Statewide Safety**
**Last Updated: 2017**

## JHA Instructions

The JHA shall identify the location of the work project or activity, the name of employee(s) writing the JHA, the date(s) of development, and the name of the appropriate person approving it. The supervisor acknowledges that employees have read and understand the contents, have received the required training, and are qualified to perform the work project or activity.

**Block 1:** Identify all tasks and procedures associated with the work project or activity that have potential to cause injury or illness to personnel and damage to property or material. Include Emergency Evacuation Procedures (EEP).

**Block 2:** Identify all known or suspect hazards associated with each respective task/procedure listed. For example:

a. Research past accidents/incidents
b. Discuss project/activity with participants
c. Observe the work area for project/activity
d. Temporary Traffic Control if needed
e. A combination of the above

**Block 3:** Identify appropriate actions to reduce or eliminate the hazards identified. Abatement measures listed below are in the order of the preferred abatement method:

a. **Engineering Controls** (the most desirable method of abatement): For example, ergonomically designed tools, equipment, and furniture.
b. **Substitution**: For example, switching to high flash point, non-toxic solvents.
c. **Administrative Controls**: For example, limiting exposure by reducing the work schedule.
d. **PPE** (least desirable method of abatement): For example, using hearing protection when working with or close to portable machines (chain saws, rock drills, portable water pumps).
e. A combination of the above.

## Emergency Evacuation Instructions

Work supervisors and crew members are responsible for developing and discussing field Emergency Evacuation Procedures (EEP) and alternatives in the event a person(s) becomes seriously ill or injured at the work site.

Be prepared to provide the following information:

a. Nature of the accident or injury (avoid using victim's name).
b. Type of assistance needed, if any (ground, air or water evacuation).
c. Location of accident or injury, best access route into the work site (road name/number), identifiable ground/air landmarks.
d. Radio frequency(s).
e. Contact person.
f. Local hazards to ground vehicles
g. Weather conditions (wind speed and direction, visibility, temp).
h. Topography.

The items listed above serve only as guidelines for the development of emergency evacuation procedures.

### JHA and Emergency Evacuation Procedures Acknowledgement

As supervisor I acknowledge that the following employees have participated in the development of this JHA, accompanying emergency procedures and have also been briefed on the provisions thereof:

Supervisor/Crew Signatures:

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RESET FORM

# Herbicide Record Sheet

Revised 6/21

Scan and attach this worksheet to the work order. If multiple days are necessary- use a separate sheet each day- but only one work order needs to be completed per route/road.

| District | Sub District | Unit | Date | Start time | |
|---|---|---|---|---|---|
| | | | | Stop time | |

| Details | | | Activity | | Work Request |
|---|---|---|---|---|---|
| Route | Beginning MM/RP | | 2220- Manual Brush Cutting | 2251- Tree Removal | YES / NO |
| | End MM/RP | | 2230- Herbicide Spot Treatment | | If YES- Number |
| Application Rate | | Acre / Sq. Ft. | 2231- Herbicide Broadcasting | | |
| | Spraying Speed (mph) | | | Sub-Activity | |

| Pavement Key(s) | Spray Width (2231) | Acres / Sq. Ft. |
|---|---|---|
| | | |
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| | | |
| | TOTAL | |

| | | |
|---|---|---|
| 21: Bridge Cones | 32: Crack Spraying | 130: Kudzu |
| 22: Cut Stump | 34: Rip-rap | 131: Facilities |
| 23: Guardrail & Sign | 35: Native Plant | 132: Yard and Landscape |
| 24: Johnsongrass | 36: Phragmites | 133: Barrier wall |
| 26: Thistle | 39: Wetland Maintenance | 137: Purple loosestrife |
| 27: Cattails | 97: Basal Bark | 190: Woody vegetation |
| 29: Other Invasive Species | 128: Knapweed | |

| Labor | | | Equipment | | |
|---|---|---|---|---|---|
| Laborer | License # | Hours | Description | Commission # | Hours Used |
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## Weather (Start/Stop)

| Rain | | Temperature | Relative Humidity | Wind Speed | Wind Direction |
|---|---|---|---|---|---|
| NO | YES - Time: | / | / | / | / |

## Materials

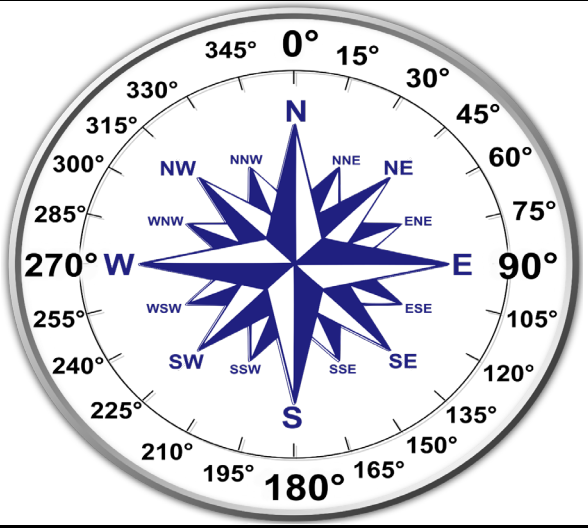
| Material Master Code (Last 4 Digits) | Amount Used | Unit (Circle) | Rate Applied | Unit (Circle) |
|---|---|---|---|---|
| Water | | GAL | ////////////////// | Acre / Sq. Ft. |
| Herbicide 1 | | OZ / FLOZ | | OZ / FLOZ |
| Herbicide 2 | | OZ / FLOZ | | OZ / FLOZ |
| Drift Control | | FLOZ | | FLOZ: Gallon Hundred |
| Surfactant | | FLOZ | | FLOZ: Gallon Hundred |
| Conditioner | | FLOZ | | FLOZ: Gallon Hundred |
| | | OZ / FLOZ | | OZ / FLOZ |

## Comments

For spot treatments: include accurate description of location of treatments within the pavement key (for example "on the backslope 200' north of mailbox 555").

| Water Source | | Nozzle type and size | | Application Pressure | |
|---|---|---|---|---|---|
| Target species and size/growth stage: | | | | | |
| Concerns/Areas Skipped: | | | | | |
| Exact location information | | | | | |
| Other comments: | | | | | |

| Material Master Codes |
| --- |
| 370M03688: GARLON 4 ULTRA HERBICIDE: 62719-527 |
| 370M03689: ACCORD XRT2 HERBICIDE: 62719-556 |
| 370M03691: HABITAT HERBICIDE: 241-426 |
| 370M03696: MILESTONE HERBICIDE: 62719-519 |
| 370M03702: ESCORT XP HERBICIDE: 432-1549 |
| 370M03707: KRENITE S HERBICIDE: 42750-247 |
| 370M03714: OUTRIDER HERBICIDE: 59639-223 |
| 370M03731: TELAR XP HERBICIDE: 432-1561 |
| 370M03734: RODEO HERBICIDE: 62719-324 |
| 370M03735: ARSENAL HERBICIDE: 241-346 |
| 370M03742: PLATEAU HERBICIDE: 241-365 |
| 370M03744: NU-FILM IR/ELITE RADIANT STICKER-SPREADER: Exempt |
| 370M03746: TRANSLINE HERBICIDE: 62719-73 |
| 370M03760: PATHFINDER II HERBICIDE: 62719-176 |
| 370M03764: OPENSIGHT HERBICIDE: 62719-597 |
| 370M03771: ELITE PREMIER BASAL OIL: EXEMPT |
| 370M03772: ELITE SECURE ULTRA DRIFT CONTROL: EXEMPT |
| 370M03775: ELITE PLATINUM NON-IONIC SURFACTANT: EXEMPT |
| 370M03776: RRSI SUNRISE METHYLATE SEED OIL W/ORGANOSILICONE: EXEMPT |
| 370M03778: ELITE VIGOR TANK CLEANER: EXEMPT |
| 370M03804: ESPLANADE 200 SC HERBICIDE: 432-1516 |
| 370M03805: METHOD 240 SL HERBICIDE: 432-1565 |
| 370M03806: RRSI 1% SOLUTION DRIFT CONTROL: EXEMPT |
| 370M03807: RRSI DEFOAMER: EXEMPT |
| 370M03808: ELITE IMPERIAL WATER CONDITIONER: EXEMPT |
| 370M03809: TRIPLET SF HERBICIDE: 228-312 |
| 370M03810: CLEANTRAXX HERBICIDE: 62719-702 |
| 370M03811: FREELEXX HERBICIDE: 62719-634 |
| 370M03812: VASTLAN HERBICIDE: 62719-687 |
| 370M03813: ELITE SPLENDOR WATER SOLUBLE DYE: EXEMPT |
| 370M03814: ELITE VELOCITY DRIFT CONTROL: EXEMPT |
| 370M03815: TRAIL LITE/BAS-OIL BLUE OIL SOLUBLE DYE: EXEMPT |
| 370M03816: ESPLANADE EZ HERBICIDE: 432-1528 |
| WIND DIRECTION GUIDE:<br>REPORTED AS WIND OUT OF/COMING FROM A GIVEN DIRECTION.<br>REPORT IN NEAREST 15 DEGREES. |



INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Herbicide Broadcast Treatment | CODE | 2231 |
|---|---|---|---|
| | | Category | Vegetation |

**Purpose**

To control undesirable vegetation and noxious weeds by applying herbicide continually to large areas of roadside vegetation or soil along shoulders maintained by State forces. The primary objectives for maintenance of roadside vegetation are to provide for safe highway operation, to comply with legal regulations for control of noxious and invasive weeds, and to protect the environment.

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Late summer and early fall is the best time to control perennial weeds and brush. The spring and early summer is the best time to control annual weeds.

Proper attention to the following three basic principles will improve the effectiveness of herbicides and decrease potential negative impacts to non-target species, the environment, and the applicator:

1. Choose the right herbicide for the job, plant identification is critical. If you do not know the plants to control, get assistance from District Roadside Coordinator.
2. Apply the herbicide at the right time for the target species. Example: treating biennial plants such as bull thistle and teasel after they have developed seed is a waste of resources as the plant has already reproduced., while treating it during its rosette stage is ideal.
3. Use the proper application technique. Knowledge of equipment capability is needed to select the method best suited for project. Proper technique should consider the location of target plant(s), available equipment and the knowledge/skill level of applicator. Additional site characteristics such as soil type, slope, and the existing vegetation — both target and non-target plants — should also be considered when selecting the herbicide and planning the application process.

Always read and follow the herbicide label directions.

| Reporting | | Asset to Report to | Various* | Reporting Units | Acres |
|---|---|---|---|---|---|

Accomplishment is the total acres treated. Report work to the appropriate sub activity.

Attach a scanned copy of the completed Herbicide Record Sheet to the work order in WMS.

For additional work order reporting guidance see the Work Orders section of the Preface.

*Reporting Options:

- Pavement Keys
- Unit Structure - Use the four-digit unit code for the unit at which the activity was performed.
  Example: **3101** – Brookville Unit

**Crew Size** — **2-4 Workers**

| | |
|---|---|
| Licensed Herbicide Applicator | 1 |
| Laborer | 1-3 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | |
|---|---|
| Herbicide Spray unit | 1 |

*Traffic Control Equipment is NOT shown here

**P.P.E.**

Base PPE

Additional PPE per Safety Data Sheet and Pesticide Label

**Materials**

Choose correct herbicide formulation for the plants that are being targeted.

Drift Reduction Agent

Surfactant

**Other References**

www.driftwatch.org

Herbicide Product Labels & Safety Data Sheets

| Average Daily Production | 75 Acres | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Herbicide Broadcast Treatment | CODE | 2231 |
|---|---|---|---|

## Sub Activities

General guidelines are as follows:
Sub Activity 21 (Bridge Cones): Late Summer until Frost
Sub Activity 22 (Cut Stump): Fall, Winter, less than one (1) hour after cutting.
Sub Activity 23 (Guardrail & Signs): Spring, before weeds are 12 inches tall, summer after weeds have been cut.
Sub Activity 24 (Johnson Grass): Summer, when plant is actively growing.
Sub Activity 26 (Thistle): Throughout the growing season but prior to seed setting on biennial plants.
Sub Activity 27 (Cattails): Summer prior to seed setting.
Sub Activity 32 (Crack Spraying): 30 days prior to sealing crew.
Sub Activity 34 (Riprap): Late summer to fall.
Sub Activity 35 (Native Plant): Late fall to early Spring
Sub Activity 36 (Phragmites): August & September
Sub Activity 39 (Wetland Maintenance): During times of low water levels
Sub Activity 97 (Basal Bark): Fall to Spring (before bud break)
Sub Activity 128 (Knapweed): Spring through Fall
Sub Activity 130 (Kudzu): From green up to Fall
Sub Activity 133 (Barrier Wall): Throughout growing season, prior to plants reaching ten (10) inches.
Sub Activity 137 (Purple Loosestrife): June & July, bud to flowering stages.
Sub Activity 190 (Woody Vegetation): Late spring to early winter

## Work Method

1. Read herbicide product label. Handle, mix and apply only as label specifies for the intended use. If label is not specific about a certain area, contact the Roadside Maintenance Specialist.
2. All herbicide must be applied by a licensed applicator.
3. Avoid mixing/loading on gravel driveways or other surfaces that allow spills to sink quickly through the soil. Install an anti-backflow device on the well or hydrants to prevent reverse flow of liquids into the water supply. Never put the hose in the sprayer tank. Provide an air gap of 6 inches between the hose and the top of the sprayer tank.
4. Mix chemical. Spray mixture must be mixed correctly and in the correct order.
   - Fill the tank ½ to ¾ of top with water and begin agitation.
   - Add water conditioners (for example, pH adjusters, ammonium sulfate).
   - Add granules / flowables / powdered herbicides and mix well.
   - Add water soluble herbicides.
   - Add stickers, spreaders, surfactants.
   - Add drift reduction agent. Drift reduction agents must be used at labeled rates for every tank.
   - Fill the remaining portion of the tank with continued agitation.
5. Place signs and safety devices.
6. Apply mix to designated areas using methods as instructed. If weather or wind changes and causes the potential for drift, then change locations or cease work and notify supervisor.

   -Document all required information on Herbicide Record Sheet
7. Remove signs and safety devices.
8. Clean and maintain clothing and protective equipment.
9. Herbicide spray mixtures should remain in the tank for short durations only. Take proper measures to clean out sprayers at the conclusion of the application.

| ACTIVITY | Herbicide Broadcast Treatment | CODE | 2231 |
|---|---|---|---|

**Special Considerations**

Document necessary information and comply with pesticide laws (i.e. labels of all chemicals in tank + SDS sheets should be readily available.).

A pesticide spill can happen to anyone — even to those individuals who exercise safety procedures to minimize the possibility. Your degree of emergency preparedness will have a direct impact on the severity of the situation if a spill occurs.

PLAN AHEAD. HAVE EQUIPMENT AVAILABLE FOR THE SPILL EMERGENCY

Be prepared. Missing, unavailable, and nonfunctional equipment is of no help in an emergency.

- Protective equipment for all products handled.
- Absorbent material to contain a spill (Granular absorbent, absorbent pads and boom, as appropriate).
- Tools for constructing temporary earthen dikes (i.e. a shovel)

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 75 Acres | EFFECTIVE DATE | 7/12/2023 |

RESET FORM

# Herbicide Record Sheet

Revised 6/21

Scan and attach this worksheet to the work order. If multiple days are necessary- use a separate sheet each day- but only one work order needs to be completed per route/road.

| District | Sub District | Unit | Date | Start time | |
|---|---|---|---|---|---|
| | | | | Stop time | |

| Details | | | Activity | | Work Request |
|---|---|---|---|---|---|
| Route | Beginning MM/RP | | 2220- Manual Brush Cutting | 2251- Tree Removal | YES / NO |
| | End MM/RP | | 2230- Herbicide Spot Treatment | | If YES- Number |
| Application Rate | | Acre / Sq. Ft. | 2231- Herbicide Broadcasting | | |
| | Spraying Speed (mph) | | | Sub-Activity | |

| Pavement Key(s) | Spray Width (2231) | Acres / Sq. Ft. |
|---|---|---|
| | | |
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| | | |
| | | |
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| | | |
| | TOTAL | |

| | | |
|---|---|---|
| 21: Bridge Cones | 32: Crack Spraying | 130: Kudzu |
| 22: Cut Stump | 34: Rip-rap | 131: Facilities |
| 23: Guardrail & Sign | 35: Native Plant | 132: Yard and Landscape |
| 24: Johnsongrass | 36: Phragmites | 133: Barrier wall |
| 26: Thistle | 39: Wetland Maintenance | 137: Purple loosestrife |
| 27: Cattails | 97: Basal Bark | 190: Woody vegetation |
| 29: Other Invasive Species | 128: Knapweed | |

| Labor | | | Equipment | | |
|---|---|---|---|---|---|
| Laborer | License # | Hours | Description | Commission # | Hours Used |
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## Weather (Start/Stop)

| Rain | | Temperature | Relative Humidity | Wind Speed | Wind Direction |
|---|---|---|---|---|---|
| NO | YES - Time: | / | / | / | / |

## Materials

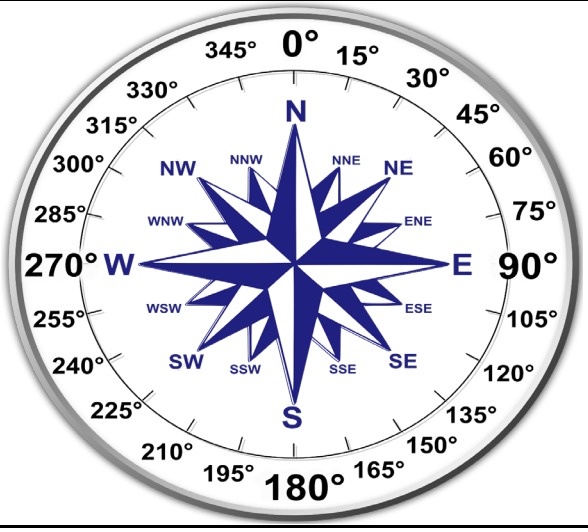
| Material Master Code (Last 4 Digits) | Amount Used | Unit (Circle) | Rate Applied | Unit (Circle) |
|---|---|---|---|---|
| Water | | GAL | ////////////////// | Acre / Sq. Ft. |
| Herbicide 1 | | OZ / FLOZ | | OZ / FLOZ |
| Herbicide 2 | | OZ / FLOZ | | OZ / FLOZ |
| Drift Control | | FLOZ | | FLOZ: Gallon Hundred |
| Surfactant | | FLOZ | | FLOZ: Gallon Hundred |
| Conditioner | | FLOZ | | FLOZ: Gallon Hundred |
| | | OZ / FLOZ | | OZ / FLOZ |

## Comments

For spot treatments: include accurate description of location of treatments within the pavement key (for example "on the backslope 200' north of mailbox 555").

| Water Source | | Nozzle type and size | | Application Pressure | |
|---|---|---|---|---|---|
| Target species and size/growth stage: | | | | | |
| Concerns/Areas Skipped: | | | | | |
| Exact location information | | | | | |
| Other comments: | | | | | |

| Material Master Codes |
| --- |
| 370M03688: GARLON 4 ULTRA HERBICIDE: 62719-527 |
| 370M03689: ACCORD XRT2 HERBICIDE: 62719-556 |
| 370M03691: HABITAT HERBICIDE: 241-426 |
| 370M03696: MILESTONE HERBICIDE: 62719-519 |
| 370M03702: ESCORT XP HERBICIDE: 432-1549 |
| 370M03707: KRENITE S HERBICIDE: 42750-247 |
| 370M03714: OUTRIDER HERBICIDE: 59639-223 |
| 370M03731: TELAR XP HERBICIDE: 432-1561 |
| 370M03734: RODEO HERBICIDE: 62719-324 |
| 370M03735: ARSENAL HERBICIDE: 241-346 |
| 370M03742: PLATEAU HERBICIDE: 241-365 |
| 370M03744: NU-FILM IR/ELITE RADIANT STICKER-SPREADER: Exempt |
| 370M03746: TRANSLINE HERBICIDE: 62719-73 |
| 370M03760: PATHFINDER II HERBICIDE: 62719-176 |
| 370M03764: OPENSIGHT HERBICIDE: 62719-597 |
| 370M03771: ELITE PREMIER BASAL OIL: EXEMPT |
| 370M03772: ELITE SECURE ULTRA DRIFT CONTROL: EXEMPT |
| 370M03775: ELITE PLATINUM NON-IONIC SURFACTANT: EXEMPT |
| 370M03776: RRSI SUNRISE METHYLATE SEED OIL W/ORGANOSILICONE: EXEMPT |
| 370M03778: ELITE VIGOR TANK CLEANER: EXEMPT |
| 370M03804: ESPLANADE 200 SC HERBICIDE: 432-1516 |
| 370M03805: METHOD 240 SL HERBICIDE: 432-1565 |
| 370M03806: RRSI 1% SOLUTION DRIFT CONTROL: EXEMPT |
| 370M03807: RRSI DEFOAMER: EXEMPT |
| 370M03808: ELITE IMPERIAL WATER CONDITIONER: EXEMPT |
| 370M03809: TRIPLET SF HERBICIDE: 228-312 |
| 370M03810: CLEANTRAXX HERBICIDE: 62719-702 |
| 370M03811: FREELEXX HERBICIDE: 62719-634 |
| 370M03812: VASTLAN HERBICIDE: 62719-687 |
| 370M03813: ELITE SPLENDOR WATER SOLUBLE DYE: EXEMPT |
| 370M03814: ELITE VELOCITY DRIFT CONTROL: EXEMPT |
| 370M03815: TRAIL LITE/BAS-OIL BLUE OIL SOLUBLE DYE: EXEMPT |
| 370M03816: ESPLANADE EZ HERBICIDE: 432-1528 |
| WIND DIRECTION GUIDE:<br>REPORTED AS WIND OUT OF/COMING FROM A GIVEN DIRECTION.<br>REPORT IN NEAREST 15 DEGREES. |



INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Seeding and Fertilizing | CODE | 2240 |
|---|---|---|---|

**Purpose**

The purpose of this activity is to achieve successful soil stabilization and revegetation by providing simple, proven and cost-effective techniques, particularly along roadside ditches.

Vegetation is the most effective and efficient form of erosion control. When effectively established and maintained, vegetation can protect shoulders, ditches and slopes by preventing erosion and establishment of invasive/noxious weeds.

**Category** Vegetation

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Seeding should be scheduled any time adequate moisture is available and when soil temperatures are above 50 degrees. These soil temperatures are ordinarily experienced between 1 April and 1 November. The months of July and August are generally too hot and dry to attempt seeding without irrigation. While soil temperatures may be above 50 until mid- to late November, fall grass seeding should occur at least 45 days before the first anticipated frost event (Indiana average first frost is around 1 November)- as such, fall seeding should be complete prior to around 15 September.

Dormant season seeding (when soils are below 50 degrees and are experiencing frost heave) is best executed during the late winter, generally February and March. Special considerations and preparations for dormant season seeding must be properly accounted for proper to achieve desirable vegetative cover and minimize soil erosion.

Grass seed should be selected according to area being seeded. Short statured cool season grasses should be used in the areas inside the mowing limits while native warm-season grasses and wildflowers can be used beyond the mowing limits.

Seeding should be completed as soon as possible after any soil disturbance, such as ditching and clipping of unpaved shoulders.

Grass seed should be ordered from the current Quantity Purchase Agreement. Grass seed has a shelf life- do not expect seed greater than 1 year old to germinate. Care should be taken to order what you need, when you need it.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Acres |
|---|---|---|---|---|---|

Accomplishment is the total acres seeded. This activity is used when seeding over ½ acre. (1 acre equals 43,560 ft.²). If area is less the ½ acre, use Spot Seeding & Fertilizing (Activity 2241).

For additional work order reporting guidance see the Work Orders section of the Preface

**Crew Size** 2 Workers

| | QTY |
|---|---|
| Hydroseed/tractor operator | 1 |
| Truck driver | 1 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | QTY |
|---|---|
| Hydro-seeder | 1 |
| Tractor/no-till drill | 1 |
| Tractor/fertilizer spreader | 1 |
| Tractor/tiller | 1 |

*Traffic Control Equipment is NOT shown here

**P.P.E.**

1) Base PPE
2) Eyewash Kit
3) Soap & Water for washing

**Materials**

Grass seed: cool or warm-season – INDOT Spec Section 621

Fertilizer

Hydro-mulch

Erosion control materials

**Other References**

Storm Water Management Field Guide

327 AIC 15 - 5, Rule 5

Standard Specifications 621.03 thru 621.14,

Seed (914.04), Fertilizer( 914.03),Mulch (914.05),Blanket (914.09)

| Average Daily Production | 1 - 10 Acres | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Seeding and Fertilizing | CODE | 2240 |
|---|---|---|---|

**Sub Activities**

98 – Wildflower Planting

**Work Method**

Work method is determined by the equipment used in the seeding process

Regardless of planting method being utilized, seed-to-soil contact is essential to successful vegetation establishment. Further, the soil must be loose enough for roots to penetrate, if not, seeds will germinate but will then die shortly thereafter.

Steps for hydro-seeding or broadcast seeding and the installation of erosion control matting:

1. Verify that invasive species in the surrounding area have been treated.
2. Identify soil fertility and pH needs by conducting a soil test.
3. Measure area to be seeded.
4. Order necessary materials.
5. Place signs and other safety devices.
6. Clear the site of all stones or other debris that is larger than 2 inches in diameter.
7. Till soil to a depth of at least 2 inches, prior to adding any topsoil or soil amendments. Take care so as to not impact established rough grade.
8. Amend soil according to recommendations from the soil test.
9. Incorporate soil amendments. Take care to minimize impact to established rough grade. Add topsoil where necessary to maintain desired grade.
10. Finish grade the entire site, maintaining the rough grading contours and slopes with a tractor-mounted box blade on large areas or heavy-duty rake on smaller sites.
11. Lightly compact soil- Soil should be loose enough that the tread of your boot shows when walking on the soil, but not so loose as to allow more than ½ inch of total compaction.
12. Prepare seeder:
    - Hydro-seeding: Refer to the operator's manual for operating instructions.
      - There is a specific method/process to mixing the seed, mulch and tackifier.
    - Broadcast seeder: Refer to the operator's manual for operating instructions. Seed gate openings vary by make/model. It is better to make multiple passes with a lighter seeding rate than to start heavy and run out of seed prior to covering the area completely. A filler material might be necessary to achieve desired rate per acre.
13. Apply grass seed at a rate appropriate to the seed mix being used. Guidelines are also listed in the Quantity Purchase agreement.
    – "R" 205 lb/acre- Use this mix for seeding in rural areas.
    – "U" 200 lb/acre- Use this mix for seeding in urban areas.
    – "P" 130 lb/acre- Use this mix for seeding along the edge of pavement or pavement drain areas where soil salinity is a concern.
    – "D" 16 lb/acre- Use this mix for seeding in ditch bottoms that experience seasonal-to-chronically saturated soils.
14. Lightly compact/scratch/mix the seed into the soil. Use care to place seed less than ½" deep in the soil.
15. Cover the area.
    - Refer to the Storm Water Management Field Guide for covering the seed and installing appropriate erosion control strategies for the situation at hand.
16. Remove signs and other safety devices.
17. Inspect and Maintain
    - All soil stabilization blankets and matting should be inspected periodically following installation, particularly after rainstorms, to check for dislocation or failure and should be repaired immediately. Continue to monitor these areas until they become permanently vegetated and the soil has been stabilized.

## Work Method (Continued)

Steps for no-till seeding. In no-till planting systems, seeds are planted directly into a firm seedbed.

1. Verify that invasive species in the surrounding area have been treated.
2. Identify soil fertility and pH needs by conducting a soil test.
3. Measure area to be seeded.
4. Order necessary materials.
5. Place signs and other safety devices.
6. Clear the site of all stones or other debris that is larger than 2 inches in diameter.
7. Amend soil according to recommendations from the soil test.
8. Prepare seeder:
   - Refer to the Operator's Manual for calibration process and seed gate settings.
9. Apply grass seed at a rate appropriate to the seed mix being used. Use care to place seed less than ½" deep in the soil. Guidelines are also listed in the Quantity Purchase agreement.
   – "R" 205 lb/acre- Use this mix for seeding in rural areas.
   – "U" 200 lb/acre- Use this mix for seeding in urban areas.
   – "P" 130 lb/acre- Use this mix for seeding along the edge of pavement or pavement drain areas where soil salinity is a concern.
   – "D" 16 lb/acre- Use this mix for seeding in ditch bottoms that experience seasonal-to-chronically saturated soils.
10. Cover the area if necessary to reduce soil erosion. Due to the limited soil disturbance of this method, installing mulch or other methods generally are not required.
    - Refer to the Storm Water Management Field Guide for covering the seed and installing appropriate erosion control strategies for any situation at hand.
11. Remove signs and other safety devices.
12. Inspect and Maintain
    - All soil stabilization blankets and matting should be inspected periodically following installation, particularly after rainstorms, to check for dislocation or failure and should be repaired immediately. Continue to monitor these areas until they become permanently vegetated and the soil has been stabilized.

## Special Considerations

Grass seed storage tips (a loss of seed viability will occur if the any of these conditions are not met):

1. Store seed in a well ventilated cool, dry and dark location.

   -Seed should be protected from freezing.

   -Seed should be stored below 70 degrees.

   -The storage area should be conditioned to keep relative humidity below 60%.

   -Seed should not be stored directly on the ground/floor.
2. Protect seeds from rodents.

Site preparation and seed placement:

1. Prior to seeding, the site should be free of any noxious or invasive plant species.
2. A soil test should be conducted prior to placing seed to determine any fertility and pH needs.
   - Make any adjustments necessary prior to seeding according to soil test recommendations.
   - If soils in the near vicinity have been tested in the past, utilize commonly recommended adjustments.
3. Seed bed
   - If soil is disturbed, soil should be graded smooth and lightly packed prior to seeding. Loose soil is highly likely to erode and may allow seed to be planted too deeply. Soil should be loose enough that the tread of your boot shows when walking on the soil, but not so loose as to allow more than ½ inch of compaction.
   - Hard packed soil surfaces, such as those created by an excavator or Gradall bucket are not conducive to seed germination. These soils need to be loosened and properly packed prior to seeding.

If using a no-till drill, the site should have standing vegetation killed prior to planting.

| ACTIVITY | Seeding and Fertilizing | CODE | 2240 |
|---|---|---|---|

**Special Considerations (Continued)**

4. Seed should be planted no deeper than ½", it is good practice to be able to visually see some of the seed on the soil surface when planting is complete.

   - If broadcast seeding- the seed should be lightly scratched into the soil with a harrow or rake.
   - If a no-till drill is used- some of the seed should be visible at the soil surface.
   - If hydro-seeding- be sure that good seed to soil contact occurs.
5. Protect the seed and the soil
   - If broadcast seeding- the area seeded should be covered with
     A) no less than 3" of loosely placed straw
     B) no less than ½" straw erosion control blanket or other material
   - If a no-till drill is used- no seed/soil protection is necessary but monitor for, and immediately correct erosion issues if any arise.
   - If hydro-seeding- utilize an adequate amount of hydro-mulch and tackifier to keep the seed and soil covered and in place.

Grass stands can be improved by using no-till methods to strengthen weak grass stands through the introduction of both legumes and/or grasses.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 1 - 10 Acres | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Spot Seeding and/or Fertilizing | CODE | 2241 |
|---|---|---|---|

**Purpose**

The purpose of this activity is to achieve successful soil stabilization and re-vegetation by providing simple, proven and cost-effective techniques in areas less the 1/2 acre(21,780 Sq Ft), particularly along roadside ditches and wheel ruts cause by accident on grass shoulders and medians.

**Category** Vegetation

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Seeding should be scheduled any time adequate moisture is available and when soil temperatures are above 50 degrees . Seeding should be completed as soon as possible after any soil disturbance such as ditching, pipe replacement, vehicle accidents or anywhere the sod has been managed.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Square Feet |
|---|---|---|---|---|---|

Accomplishment is the total square footage seeded. Report to this activity when seeding under 1/2 acre. 1/2 acre equals 21,780 ft.² This would include laying sod and repairing wheel ruts.

Report seeding of > 1/2 acre to Activity 2240.

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** **2 Workers**

| | QTY |
|---|---|
| Hydroseed/tractor operator | 1 |
| Truck driver | 1 |

*Traffic Control Personnel are NOT shown here

**P.P.E.**

1) Base PPE
2) Eye wash Kit
3) Soap & Water for Washing

**Materials**

Grass seed: cool or warm season – INDOT Spec Section 621
Fertilizer
Hydro-mulch
Grass seed blanket
Sod

**Job Specific Equipment**

| | |
|---|---|
| Hydroseeder | 1 |
| Tractor/no till drill | 1 |
| Tractor/fertilizer spreader | 1 |
| Tractor/tiller | 1 |
| Hand yard roller | 1 |
| Sod Cutter | 1 |

*Traffic Control Equipment is NOT shown here

**Other References**

(327 A I C 15 - 5, Rule 5

Standard Specifications 621.03 thru 621.14

Seed (914.04), Fertilizer( 914.03),Mulch (914.05),Blanket (914.09)

**Sub Activities**

98 – Wildflower Planting

| Average Daily Production | 7,500 Square Feet | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Spot Seeding and/or Fertilizing | CODE | 2241 |
|---|---|---|---|

**Work Method**

Work method is determined by the equipment used in the seeding process. If using hydro-seeder, fill tank to approximately 1/2 full or above the agitator inside tank. Next place water soluble fertilizer and any spreaders/stickers in with agitator activated. Continue filling with water and add grass seed and lastly hydro-mulch. Finish filling water tank and continue to agitate until ready to use.

Method 1. If using a hydro-seeder or seeding by hand there must always be seed to soil contact. There must be loose soil for roots to penetrate, if not seeds will germinate but will die shortly thereafter.

Grass stands can be improved using no-till methods to strengthen weak grass stands through the introduction of both legumes and/or grasses.

Site Preparation Steps for hydro seeding or broadcast seeding & matting.

1. Place signs and other safety devices.
2. Clear the site of all rocks , stones or other debris that is larger than 2-3 inches in diameter.
3. Initial tilling, to a depth of at least 2 inches, should be completed prior to adding any topsoil or soil amendments.
4. Apply "starter fertilizer" that is high in phosphate (P, or the middle number on a bag of fertilizer), at a rate recommended for the particular product.
5. Finish grade the entire site, maintaining the rough grading contours and slopes, with a tractor-mounted box blade on large areas or heavy-duty rake on smaller sites.
6. Apply grass seed at a rate of 170 lbs per acre or 4 pounds per 1,000 sq. ft.
7. Roll the area with a lawn roller one third full of water to firm and settle the surface and reveal any low spots that should be filled to match the surrounding grade surface.
8. Cover with Matting, Laying and Stapling.
   - Start laying the matting/covering from the top of the channel and unroll down-grade.
   - Allow to lay loosely on soil –do not stretch.
   - Upslope ends of the matting should be buried in an anchor slot no less than 6-inches deep. Tamp earth firmly over material. Staple the matting at a minimum of every 12 inches across the top end.
   - Edges of matting shall be stapled every 3 feet. Where multiple widths are laid side by side, the adjacent edges shall be overlapped a minimum of 2 inches and stapled together.
   - Staples shall be placed down the center, staggered with the edges at 3 foot intervals.

***Maintenance, all soil stabilization blankets and matting should be inspected periodically follow installation, particularly after rainstorms to check for dislocation or failure and should be repair immediately. Continue to monitor theses areas until they become permanently stabilized.

9. Remove signs and other safety devices.

| ACTIVITY | Spot Seeding and/or Fertilizing | CODE | 2241 |
|---|---|---|---|

Method 2. No-till seeding, in no-tillage planting systems, a planting is made directly into an essentially unprepared seedbed.

1. Place signs and other safety devices.

In addition to reducing soil erosion, no-till seeding conserve moisture already present in the seedbed. Moisture conservation, along with a dramatic reduction in water run-off, improves the water supply for the new seedlings. No-till seeding methods also require less time and fuel than traditional methods because rocks remain below the soil surface.

There are several rules that must be followed for no-till seeding to be successful. The five most important are:

2. Proper Soil Testing is a Must - It is a waste of time and money to try to establish or improve stands when the soil fertility and/or pH are too low to support productive plants. Fertilize and lime according to soil test recommendations prior to seeding ( soil testing kits are available at most hardware stores).
3. Seed on the Proper Date - Depending on the situation, no-till seeding can be successful in late winter, spring or late summer/early fall. It is extremely important to make plans and preparations well in advance so the seeding can be made on time.
4. Use High-Quality Seed – Do not use seed that has been in storage for over 6 months, each month seed is stored it loses 5-8 % germination.
5. Control Depth of Seeding - Seeds of most plants are small and cannot be counted upon to emerge from a seeding depth of greater than 1/2 inch. Adjust seeding equipment to place the seed at a shallow depth of 1/4 - 1/2 inch. Placing the seed too deep is the most common single reason for failure to get a stand. If you see a few seeds on the soil surface after seeding, then your seeding depth is about right.
6. Because the seeder are primarily designed for field applications, a minimum of 4 passes should be made over the entire area. These passes should be at different angles to ensure better coverage.
7. Remove signs and other safety devices.

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 7,500 Square Feet | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Tree Trimming | CODE | 2250 |
|---|---|---|---|

**Purpose**

The primary purpose of trimming trees is to ensure they stay healthy and grow correctly. Vegetation management is critical to maintaining the reliability of Highway users. So trees are also trimmed for safety purposes—if the branches are in a precarious position endangering the lives of passersby or at risk of causing property damage. When trees are affected by disease or insects, trimming or pruning is often the only solution possible. If extreme weather conditions have caused damage to the tree, then trimming can help the wounds heal and close faster.

**Category** Vegetation

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Deciduous trees may be pruned in the dormant season once leave have fallen in October or November, but January to March is preferred. Trimming in the dormant season is preferred to lessen the stress to the tree. Finish pruning in the spring, before the color is evident in swelling leaf and flower buds. However, there are no rules for the pruning/trimming of trees on the Right of Way, this activity can be done any month

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Trees |
|---|---|---|---|---|---|

Accomplishment is the number of trees trimmed.

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** 5-7 Workers

| | QTY |
|---|---|
| Operator | 1 |
| Assistant/Safety Observer | 1 |
| Laborer | 2-3 |

*Traffic Control Personnel are NOT shown here

**P.P.E.**

1) Base PPE 2) Face Protection 3) Chainsaw Chaps 4) Safety Harness/Fall Protection when using aerial lift 5) OSHA Logger's First-Aid Kit

NOTE: Poison Ivy, long sleeve-shirt & soap /water are additional recommendations

No Loose fitting Clothing or Jewelry

**Materials**

None

**Job Specific Equipment**

| | |
|---|---|
| Boom Truck or Loader | 1 |
| Bucket Truck | 1 |
| Chipper | 1 |
| Rope, 3/4 inch rope a minimum of 100 feet long | 1 |
| Chainsaws (w/lanyard),appropriate size for the job | 2-4 |
| Appropriate round file for the chain size | 1-2 |
| Flat file, steel file to file the rakers with a depth gauge | 1 |
| Extra bars and chains | 1-2 |
| Wedges and lineman's axe | 2-4 |
| Chainsaw wrench specific to your brand of chainsaw | 2 |

*Traffic Control Equipment is NOT shown here

**Other References**

**Sub Activities**

| Average Daily Production | 14-23 Trees | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Tree Trimming | CODE | 2250 |
|---|---|---|---|

**Work Method**

1. Place signs and other safety devices
2. Consider pruning a branch if it meets any of the following criteria -
   - dead, dying or severely diseased branches
   - sprouts forming at the base of the trunk
   - branches growing toward or across the tree's center
   - crossed limbs that rub together or may rub in the future
   - V-shaped crotches (when possible to prune)
   - multiple leaders (upright branches that compete, as secondary trunks or may develop into additional, trunks)
   - nuisance growth (interfering with power lines, sidewalks, buildings, traffic or traffic visibility, etc.)The cut is the key to good pruning. As a rule, always cut back to a branch, twig or bud that is pointed in the direction you want the tree to grow.
   - This method encourages controlled, healthy new growth. If you're unsure whether to remove a branch, don't cut. You can always cut it later, but you can never put it back.
   - At the position where each branch originates from the trunk is a "collar" between the branch and the trunk. This branch collar contains vascular tissues from both the branch and the trunk. If you cut into the trunk tissue, you will interfere with the tree's natural protective mechanisms, allowing the entry of disease and insect pests which damage the tree trunk. Make your pruning cut outside the collar on the branch side without leaving a stub.
3. Never Top a tree! Topped trees have shortened life spans, pose safety hazards to people and property plus require continuing intensive maintenance.
4. Always start trimming on lower limbs and work your way up. Never start a cut unless all personnel and bystanders are clear.
5. Use chipper to reduce volume of waste material.
6. Haul to disposal area, dispose of waste according to INDOT environmental policy or Indiana Code.
7. Clean work area, being sure to clear roadway of any debris.
8. Remove signs and other safety devices

**Special Considerations**

INDOT will not maintain trees where property owners retained timber rights. Where such trees are known to exist and where hazardous to persons using the highway, INDOT will advise the owner of their responsibility to remedy the situation. Where the owner fails to take action within a reasonable period of time, INDOT will remedy the situation in the least costly method available.

INDOT will not maintain, remove or trim trees inside incorporated municipalities which are located in grassy strips between the edge of pavement and sidewalk.

NOTE: Incorporated municipalities have the responsibility for maintenance of trees to the corporate boundaries even though there are no curbs or sidewalks.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 14-23 Trees | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Tree Removal | CODE | 2251 |
|---|---|---|---|
| | | Category | Vegetation |

**Purpose**

Trees should be removed for safety purposes when they present an unacceptable level of risk to the motoring public, infrastructure and roads or have the potential to impact drainage.

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

All routine/ planned tree removal shall be scheduled between 1 October and 1 April. These calendar limitations are to ensure we are in compliance with regulations that exist due to the federally endangered Indiana Brown Bat and threatened Northern long-eared bat. However, if a tree is identified as an immediate threat to life or property, it may be removed- this should only occur in rare circumstances and should include consultation with District Environmental Staff prior to removal if at all possible. If you see a bat in any tree in the work area, stop all work (assuming it is safe to do so) and contact District Environmental Staff. All tree removal should be communicated/ coordinated with the adjacent property owner.

As defined by, and adapted from, the US Forest Service, a tree is a woody perennial plant, typically large, with a single well-defined stem carrying a more or less definite crown; and that stem must be at least 15 feet tall and at least 3 inches in diameter at 4 ½ feet from the ground. This is called “Diameter at Breast Height” (DBH).

For all live trees that are removed with the stumps to remain, a cut surface herbicide treatment shall be conducted following removal. Only licenses applicators may apply herbicides.

If the woody vegetation is less than 3 inches DBH and less than 15 feet tall, manual removal work should be reported to Manual Brush Cutting (Activity 2220).

Removal of limbs from trees should be reported to Tree Trimming (Activity 2250).

Removal of downed limbs, or other storm debris, should be reported to Storm Debris Removal (Activity 2611).

Only trained personnel may operate chainsaws.

| Reporting | | Asset to Report to | Various* | Reporting Units | Trees |
|---|---|---|---|---|---|

Accomplishment is the number of trees removed.

A scanned copy of the completed Job Hazard Analysis and Herbicide Record Sheet must be attached to the Work Order in WMS.

Report work completed on bridge cones to the bridge asset, not the pavement key.

For additional work order reporting guidance see the Work Orders section of the Preface

*Report to bridge structures or large culverts when the work performed is to address a work request for a bridge structure or large culvert.

Reporting Options:
- Pavement Keys
- Bridge Structures
- Large Culverts

**Crew Size** 5-8 Workers

| | QTY |
|---|---|
| Bucket Truck Operator | 1 |
| Safety Observer | 1 |
| Truck Driver/ Laborer | 3 |

*Traffic Control Personnel are NOT shown here.

**P.P.E.**

1) Base PPE
2) Face Protection
3) Chainsaw Chaps
4) Safety Harness/Fall Protection when using aerial lift
5) OSHA Logger’s First-Aid Kit

NOTE: Poison Ivy, long sleeve-shirt & soap /water are additional recommendations

No Loose Fitting Clothing or Jewelry

| Average Daily Production | 4 Trees | Effective Date | 7/12/2023 |
|---|---|---|---|

| ACTIVTY | Tree Removal | CODE | 2251 |
|---|---|---|---|

**Job Specific Equipment**

| | |
|---|---|
| Boom Truck or Loader | 1 |
| Bucket Truck | 1 |
| Chipper | 1 |
| Chainsaws (with lanyard), appropriate size for the job | 2-4 |
| Appropriate round file for the chain size | 2 |
| Flat file, for the rakers with a depth gauge | 1 |
| Extra bars and chains | 1-2 |
| Wedges and lineman's axe | 2-4 |
| Chainsaw wrench specific to your brand of chainsaw | 2 |

*Traffic Control Equipment is NOT shown here

**Materials**

Mixed Gas at appropriate ratio per chainsaw operator's manual

Bar Oil

Herbicide and Basal Oil
or
Ready-To-Use Herbicide labeled for cut surface/stump treatments.

**Other References**

US Fish and Wildlife Indiana Bat Website:
http://www.fws.gov/midwest/endangered/mammals/inba/

Chainsaw Operator's Manual

Chainsaw Safety Instructions

Herbicide Product Labels and Safety Data Sheets

**Sub Activities**

## Work Method

1) Place all Safety Devices and set up appropriate traffic control measures per IN Work Zone Traffic Control Guidelines.
2) Review site and conduct onsite Job Safety Briefing.
3) Put on required personal protective equipment.
4) Perform final inspection of the chainsaw and other equipment to ensure it is ready for use (*e.g.* check fluid levels in chipper, top off fuel in chainsaw and properly tension chain, *etc.*).
5) Walk to the tree(s) to be cut.
6) Conduct inspection of tree and surrounding area for hazards *i.e*. rocks, metal, *etc*. that may damage the chainsaw, or be a hazard, if contacted or happened upon while working and move these hazards a safe location if possible. Discuss cut plan with assistant.
7) Remove bar scabbard with a cut resistant gloved hand.
8) Ensure area is clear and start the chainsaw according to your model's starting instructions.
9) Using cutting methods appropriate to the task at hand, cut identified hazards such as vines, other woody undergrowth, or downed debris in exit lanes and around base of the tree(s) to be removed. This material should be cut into manageable sized pieces. All stumps shall be cut flush with the surrounding ground surface to eliminate tripping hazards.
10) Engage chain brake and/or stop chainsaw and move cut materials so that they are not impeding work and identified exit paths.
11) Proceed with cut plan until tree is safely on the ground. If modifications are needed during the felling process, be sure that all workers are informed of these changes prior to proceeding. All stumps shall be cut flush with the surrounding ground surface.
12) Cut felled tree into manageable sized pieces..

| ACTIVITY | Tree Removal | CODE | 2251 |
|---|---|---|---|

**Work Method**

13) If cut material is within the clear zone (a minimum of 15'), continues to impact sight distance or drainage after being cut, process the material through a wood chipper. Chips should be evenly distributed within the right-of-way, but out of the flowline of the ditch, to a depth not to exceed 3". Rake material to distribute, as needed. If processed material cannot be distributed on the right-of-way, material should be directed into a dump truck and disposed of consistent with practices outlined in Operations Memorandum 15-02
14) A licensed pesticide applicator shall apply an approved cut surface/stump treatment to the outermost 2" of all live stems cut within 1 hour of being cut/felled and consistent with product label instructions. Document the amount of herbicide material used for later reporting.
15) Clean work area, being sure to clear roadway of any debris.
16) Remove all Traffic Control Devices and carefully merge with traffic.

**Special Considerations**

INDOT will not maintain trees where property owners retain timber rights. Where such trees are known to exist and where posing unacceptable levels of risk to persons using the highway, INDOT will advise the owner of their responsibility to remedy the situation. Where the owner fails to take action within a reasonable period of time, INDOT will remedy the situation in the least costly method available.

INDOT will not maintain, remove, or trim trees inside municipalities.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 4 Trees | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Stump Removal | CODE | 2260 |
|---|---|---|---|

**Purpose**

This activity is intended to mitigate traffic hazards posed to errant vehicles that leave the road surface or to remove an obstacle for other maintenance activities by eliminating the above-ground portion of the stump of a woody plant within the right-of-way.

**Category** Vegetation

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Stump removal/grinding should be scheduled only if requested by the adjacent landowner, or if the stump cannot be cut flush with the surrounding ground surface. This work may be necessary following Activity 2220 – Manual Brush Cutting; Activity 2251 - Tree Removal; or Activity 2611 – Storm Debris Removal. Due to soil disturbance occurring with this activity, underground utilities shall be located before work is conducted.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Stumps |
|---|---|---|---|---|---|

Accomplishment is the number of stumps ground.

Utility locate request number shall be included in the Comments field of the Work Order.

If waste material will be disposed of on private property, ensure an "Excavation Material Disposal" form is completed. Attach a copy of this form to the Work Order.

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** 2-5 Workers

| | QTY |
|---|---|
| Equipment Operator | 1 |
| Truck Driver / Laborer | 1-3 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | |
|---|---|
| Stump Cutter/Grinder | 1 |
| Chainsaw | 1 |

*Traffic Control Equipment is NOT shown here

**P.P.E.**

1) Base PPE
2) Face and hearing protection (loggers' helmet)
3) Chainsaw Chaps
4) OSHA Logger's First-Aid Kit

NOTE: Poison Ivy may be present- long-sleeved shirt & soap / water are additional recommendations

No Loose-fitting Clothing or Jewelry

**Materials**

Grass Seed – INDOT Standard Specifications Section 621

Topsoil

Straw or Straw Erosion Control Blanket

**Other References**

Standard Specifications 621.03 thru 621.14 and 914.01

**Sub Activities**

| Average Daily Production | 1-4 Stumps Removed | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Stump Removal | CODE | 2260 |
|---|---|---|---|

## Work Method

1. Conduct under-ground utility locates and confirm that all utilities have responded prior to conducting work.
2. Place all Safety Devices and set up appropriate traffic control measures per IN Work Zone Traffic Control Guidelines.
3. Review site and conduct onsite Job Briefing.
4. Put on all additional required personal protective equipment.
5. Perform final inspection of all equipment. Observing all safety precautions, install/check that all safety shields and guards are in place and properly functioning and/or secured. Check fluid levels, ensure no loose bolts and that all controls and safety shut offs are fully functional.
6. Use a shovel or mattock to remove any rocks or other foreign debris from around the base of the stump that may cause damage to or be thrown by the grinder.
7. The stump should already be within a few inches of the surrounding soil. If not, a certified chainsaw operator should use a chainsaw to carefully cut the stump flush with the ground. This step is important to reduce the time spent grinding thereby reducing the amount of material to process.
   - Refer to INDOT Chainsaw Safety Instructions and the Operators Manual for specific instructions.
8. Ensure that all operators and bystanders are at a safe distance and position in relation to the equipment as specified by the operator's manual prior to starting the grinder.
9. Grind stump according to operator's manual to a depth of four (4) inches below surrounding grade.
10. Collect all wood chips and load into truck for disposal consistent with practices outlined in Operations Memorandum 15-02.
    - If waste material will be disposed of on private property, ensure an "Excavation Material Disposal" form is completed. Attach a copy of this form to the work order.
11. Fill the newly created depression with clean topsoil.
12. Tamp down and smooth/blend soil with surrounding area with a rake.
13. Spread an even layer of grass seed
    - Seeding rate should be approximately ½ pound per 100 square feet or the equivalent of about 10 seeds per square inch.
14. Lightly rake the seeds into the soil (you should still see some seed on the surface).
15. Cover the disturbed area with a layer of loose straw or use a straw matting- secure straw matting with staples.
16. Water the area.
17. Collect and stow all tools.
18. Load and secure all equipment.
19. Remove all Traffic Control Devices and carefully merge with traffic.

## Special Considerations

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 1-4 Stumps Removed | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Spot Mowing | CODE | 2270 |
|---|---|---|---|

**Purpose**

This activity is utilized for mowing of intersections to improve sight distances prior to a scheduled mowing, mowing of state-owned properties outside of INDOT ROW, used to control the height or seed development of noxious/invasive weeds and for slope mowing with special equipment or by hand.

**Category** Vegetation

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule whenever necessary to correct any sight distance hazards due to overgrown vegetation. Parcels of land outside of ROW should be conducted as necessary. Spot mowing for noxious/invasive species should be conducted prior to flower/seed formation.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Square Feet |
|---|---|---|---|---|---|

Accomplishment is the square feet mowed. Measure the length and width of the area mowed in feet. Multiply these two numbers together to get the square feet.

If mowing for sight distance correction for Work Request, include the Work Request number in Comments field of Work Order. Measure actual sight distance prior to and after work and include these measurements in the Comments field of the Work Order.

If mowing for invasive or noxious weed species include species of vegetation being cut in Comments field of Work Order.

Mowing of rest parks to be reported to Activity 2720. Mowing of Unit, Sub-district, District or any other facilities is to be reported to Activity 2830.

For additional work order reporting guidance see the Work Orders section of the Preface

**Crew Size** 2 Workers

| | QTY |
|---|---|
| Tractor/Mower Operator | 1 |
| Truck Driver / Laborer | 1 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | |
|---|---|
| Tractor / Mower | 1 |
| Riding / Push or Slope Mower | 1 |
| String Trimmer | 1 |

*Traffic Control Equipment is NOT shown here.

**P.P.E.**

1) Base P.P.E.
2) Face Protection recommended when using Trimmer.

**Materials**

**Other References**

IC 15-16-8: Destruction of Detrimental Plants

**Sub Activities**

134- Mowing for Safety Conditions (e.g., Sight Distance)

135- Mowing for Noxious or Invasive Species

136- Mowing State-owned Lots Outside The Normal Right-of-Way

| Average Daily Production | 21,780 - 43,560 Sq Ft | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Spot Mowing | CODE | 2270 |
|---|---|---|---|

## Work Method

1. Place all Safety Devices and set up appropriate traffic control measures per IN Work Zone Traffic Control Guidelines.
2. Put on required personal protective equipment.
3. Conduct onsite Job Briefing.
4. Review site, being sure to check for hidden objects/obstacles.
   - For Sub Activity 134 (Sight Distance) work orders: measure and record initial sight distance.
5. Unload equipment.
6. Perform final inspection of the equipment to be used to ensure that all guards are in place and functioning properly and the equipment is ready for use.
7. Operate all equipment consistent with Operators Manual. Mow only those areas necessary to a height of six (6) inches.
   - Ensure all bystanders maintain a safe distance from the work being conducted as recommended by the equipment's operators manual.
8. Clean off any vegetative debris from equipment prior to loading to reduce the spread of invasive species.
9. Load and secure equipment.
10. Measure and record area mown.
    - For Sub Activity 134 (Sight Distance) work orders: measure and record final sight distance.
11. Remove all Traffic Control Devices and carefully merge with traffic.

## Special Considerations

NOTE: Exercise caution when cutting hazardous vegetation, such as poison hemlock, wild parsnip, poison ivy, etc. is unavoidable. Utilize chemical control methods instead of mechanical methods for these species, whenever possible.

| Sight Distances for Passenger Cars<br>*As measured with object of 24" in height viewed from 42" in height* | |
|---|---|
| Speed | Distance (Feet) |
| 30 | 200 |
| 35 | 250 |
| 40 | 305 |
| 45 | 360 |
| 50 | 425 |
| 55 | 495 |
| 60 | 570 |
| 65 | 645 |
| 70 | 730 |

APPROVED BY

Director, Highway Maintenance

| Average Daily Production | 21,780-43,560 Sq Ft | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Right-Of-Way Fence | CODE | 2280 |
|---|---|---|---|

**Purpose**

Repair damaged, state-owned right-of-way fencing to maintain delineation of the right-of-way. Includes rebuilding existing fence using materials in place and/or replacing short sections of damaged fencing with new materials.

**Category** Right-of-Way

- ☐ PM
- ☐ QA
- ☐ Plan Location

**Scheduling & Coordination**

Schedule this work when other road work is not possible if not a hazard. Damaged fencing which is hazardous to the traveling public should be scheduled for removal and repair as soon as possible.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Linear Feet |
|---|---|---|---|---|---|

Accomplishment is the total linear feet of fence repaired or replaced.

Repair work taking multiple days should be reported to a single work order.

Removal of fence only, with no installation, is reported as the total linear feet removed. Report removal only to Subactivity 200.

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** 3-4 Workers

| | QTY |
|---|---|
| Tractor Operator | 1 |
| Truck Driver / Laborer | 2-3 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | |
|---|---|
| Tractor | 1 |
| Chainsaw | 2 |
| Fence Stretcher/Pulley | 1 |
| Post Driver | 2 |
| Log Chain | 1 |
| Fence Pliers | 2 |
| 50 foot Tape Measure | 1 |

*Traffic Control Equipment is NOT shown here

**P.P.E.**

1) Base PPE
2) Face Protection
3) Chainsaw Chaps.
4) OSHA Logger's First-Aid Kit

NOTE: Poison Ivy, long-sleeved shirt & soap /water are additional recommendations

No Loose Fitting Clothing or Jewelry

**Materials**

Fence - INDOT Spec Section 910.18

Salvage Fence

Tee Fence Post - INDOT Spec Section 910.18

Fence Ties/Clips - INDOT Spec Section 910

Fencing Nails - INDOT Spec Section 910

Barbed Wire Fence - INDOT Spec Section 910

**Other References**

**Sub Activities**

200 - Fence Removal Only (no new installation)

| Average Daily Production | 260 Linear Feet | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Right-Of-Way Fence | CODE | 2280 |
|---|---|---|---|

**Work Method**

1. Place signs and other safety devices
2. Remove any damaged fence and posts, salvage material if possible in the fence .
3. Measure the width and length of the hole,
4. Replace any T-posts that were damaged, they should be every 10 feet. T-posts have “blades” on them that should be buried at least 2 feet for a 5 foot fence.
5. Unroll a new roll of woven wire and cut a piece that is a minimum 12 inches longer than the hole you are patching.
6. Attach the fence to one corner/anchor post (Anchor post should be every 50-75 feet) with U staples/nails, and then put a temporary post in the ground beyond the other end, which you will attach the pulley to in order to stretch the fence. (Tractor may be used as anchor to stretch fence)
7. The fence should be stretched until the little V shaped crimps in it become about 1/3 straighter.
8. Start at the end furthest away from stretcher and began attaching the clips to fence. 5 clips per post is recommended, make sure the top of the fence is over one of notches on the post.
9. When all fencing has been attached, remove stretcher, pick up tools.
10. Remove signs and other safety devices

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 260 Linear Feet | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Other Roadside Maintenance | CODE | 2290 |
|---|---|---|---|

**Purpose**

Report other routine roadside maintenance activities that are not specifically identified as separate activities.

Note: Work performed in preparation of or as follow up to a specific activity is to be recorded to that activity.

**Category** Right-of-Way

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule throughout the year as required. Observe temperature and weather limitations for individual activities.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Accomplishment is the total person hours. Ensure specific work description is included in the comments.

Ensure specific materials and equipment used are reported.

Repair work at one location taking multiple days should be reported to a single work order.

Repair of slides or major washouts should be reported to Activity 2291.

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size**

| Workers | QTY |
|---|---|
| Determined by specific repair being performed. | |

**Job Specific Equipment**

Determined by specific repair being performed.

**P.P.E.**

Base P.P.E.

**Materials**

Determined by specific repair being performed.

Typical materials may include:

- Aggregates (#2, #53, #73, riprap) (TNS – Tons) INDOT Spec Section 904
- HMA Surface (TNS – Tons) INDOT Spec Section 902.01
- Filter Cloth (SQF - Square Feet) INDOT Spec Section 718
- Grass seed (LBS – Pounds) INDOT Spec Section 621
- Guardrail components - INDOT Spec Section 601

**Other References**

| Sub Activities | | | |
|---|---|---|---|
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

| ACTIVITY | Other Roadside Maintenance | CODE | 2290 |
|---|---|---|---|

**Work Method**

Examples of work to perform under this activity:

+ Rock cut maintenance
+ Spot slope repairs
+ Removal of unauthorized or illegal signs from within the right-of-way

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Roadway Slide Maintenance | CODE | 2291 |
|---|---|---|---|

**Purpose**

Repair of roadway due to slope failures, slides, and large washouts impacting the mainline roadway.

**Category** Right-of-Way

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule throughout the year as required. Observe temperature and weather limitations for the specific work being performed.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Report accomplishment in person hours. Ensure specific work description is included in the comments.

For small washout repair (typically less than 50 tons of material), report to Activity 2390.

Ensure specific materials and equipment used are reported.

Slide repair work taking multiple days should be reported to a single work order.

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** | **Workers**

QTY

Determined by specific repair being performed.

**P.P.E.**

Determined by specific repair being performed.

**Materials**

Determined by specific repair being performed.

Typical materials may include:

- Aggregates (#2, #53, #73, riprap) (TNS – Tons) INDOT Spec Section 904
- HMA Surface (TNS – Tons) INDOT Spec Section 902.01
- Filter Cloth (SQF - Square Feet) INDOT Spec Section 718
- Grass seed (LBS – Pounds) INDOT Spec Section 621
- Guardrail components - INDOT Spec Section 601

**Job Specific Equipment**

Determined by specific repair being performed.

**Other References**

| Sub Activities | | | |
|---|---|---|---|
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

| ACTIVITY | Roadway Slide Maintenance | CODE | 2291 |
|---|---|---|---|

**Work Method**

Work conducted under this activity may include, but is not limited to:

- Removal of dirt and debris from the roadway
- Placing fill in settled or washed out areas
- Clean and reshape ditch from slide movement
- Cut and remove trees from roadway due to slide movement
- Shoulder work to maintain adequate shoulder for the traveling public
- Roadway or shoulder paving due to slide movement
- Resetting guardrail due to slope settlement
- Reseeding graded/filled areas

**Special Considerations**

Slides should be reported and investigated by the Geotechnical Engineering Section. They can make recommendations on repair methods and techniques.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Major Cleaning & Reshaping Ditching | CODE | 2310 |
|---|---|---|---|

**Purpose**

The primary purpose of this activity is for excavating large amounts of soil or digging long distances to restore drainage along the roadside. This activity may be used to reshape ditches so a vehicle leaving the roadway can cross over them without the vehicle overturning, being abruptly stopped or causing the driver to lose control.

**Category**: Drainage Structures & Drainage

- ☒ **PM**
- ☒ **QA**
- ☒ **Plan Location**

**Scheduling & Coordination**

Schedule this work on ditches which have standing water or have obstructions. Emphasis should be on ditches with excessive silting and blocked drainage structures. This should be done during the growing season when it is easiest to reestablish vegetation. For large areas this is from mid-August through October (lowest amount and less intense rainfall events). Dredging shall be conducted during low water periods and 'in the dry".

Ditching Excavation area that is needed to be removed should be marked prior to the date of actual work. The amount will be determined by fixed flow elevation points (i.e. culvert inlets/outlets, catch basin inlets, etc.).

Plan for installation of temporary erosion & sediment control measures. Coordinate with underground utilities.

This activity should also plan where to dispose of excavated material that are close to the work area. First choice should be used on R/W, where washout/erosion are accruing or where poor soil conditions exist.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Linear Feet |
|---|---|---|---|---|---|

Accomplishment is the total linear feet of ditch dug.

Only report continuous ditching of greater than 200 feet to this activity. Areas reported to this activity that are greater than 500 linear feet of excavated material shall have a survey of drainage area to be cleaned by a qualified person. Survey will consist of both depth elevations and finished transverse slopes and erosion control plans. A copy of this survey must be attached to the work order.

If waste material will be disposed of on private property, ensure an "Excavation Material Disposal" form is completed. Attach a copy of this form to the work order.

Ditching that is less than 200 feet shall be reported to Spot Ditching (Activity 2311).
Cleaning paved side ditches is reported to Other Drainage Maintenance (Activity 2390, Sub-Activity 819)

For additional work order reporting guidance see the Work Orders section of the Preface

**Crew Size** 6-9 Workers

| | QTY |
|---|---|
| Operator | 1-2 |
| Laborer | 2-3 |
| Truck drivers | 3-4 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | |
|---|---|
| Excavator or Grader | 1 |
| Surveyor's Equipment | 1 |
| Dump truck | 3-4 |
| Travel loader or Loader | 0-1 |
| Tractor/Tiller or Tractor /Seed drill | 1 |

*Traffic Control Equipment is NOT shown here

**P.P.E.**

Base PPE

**Materials**

Erosion Control Items

Grass seed – INDOT Spec Section 621

Fertilizer

Straw/Straw Mat

**Other References**

327 A I C 15 - 5, Rule 5

Standard Specifications 205.01 thru 205.06

Standard Specifications 621.03 thru 621.14

Seed (914.04), Fertilizer( 914.03),Mulch (914.05),Blanket (914.09)

**Sub Activities**

| Average Daily Production | 500 - 1,000 Linear Ft | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Major Cleaning & Reshaping Ditching | CODE | 2310 |
|---|---|---|---|

**Work Method**

1. Call Indiana 811 at least two full working days prior to beginning work. Record provided locate reference numbers in the work order.
2. Place signs and other safety devices
3. Install silt/sediment control devises where needed to keep all material on R/W.
4. Survey the ditch bottom and adjacent culverts to determine where sediment has accumulated. If this hasn't already been identified by survey.
5. Identify any underground utilities and hand dig areas to proper elevations, 24 inches on each side of painted marks. This should be done while excavator is working in areas with no utilities.
6. When excavating excess material from a ditch, return the ditch to the original design depth and location. Over-excavation and undercutting can result in slope failure, road failure, and ditch head cutting.
7. Remove material and debris from ditch with excavator to allow drainage and load in trucks. All efforts shall be made to retain existing vegetation, especially along the ditch slopes to maintain slope stability. Careful precaution shall be taken as not to disturb vegetated ditch areas not requiring dredging.
8. The side slopes of the ditch/channel should not exceed the angle of repose of the soil comprising the ditch line, and should generally be 3:1 or flatter. Re-establish uniform flow line, taking care to avoid low spots which will accumulate water.
9. Avoid creating a "V" or cup bottom ditch, V-shaped ditches concentrate flow, become incised, and erode sediment
10. Dispose of waste according to INDOT environmental policy, INDOT is responsible for the proper disposal of items taken from INDOT's right-of-way.
11. Dress and shape fore-slopes and back slopes. Avoid creating steep slopes whenever possible.
12. Prepare area to be treated, ditch side slopes shall be seeded and mulched as soon as possible.
13. Apply fertilizer, seed and mulch side slopes as appropriate to prevent subsequent erosion.
14. Ditch cleanings are not to be left on the roadway surfaces. Sweep dirt and debris remaining on the pavement at the completion of ditch cleaning operations.
15. Remove signs and other safety devices
16. Remove silt/sediment control devices after permanent vegetation cover as been established.

**Special Considerations**

When disposing of ditching material off of state property, utilize the "Excavation Material Disposal Site" form. Attach a copy of this form to the work order.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 500 - 1,000 Linear Ft | EFFECTIVE DATE | 7/12/2023 |

# Indiana Department of Transportation

## Activity 2310 QA Form - Major Cleaning & Reshaping Ditching

Asset Inventory #:_____ District/Sub/Unit:_____
Work Order #:_____ Route:_____
Date completed:_____ Intersections:_____
Date inspected:_____ Limits:_____
Inspector:_____ RP Start/End:_____
QA Window: 1-4 months

**Observations:**

1. Was excavation, grading, seeding and installation of temporary erosion control measures completed during:

15 15 April - 15 June OR 1 September to 15 October
5 1 March - 14 April OR 16 June - 30 August
0 15 October - 1 March

2. Has work resulted in reestablishing an appropriate & consistent grade with all excess excavated materials having been removed? (no signs of pooling or ponding of water)

0 No **describe deficiency in Inspectors Comments**
10 Yes

3. Has greater than 70% cover of permanent vegetation been established on any disturbed soil and all temporary erosion control measures have been removed?

0 No **describe deficiency in Inspectors Comments**
10 Yes

4. Does the work order contain all of the following? (Locate reference numbers, grass seed, fertilizer, straw mat, other temporary erosion control materials)

0 No **describe deficiency in Inspectors Comments**
10 Yes

5. What are the angles of the fore and back slopes of the ditch?

0 Slope is steeper than 3:1 **describe deficiency in Inspectors Comments**
10 Slope is 3:1 or flatter

6. Where is the ditch located in respect to its surroundings?

0 Ditch doesn't follow a smooth line, or any portion is too close to the road when suitable ROW is available **describe deficiency in Inspectors Comments**
10 Ditch aligns well with any existing drainage structures with channel following a smooth line between structures

**Inspector Comments:**

| |
|---|
| |

**Score:**

| | Possible | Actual |
|---|---|---|
| **1** | 15 | |
| **2** | 10 | |
| **3** | 10 | |
| **4** | 10 | |
| **5** | 10 | |
| **6** | 10 | |
| **Total:** | 65 | |

**Final % score (divide Actual by Possible):_____**

**Indiana Department of Transportation**
**Highway Maintenance Division**
**Excavation Material Disposal Site**

## A. Site Information

1. Name of the Property Owner: _____
2. Address/location of the Site: _____
   _____
3. Material to be disposed of at the Site:_____ Amount:_____
4. Date(s) of disposal operations: _____to _____
5. Intended material use: _____
6. Environmental Impacts:
   a. Will there be impacts to wetlands or waters of the US at the Site? ☐ Yes ☐ No
   b. Is the Site in a Floodway? ☐ Yes ☐ No
   c. Will more than one acre of land at the Site be disturbed by disposal activities? ☐ Yes ☐ No
7. Comments:
   _____
   _____
8. Site Drawing: (*In the space below, include a sketch of the proposed Site, including where material is being dumped and used, as well as the closest waterway, if it can be seen. i.e. 500 feet north of limestone branch,*)

## B. Certification

The Property Owner hereby certifies that the proposed disposal site, as described above, is in accordance with all local, state, and federal laws and that the Property Owner will only perform those operations at the site that are permitted and the material will be used only as stated above.

Signature of Property Owner: _____Date: _____

Signature of Unit Foreman: _____Date: _____

Signature of Subdistrict Manger: _____Date: _____

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Spot Ditching | CODE | 2311 |
|---|---|---|---|

**Purpose**

The primary purpose of this activity is to reduce the amount of disturbances to roadside vegetation in ditches while improving the drainage of area.

By machine cleaning and reshaping of roadside ditches, with an excavator or similar equipment to maintain adequate drainage.

This practice will reduce the pollution caused by maintenance ditch cleaning. Minimize vegetation removal to limit sediment and pollutant discharge from the work area by leaving undisturbed sections to act as sediment filters.

**Category**: Drainage Structures & Drainage

- ☒ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule this work throughout the year on ditches which are ponding water or have minor obstructions. Emphasis should be on ditches with excessive silting and blocked drainage structures. Excavation area that is needed to be removed should be marked prior to the date of actual work. The amount will be determined by fixed flow elevation points (i.e. culvert inlets/outlets, catch basin inlets, etc.).

Coordinate with underground utilities

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Locations |
|---|---|---|---|---|---|

Accomplishment is reported in number of locations spot ditched.

Areas reported to this activity will be no greater than 200 continuous linear feet of excavated material in a single location. Ditching that is longer than 200 feet shall be reported to Major Cleaning and Reshaping Ditching (Activity 2310).

Record the total footage ditched by inventory asset in the accomplishment portion of the Work Order. Ensure that each specific location and quantity is described in the comments field.

Cleaning paved side ditches is reported to Other Drainage Maintenance (Activity 2390, Sub-Activity 819)

If waste material will be disposed of on private property, ensure an “Excavation of Material Disposal” form is completed. Attach a copy of this form to the work order.

For additional work order reporting guidance see the Work Orders section of the Preface

**Crew Size** 5-7 Workers

| | QTY |
|---|---|
| Operator | 1-2 |
| Laborer/Truck Driver | 3-4 |
| Crew leader/ Surveyor Operator | 1 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | |
|---|---|
| Excavator or Grader | 1 |
| Surveyor's Equipment | 1 |
| Dump truck | 2-3 |
| Travel loader or Loader | 0-1 |
| Tractor/Tiller or Tractor /Seed drill | 1 |

*Traffic Control Equipment is NOT shown here

**P.P.E.**

Base PPE

**Materials**

Erosion Control Items

Grass seed – INDOT Spec Section 621

Fertilizer

**Other References**

327 A I C 15 - 5, Rule 5

Standard Specifications 621.03 thru 621.14

Seed (914.04), Fertilizer( 914.03),Mulch (914.05),Blanket (914.09)

**Sub Activities**

| Average Daily Production | 2 Locations Ditched | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Spot Ditching | CODE | 2311 |
|---|---|---|---|

**Work Method**

1. Place signs and other safety devices
2. Survey the ditch bottom and adjacent culverts to determine where sediment has accumulated.
3. When excavating excess material from a ditch, return the ditch to the original design depth and location. Over-excavation and undercutting can result in slope failure, road failure, and ditch head cutting.
4. Remove as little material and debris from ditch with excavator to allow drainage and load in trucks. All efforts shall be made to retain existing vegetation, especially along the ditch slopes to maintain slope stability. Careful precaution shall be taken as not to disturb vegetated ditch areas not requiring dredging.
5. Dispose of waste according to INDOT environmental policy. INDOT is responsible for the proper disposal of items taken from INDOT's right-of-way.
6. The side slopes of the ditch/channel should not exceed the angle of repose of the soil comprising the ditch line, and should generally be 3:1 or flatter. Re-establish uniform flow line, taking care to avoid low spots which will accumulate water.
7. Avoid creating a "V" or cup bottom ditch. V-shaped ditches concentrate flow, become incised, and erode sediment.
8. Dress and shape fore-slopes and back slopes. Avoid creating steep slopes whenever possible.
9. Prepare area to be treated, ditch side slopes shall be seeded and mulched as soon as possible.
10. Apply fertilizer, seed and mulch side slopes as appropriate to prevent subsequent erosion.
11. Ditch cleanings are not to be left on the roadway surfaces. Sweep dirt and debris remaining on the pavement at the completion of ditch cleaning operations.
12. Remove signs and other safety devices

**Special Considerations**

When disposing of ditching material off of state property, utilize the "Excavation Material Disposal Site" form. Attach a copy of this form to the work order.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 2 Locations Ditched | EFFECTIVE DATE | 7/12/2023 |

**Indiana Department of Transportation**
**Highway Maintenance Division**
**Excavation Material Disposal Site**

## A. Site Information

1. Name of the Property Owner: _____
2. Address/location of the Site: _____
   _____
3. Material to be disposed of at the Site:_____ Amount:_____
4. Date(s) of disposal operations: _____to _____
5. Intended material use: _____
6. Environmental Impacts:
   a. Will there be impacts to wetlands or waters of the US at the Site? ☐ Yes ☐ No
   b. Is the Site in a Floodway? ☐ Yes ☐ No
   c. Will more than one acre of land at the Site be disturbed by disposal activities? ☐ Yes ☐ No
7. Comments:
   _____
   _____
8. Site Drawing: (*In the space below, include a sketch of the proposed Site, including where material is being dumped and used, as well as the closest waterway, if it can be seen. i.e. 500 feet north of limestone branch,*)

## B. Certification

The Property Owner hereby certifies that the proposed disposal site, as described above, is in accordance with all local, state, and federal laws and that the Property Owner will only perform those operations at the site that are permitted and the material will be used only as stated above.

Signature of Property Owner: _____Date: _____

Signature of Unit Foreman: _____Date: _____

Signature of Subdistrict Manger: _____Date: _____

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Culvert Replacement - Small Pipe (≤36") | CODE | 2331 |
|---|---|---|---|

**Purpose**

Excavation, removal, and installation of pipe less than or equal to 36" diameter or equivalent for arches. Deterioration, damage or hydraulic inadequacy results in a required pipe replacement to ensure adequate drainage and flow.

**Category**: Drainage Structures & Drainage

- ☒ **PM**
- ☒ **QA**
- ☒ **Plan Location**

**Scheduling & Coordination**

- Activity should be evaluated based on the current condition of the pipe and any inspection findings (Activity 2320) or reported damages. This activity should be performed in advance of any surface treatments (i.e. Pavement overlay, chip-seal, etc.) including work done under contract.
- Ensure hydraulic and environmental approvals have been obtained prior to the activity field work.
- Report to the specific small culvert assets. If the asset is not in the WMS inventory, leave the asset field blank and note in the comments the CLV number from the Bridge and Drainage Assets viewer.
- Submit a request for locate services at least 2 days prior to any excavation.
  - ***Indiana811**: (800) 382-5544, http://indiana811.org/*

| Reporting | Asset to Report to | Small Culvert | Reporting Units | Linear Feet |
|---|---|---|---|---|

Accomplishment is the linear feet of installed pipe. Report all work to one Work Order including sign/detour placement, sight preparation, material deliveries, saw cutting pavements, excavation, installation, backfill and surface overlay. Report to the specific small culvert asset. If the asset is not in the WMS inventory, leave the inventory asset field blank and note in the comments the CLV number from the Bridge and Drainage Assets viewer.

**NOTE:**

1) Pipe Lining shall NOT be reported to this activity. Pipe lining small culverts shall be reported to Activity 2336
2) This activity shall NOT include replacement of pipes greater than or equal to 36". Replacement of pipes greater than or equal to 36" shall be reported to Activity 2332.
3) Pipe extensions shall be reported to Activity 2390 (Other Drainage Maintenance)

For additional work order reporting guidance see the Work Orders section of the Preface

| Crew Size | 6 Workers | QTY |
|---|---|---|
| Crew Leader | | 1 |
| Excavator Operator | | 1 |
| Truck Driver | | 2 |
| Laborer | | 2 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | |
|---|---|
| Excavator/Backhoe | 1 |
| Dump Truck | 2 |
| Crew Cab | 1 |
| Compressor | 1 |
| Jackhammer | 1 |
| Mechanical Compactor | 1 |
| Pavement Saw (Wet) | 1 |

*Traffic Control Equipment is NOT shown here

**P.P.E.**

1) Base PPE
2) Approved APF 10 Respirator (See "Silicosis Awareness")

**Materials**

Pipe – INDOT Spec Sections 907 and 908.02
Structure Backfill – INDOT Spec Section 904.05
Bituminous Mix -INDOT Spec Section 902
Rip-Rap – INDOT Spec Section 904.04
Geotextiles – INDOT Spec Section 918.02
Removable Flowable Backfill – INDOT Spec Section 213

**Other References**

- OSHA Safety and Health Standards for the Construction Industry: Subpart B - Excavations
- **Indiana811**: (800) 382-5544, http://indiana811.org/
- INDOT Standard Specifications *(Section 715)*
- Operations Memorandum 11-06 *(Environmental & Hydraulic Requirements for INDOT Culvert Work)*
- Silica Exposure Control Plan (WPS Preface)

| Sub Activities | | | |
|---|---|---|---|
| Average Daily Production | 20 Linear Feet | EFFECTIVE DATE | 7/12/2023 |

| ACTIVITY | Culvert Replacement - Small Pipe (≤36") | CODE | 2331 |
|---|---|---|---|

## Work Method

1. Place signs and safety devices
2. Cut pavement over pipe to be replaced
3. Excavate and remove pipe
4. Clean out and replace pipe bed to original grade
5. Place culvert in trench beginning at downstream end
6. Backfill over culvert
   - ✓ Use suitable structure backfill *(INDOT Standard Specifications: Section 904.05 Structure Backfill)* material and compact in layers not exceeding 6" or
   - ✓ Use removable flowable backfill *(INDOT Standard Specifications: Section 213 Flowable Backfill).* If the weight of the pipe is less than the weight of the volume of removable flowable backfill it is displacing the pipe may float. Placing weight on the pipe, holding it down with a piece of equipment e.g. backhoe bucket, or anchoring the pipe down e.g. drive fence posts on each side of culvert and attach a fence post to them over the top of the pipe may be required. Particular attention should be given to plastic pipe and pipe joints.
7. Place bituminous patch over excavation and compact.
   - ✓ Utilize work method and details from Activity 2020 (Deep Patch), but report work to 2331.
8. Dress side slopes, inlets, outlets and ditches
9. Remove signs and safety devices

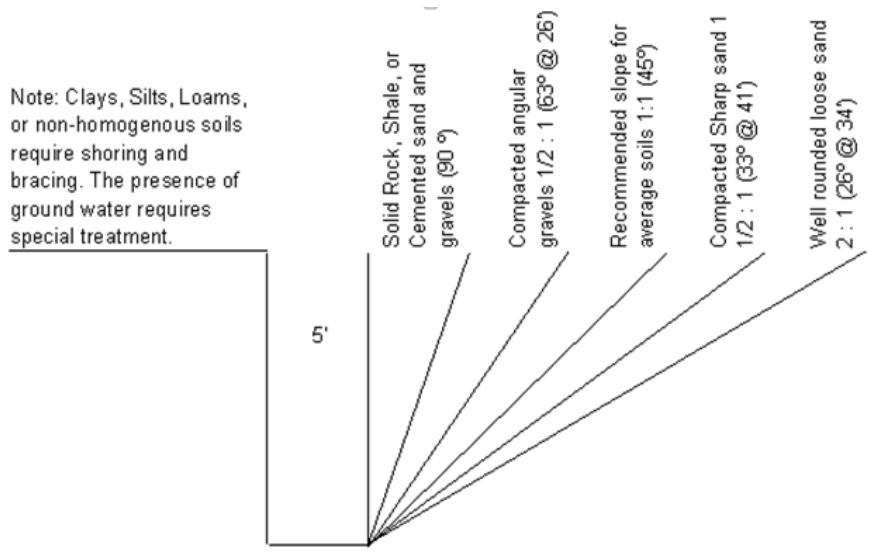
## Silicosis Awareness

All efforts should be made to eliminate/reduce the generation of dust while performing this activity, specifically pavement sawing. A wet saw should be used, or if not available, manually spray water to control dust.

If the generation of dust cannot be eliminated through use of water or other controls, then workers operating the saw or within 20' must wear an approved facepiece respirator that they are fit tested to wear.

## Special Considerations

When trenching five feet deep or more slope angles should be constructed for safe operations as shown in the diagram below.




| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 20 Linear Feet | EFFECTIVE DATE | 7/12/2023 |

# Indiana Department of Transportation

## Activity 2331 QA Form - Culvert Replacement - Small Pipe (≤36")

Asset Inventory #:_____ District/Sub/Unit:_____
Work Order #:_____ Route:_____
Date completed:_____ Intersections:_____
Date inspected:_____ Limits:_____
Inspector:_____ RP Start/End:_____
QA Window: 0-3 months

**Observations:**

1. Pipe inlet is prepared?
   - 0 Ditch is not cleaned for pipe installation/scour prevention
   - 5 Ditch cleaned and open to pipe

2. Pipe outlet is prepared?
   - 0 Ditch is not cleaned for pipe installation/scour prevention
   - 5 Ditch cleaned and open to pipe

3. Patch squared with adjacent pavement?
   - 0 Both sides not squared
   - 5 One side not squared
   - 10 Both sides squared

4. Patch flush with adjacent pavement?
   - 0 > 3/4"
   - 8 ≥ 1/4" and ≤ 3/4"
   - 15 < 1/4"

5. Pipe inlet is in correct location in relation to existing ditch and shoulder?
   - 0 Pipe inlet extends beyond ditch line and obstructs ditch flow
   - 8 Pipe inlet does not obstruct ditch flow, but side slope steepened
   - 15 Pipe inlet does not obstruct ditch flow, or pipe extends beyond toe of existing slope and shoulder improved

6. Pipe outlet is in correct location in relation to existing ditch and shoulder?
   - 0 Pipe outlet extends beyond ditch line and obstructs ditch flow
   - 8 Pipe outlet does not obstruct ditch flow, but side slope steepened
   - 15 Pipe outlet does not obstruct ditch flow, or pipe extends beyond toe of existing slope and shoulder improved

7. All construction materials/debris removed? (deduction item)
   - -5 No
   - 0 Yes

8. Vegetation established or other materials placed to prevent erosion on disturbed areas? (deduction item)

-5 No

0 Yes

9. Patch material/work is included in 2331 work order? (deduction item)

-5 Patch material/work not included in 2331 work order

0 Patch material/work included in 2331 work order

10. Was compaction equipment and tack oil on the work order? (deduction item)

-5 Compaction equipment and tack oil not on the work order

0 Compaction equipment and tack oil on the work order

**Inspector Comments:**

**Score:**

| | **Possible** | **Actual** |
|---|---|---|
| **1** | 5 | |
| **2** | 5 | |
| **3** | 10 | |
| **4** | 15 | |
| **5** | 15 | |
| **6** | 15 | |
| **7** | 0 | |
| **8** | 0 | |
| **9** | 0 | |
| **10** | 0 | |
| **Total:** | 65 | |

**Final % score (divide Actual by Possible):_____**

Clear Form | Save as PDF

*Date of Submission:* _____ /_____ /_____

# SMALL STRUCTURE INVENTORY UPDATE - Activity 2331/2332/2336/2337

**INSTRUCTIONS:**
**THIS FORM SHALL BE COMPLETED;**
**(1) Any time repair work results in modifications to the structure of a small structure, or**
**(2) any time a small structure is replaced.**
**This form shall be completed for said work and submitted to the Senior Bridge Inspection Engineer if the culvert span is 48" or greater or to the Culvert Engineer if the culvert span is less than 48". In the event work on a structure was performed under contract, a copy shall also be kept with the project file.**

**Work Performed by:** *(Check One that Applies - ✓)*

☐ Contract ☐ INDOT Maintenance

**Responsible Party:** *(Please print the following)*

Name _____ Title _____

Phone _____ Email _____

Company *(or District/Dept.)* _____

**Type of Work:** *(Check One that Applies - ✓)* **Date Work Completed:** ____ /____ /_____

| | | |
|---|---|---|
| ☐ Repair | ☐ Extension | ☐ Removal / No Replacement |
| ☐ Replacement | ☐ Re-Line | ☐ New Installation |

**Work Description:** *(Describe specific Work Activities if applicable)*

**Location:**

Route _____ County _____ RP & Offset _____ Offset _____

*If Applicable*
Latitude _____ Longitude _____

**Structure Information:**

| Before Work | After Work |
|---|---|
| ☐ Small Culvert | ☐ Small Culvert |
| ☐ Large Culvert | ☐ Large Culvert |

Existing Structure Number _____ *If Applicable, and known*

New Structure Number _____ *If known*

Type _____

Opening _____ Size _____ Length _____ Cover _____

**Additional Comments:**

CC: District Construction Engineer
District Highway Maintenance Director
District Technical Services Director
District System Assessment Manager
District Bridge Asset Engineer
Sub District Manager

Operations Memorandum 13-02F

Effective: APR 2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Culvert Replacement - Large Pipe (>36") | CODE | 2332 |
|---|---|---|---|

**Purpose**

Excavation, removal, and installation of pipe greater than 36" diameter or equivalent for arches. Deterioration, damage, or hydraulic inadequacy results in a required pipe replacement to ensure adequate drainage and flow.

**Category**: Drainage Structures/Drainage

- ☒ **PM**
- ☐ **QA**
- ☒ **Plan Location**

**Scheduling & Coordination**

- Activity should be evaluated based on the current condition of the pipe and any inspection findings (Activity 2320) or reported damages. This activity should be performed in advance of any surface treatments (i.e. Pavement overlay, chip-seal, etc.) including work done under contract.
- Ensure hydraulic and environmental approvals have been obtained prior to the activity field work.
- Submit a request for locate services at least 2 days prior to any excavation.
  - ***Indiana811**: (800) 382-5544, http://indiana811.org*

| Reporting | | Asset to Report to | Small or Large Culvert | Reporting Units | Linear Feet |
|---|---|---|---|---|---|

Accomplishment is the linear feet of installed pipe. Report all work to one Work Order including sign/detour placement, sight preparation, material deliveries, saw cutting pavements, excavation, installation, backfill and surface overlay. Report to the specific small culvert or large culvert asset. If the asset is not in the WMS inventory, leave the asset field blank and note in the comments the CLV number from the Bridge and Drainage Assets viewer.

**NOTE:**

1) Pipe Lining shall NOT be reported to this activity. Pipe lining large culverts shall be reported to Activity 2337
2) This activity shall NOT include replacement of pipes 36" or less in diameter. Replacement of pipes 36" or less in diameter shall be reported to Activity 2331.
3) Pipe extensions shall be reported to Activity 2390 (Other Drainage Maintenance)
4) Culverts greater than or equal to 48" in span are considered Large Culverts. Information on reporting requirements when working on culverts is delineated in Operations Memo 13-02.

For additional work order reporting guidance see the Work Orders section of the Preface

| Crew Size | 7 Workers | QTY |
|---|---|---|
| Crew Leader | | 1 |
| Excavator Operator | | 1 |
| Truck Driver | | 2 |
| Laborer | | 3 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | |
|---|---|
| Excavator/Backhoe | 1 |
| Dump Truck | 2 |
| Crew Cab | 1 |
| Compressor | 1 |
| Jackhammer | 1 |
| Mechanical Compactor | 1 |
| Pavement Saw (Wet) | 1 |

*Traffic Control Equipment is NOT shown here

**P.P.E.**

1) Base PPE
2) Approved APF 10 Respirator (See "Silicosis Awareness")

**Materials**

Pipe – INDOT Spec Sections 907 and 908.02
Structure Backfill – INDOT Spec Section 904.05
Bituminous Mix -INDOT Spec Section 902
Rip-Rap – INDOT Spec Section 904.04
Geotextiles – INDOT Spec Section 918.02
Removable Flowable Backfill – INDOT Spec Section 213

**Other References**

- OSHA Safety and Health Standards for the Construction Industry: Subpart B - Excavations
- **Indiana811**: (800) 382-5544, http://indiana811.org/
- INDOT Standard Specifications *(Section 715)*
- Operations Memorandum 11-06 *(Environmental & Hydraulic Requirements for INDOT Culvert Work)*
- Silica Exposure Control Plan (WPS Preface)

| Sub Activities | | | |
|---|---|---|---|
| Average Daily Production | 15 Linear Feet | EFFECTIVE DATE | 7/12/2023 |

| ACTIVITY | Culvert Replacement - Large Pipe (>36") | CODE | 2332 |
|---|---|---|---|

## Work Method

1. Place signs and safety devices
2. Cut pavement over pipe to be replaced
3. Excavate and remove pipe
4. Clean out and replace pipe bed to original grade
5. Place culvert in trench beginning at downstream end
6. Backfill over culvert
   - ✓ Use suitable structure backfill *(INDOT Standard Specifications: Section 904.05 Structure Backfill)* material and compact in layers not exceeding 6" or
   - ✓ Use removable flowable backfill *(INDOT Standard Specifications: Section 213 Flowable Backfill)*. If the weight of the pipe is less than the weight of the volume of removable flowable backfill it is displacing the pipe may float. Placing weight on the pipe, holding it down with a piece of equipment e.g. backhoe bucket, or anchoring the pipe down e.g. drive fence posts on each side of culvert and attach a fence post to them over the top of the pipe may be required. Particular attention should be given to plastic pipe and pipe joints.
7. Place bituminous patch over excavation and compact.
   - ✓ Utilize work method and details from Activity 2020 (Deep Patch), but report work to 2332.
8. Dress side slopes, inlets, outlets and ditches
9. Remove signs and safety devices

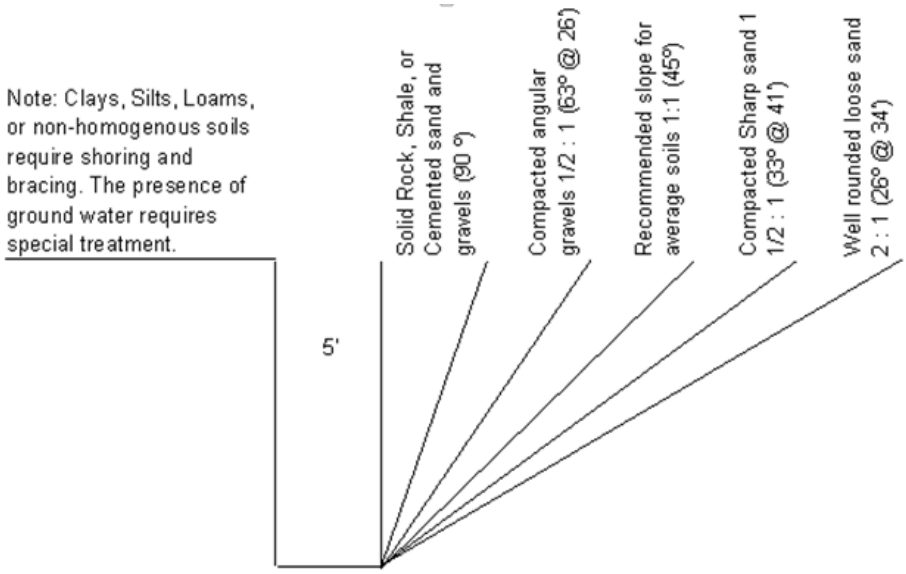
## Silicosis Awareness

All efforts should be made to eliminate/reduce the generation of dust while performing this activity, specifically pavement sawing. A wet saw should be used, or if not available, manually spray water to control dust.

If the generation of dust cannot be eliminated through the use of water or other controls, then workers operating the saw or within 20' must wear an approved facepiece respirator that they are fit tested to wear.

## Special Considerations

When trenching five feet deep or more slope angles should be constructed for safe operations as shown in the diagram below.




| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 15 Linear Feet | EFFECTIVE DATE | 7/12/2023 |

Clear Form | Save as PDF

*Date of Submission:* _____ /_____ /_____

# SMALL STRUCTURE INVENTORY UPDATE - Activity 2331/2332/2336/2337

**INSTRUCTIONS:**
**THIS FORM SHALL BE COMPLETED;**
**(1) Any time repair work results in modifications to the structure of a small structure, or**
**(2) any time a small structure is replaced.**
**This form shall be completed for said work and submitted to the Senior Bridge Inspection Engineer if the culvert span is 48" or greater or to the Culvert Engineer if the culvert span is less than 48". In the event work on a structure was performed under contract, a copy shall also be kept with the project file.**

**Work Performed by:** *(Check One that Applies - ✓)*

☐ Contract ☐ INDOT Maintenance

**Responsible Party:** *(Please print the following)*

Name _____ Title _____

Phone _____ Email _____

Company *(or District/Dept.)* _____

**Type of Work:** *(Check One that Applies - ✓)* **Date Work Completed:** ____ /____ /_____

| | | |
|---|---|---|
| ☐ Repair | ☐ Extension | ☐ Removal / No Replacement |
| ☐ Replacement | ☐ Re-Line | ☐ New Installation |

**Work Description:** *(Describe specific Work Activities if applicable)*

**Location:**

Route _____ County _____ RP & Offset _____ Offset _____

*If Applicable*
Latitude _____ Longitude _____

**Structure Information:**

| Before Work | After Work |
|---|---|
| ☐ Small Culvert | ☐ Small Culvert |
| ☐ Large Culvert | ☐ Large Culvert |

Existing Structure Number _____ *If Applicable, and known*

New Structure Number _____ *If known*

Type _____

Opening _____ Size _____ Length _____ Cover _____

**Additional Comments:**

CC: District Construction Engineer
District Highway Maintenance Director
District Technical Services Director
District System Assessment Manager
District Bridge Asset Engineer
Sub District Manager

Operations Memorandum 13-02F

Effective: APR 2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Pipe Lining - Small Pipe (≤36") | CODE | 2336 |
|---|---|---|---|

**Purpose**

Due to deterioration, damage or deficiency of pipe to restore loss of adequate drainage and flow or structural integrity.

**Category** Drainage Structures & Drainage

☒ **PM**
☒ **QA**
☒ **Plan Location**

**Scheduling & Coordination**

- Activity should be evaluated based on the current condition of the pipe and any inspection findings (Activity 2320) or reported damages.
- Obtain necessary right-of-entry if insufficient right-of-way exists.
- Ensure appropriate hydraulic and environmental approvals have been obtained prior to the activity field work.
- Submit a request for locate services at least 2 days prior to any excavation
  - ***Indiana811:*** *(800) 382-5544, http://indiana811.org/*
- If a contractor is to grout annular space, then coordination and scheduling is to be considered prior to the activity field work. Grouting of pipe liners shall start within 14 calendar days of the pipe liner installation.

| Reporting | | Asset to Report to | Small Culvert | Reporting Units | Linear Feet |
|---|---|---|---|---|---|

- Accomplishment is in the linear feet of installed pipe liner. Report all work to one Work Order including sign placement, sight preparation, material deliveries, installation, grouting, and finish grading.
- Report to the specific small culvert asset. If the asset is not in the WMS inventory, leave the asset field blank and note in the comments the CLV number from the Bridge and Drainage Assets viewer.
- For additional work order reporting guidance see the Work Orders section of the Preface.

**NOTE:**

1) This activity shall NOT include pipe liners installed into pipes greater than 36". Pipe liner installed into pipes greater than 36" shall be reported to Activity 2337.
2) Pipe extensions shall be reported to Activity 2390 (Other Drainage Maintenance)

| Crew Size | 4 Workers | QTY |
|---|---|---|
| Crew Leader | | 1 |
| Excavator Operator | | 1 |
| Truck Driver | | 1 |
| Laborer | | 1 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | |
|---|---|
| Excavator/Backhoe | 1 |
| Dump Truck | 2 |
| Crew Cab | 1 |
| Concrete Mixer | 1 |
| Grout Pump | 1 |

*Traffic Control Equipment is NOT shown here

**P.P.E.**

1) Base PPE
2) Approved APF 10 Respirator (See "Silicosis Awareness")

**Materials**

Pipe Liner - INDOT Spec Section 907.25
PVC (Vent/Grout Tubes)
Lumber
Grout Cone
Concrete - INDOT Spec Section 901
Cellular Grout - INDOT Spec Section 725
Geotextile - INDOT Spec Section 918.02
Riprap - INDOT Spec Section 904.04

**Other References**

- Spec Book: Section 725 – Slip Lining of Existing Pipe
- Operations Memorandum 11-06 *(Environmental & Hydraulic Requirements for In-House Pipe Work)*
- Silica Exposure Control Plan (WPS Preface)

**Sub Activities**

820 - Gravity Flow Grouting Pipe Liner; *Grouting pipe using gravity flow method completed with in-house forces*

821 - Pressure Grouting Pipe Liner; *Grouting pipe using pressure grout pump equipment completed with in-house forces*

| Average Daily Production | 40 Linear Feet | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Pipe Lining - Small Pipe (≤36") | CODE | 2336 |
|---|---|---|---|

**Work Method**

1) Place signs and safety devices
2) Inspect host pipe for any protrusions or debris and clean if necessary.
3) Clean area around pipe inlet or outlet, whichever end the liner will be pushed in from
4) Excavate channel back the length of the pipe liner section plus 25%
5) If necessary, fasten lumber blocking on the interior crown of the existing pipe to prevent the liner pipe from floating during grouting
   Lumber blocking should be used when the annular space is greater than 4" and the diameter of the existing pipe is greater than 48"
6) Install vent tubes and grout tubes prior to installing liner
   (a) Fasten grout tubes, running 75%, 50%, and 25% of the total length of pipe, to crown of existing pipe every 20 feet using metal banding ***(See Figure 1 below)***
   (b) Strap vent tubes at three, nine and twelve o'clock at each of existing pipe, ensure the vent tubes are longer than the thickness of each header
7) Install liner pipe
   ****Be careful not to damage the ends or joints of pipe sections when installing pipe liner*
   (a) Install liner pipe sections with **female joint upstream**
   (b) Using a choker cable system, or sling, insert lead piece leaving about **4' of liner pipe sticking out of existing pipe**
   (c) When joining two liner pipes, install all manufacturer recommended components and adhesives prior to pushing liner pipe in the existing pipe
   (d) Lower next piece of liner pipe into place. Align male and female joint square with each other and pull together the 2 pieces using approved mechanical equipment
   (e) Visually inspect joint on inside and outside to assure joint is complete
   (f) **Do not leave tail-end of pipe unsupported**
   (g) On lead piece of pipe, release first holding cable
   (h) Using choker cable, or sling, advance pipe into existing pipe
8) Repeat steps until existing structure is completely lined
9) Construct bulkheads using concrete materials to seal off annular space at the outlet and inlet of each pipe
   (a) Contact vendor or contractor if grouting is to be done with external labor
   **NOTE:** Ensure vent and grout tubes are not plugged or restricted prior to grouting
10) Once bulkheads have cured, grout the annular space between the existing and liner pipes
   (a) **Gravity Flow** grouting is a method where cellular grout is delivered into the annular space through a cone inserted into a hole cut from the crown of the existing pipe.
      i. Cut a hole in the crown of the inlet side of the existing pipe, this hole should be large enough to host a grout cone
      ii. Insert a Grout Cone in the hole
      iii. Deliver grout into the annular space through the grout cone until the space is completely filled with grout.

**Work Method**

(b) **Pressure grouting** is a method where cellular grout is delivered into the annular space via grout pumps and requires technical experience. This method requires specialized equipment and may require coordination with specialized technicians or vendors.

i. Pressure grouting should be delivered at the outlet side of structure through grout tubes placed during the install procedures

ii. Grout should be delivered through each of the grout tubes starting with the shortest grout tube and ending with the longest of the tubes

iii. Grout tubes and vent tubes should be plugged once grout is delivered past the point of the tube's extents

iv. Grouting should fill 100% of the annular space

11) After grouting, place rip rap or other materials in ditch line or channel, as specified by the hydraulic analysis

12) Dress side slopes and ditch line or channel appropriately

13) Remove signs and safety devices

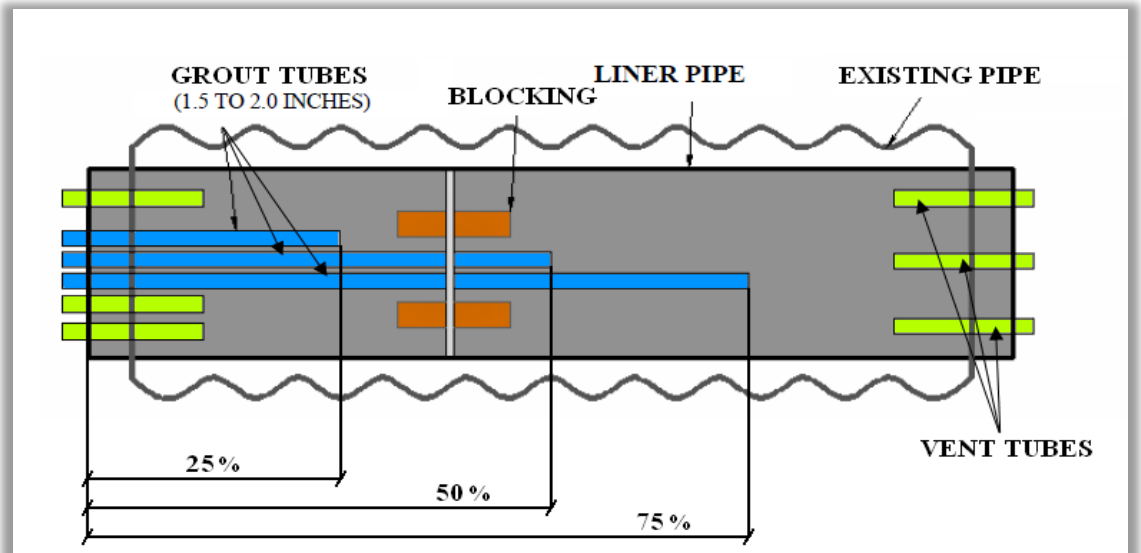



*Figure 1: Grout & Vent Tube Diagram*

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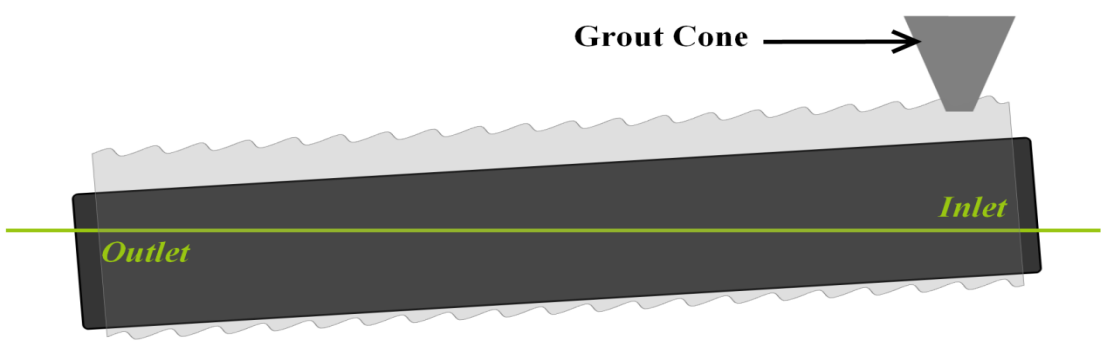


*Figure 2: Gravity Flow Diagram*

| ACTIVITY | Pipe Lining - Small Pipe (≤36") | CODE | 2336 |
|---|---|---|---|

**Silicosis Awareness**

All efforts should be made to eliminate/reduce the generation of dust while performing this activity, specifically when mixing concrete or grout.

Workers adding dry materials into mixer and mixing concrete or grout, or those within 20' must wear an approved facepiece respirator that they are fit tested to wear.

**Special Considerations**

- Materials for a liner may be more expensive than for a replacement pipe. A cost analysis should be done to determine if a liner is more economical than total pipe replacement. Factors to consider are size, depth, average daily traffic, traffic control, right-of-way, special equipment needs, and hydraulic capacity.

- Obtain necessary right-of-entry if insufficient right-of-way exists.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 40 Linear Feet | EFFECTIVE DATE | 7/12/2023 |

# Indiana Department of Transportation

## Activity 2336/7 QA Form - Pipe Lining - Small & Large Pipe

Asset Inventory #:_____ District/Sub/Unit:_____
Work Order #:_____ Route:_____
Date completed:_____ Intersections:_____
Date inspected:_____ Limits:_____
Inspector:_____ RP Start/End:_____
QA Window: 0-3 months

**Observations:**

1. Pipe inlet is prepared?
   - 0 Ditch is not cleaned for pipe installation/scour prevention
   - 5 Ditch cleaned and open to pipe

2. Liner properly installed?
   - 0 Pipe is exposed to possible bowing or floating due to improper installation
   - 10 Pipe liner is in proper position

3. Pipe inlet and outlet properly grouted?
   - 0 Grout missing from inlet and/or outlet
   - 10 Grout fully surrounding pipe insert on both ends

4. Voids adequately filled?
   - 0 Grout tubes are not drilled or completely filled
   - 5 Grout tubes are only partly filled with grout
   - 10 Grout tubes are present and properly filled

5. Inlet side - liner adequately fits existing pipe?
   - 0 Liner extends beyond ditch line and obstructs ditch flow
   - 10 Liner extends more than 3' beyond the pipe but not the ditch line
   - 15 Liner does not extend more than 3' beyond the pipe, or beyond ditch line, or liner extends beyond pipe and shoulder improved

6. Outlet side - liner adequately fits existing pipe?
   - 0 Liner extends beyond ditch line and obstructs ditch flow
   - 10 Liner extends more than 3' beyond the pipe but not the ditch line
   - 15 Liner does not extend more than 3' beyond the pipe, or beyond ditch line, or liner extends beyond pipe and shoulder improved

7. All construction materials/debris removed? (deduction item)
   - -5 No
   - 0 Yes

8. No eroded areas present? (deduction item)

-5 No

0 Yes

9. Vegetation established or other materials placed to prevent erosion on disturbed areas? (deduction item)

-5 No

0 Yes

**Inspector Comments:**

**Score:**

| | Possible | Actual |
|---|---|---|
| **1** | 5 | |
| **2** | 10 | |
| **3** | 10 | |
| **4** | 10 | |
| **5** | 15 | |
| **6** | 15 | |
| **7** | 0 | |
| **8** | 0 | |
| **9** | 0 | |
| **Total:** | 65 | |

**Final % score (divide Actual by Possible):_____**

Clear Form | Save as PDF

*Date of Submission:* _____ /_____ /_____

# SMALL STRUCTURE INVENTORY UPDATE - Activity 2331/2332/2336/2337

**INSTRUCTIONS:**
**THIS FORM SHALL BE COMPLETED;**
**(1) Any time repair work results in modifications to the structure of a small structure, or**
**(2) any time a small structure is replaced.**
**This form shall be completed for said work and submitted to the Senior Bridge Inspection Engineer if the culvert span is 48" or greater or to the Culvert Engineer if the culvert span is less than 48". In the event work on a structure was performed under contract, a copy shall also be kept with the project file.**

**Work Performed by:** *(Check One that Applies - ✓)*

☐ Contract ☐ INDOT Maintenance

**Responsible Party:** *(Please print the following)*

Name _____ Title _____

Phone _____ Email _____

Company *(or District/Dept.)* _____

**Type of Work:** *(Check One that Applies - ✓)* **Date Work Completed:** ____ /____ /_____

| | | |
|---|---|---|
| ☐ Repair | ☐ Extension | ☐ Removal / No Replacement |
| ☐ Replacement | ☐ Re-Line | ☐ New Installation |

**Work Description:** *(Describe specific Work Activities if applicable)*

**Location:**

Route _____ County _____ RP & Offset _____ Offset _____

*If Applicable*
Latitude _____ Longitude _____

**Structure Information:**

| Before Work | After Work |
|---|---|
| ☐ Small Culvert | ☐ Small Culvert |
| ☐ Large Culvert | ☐ Large Culvert |

Existing Structure Number _____ *If Applicable, and known*

New Structure Number _____ *If known*

Type _____

Opening _____ Size _____ Length _____ Cover _____

**Additional Comments:**

CC: District Construction Engineer
District Highway Maintenance Director
District Technical Services Director
District System Assessment Manager
District Bridge Asset Engineer
Sub District Manager

Operations Memorandum 13-02F

Effective: APR 2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Pipe Lining - Large Pipe (>36") | CODE | 2337 |
|---|---|---|---|

**Purpose**

Due to deterioration, damage or deficiency of pipe to restore loss of adequate drainage and flow or structural integrity.

**Category:** Drainage Structures & Drainage

☒ **PM**
☒ **QA**
☒ **Plan Location**

**Scheduling & Coordination**

- Activity should be evaluated based on the current condition of the pipe and any inspection findings (Activity 2320) or reported damages.
- Obtain necessary right-of-entry if insufficient right-of-way exists.
- Ensure appropriate hydraulic and environmental approvals have been obtained prior to the activity field work.
- Submit a request for locate services at least 2 days prior to any excavation
  - ***Indiana811:*** *(800) 382-5544, http://indiana811.org/*
- If a contractor is to grout annular space, then coordination and scheduling is to be considered prior to the activity field work. Grouting of pipe liners shall start within 14 calendar days of the pipe liner installation.

| Reporting | Asset to Report to | Small or Large Culvert | Reporting Units | Linear Feet |
|---|---|---|---|---|

- Accomplishment is in the linear feet of installed pipe liner. Report all work to one Work Order including sign placement, sight preparation, material deliveries, installation, grouting, and finish grading.
- Report to the specific small culvert or large culvert asset. If the asset is not in the WMS inventory, leave the asset field blank and note in the comments the CLV number from the Bridge and Drainage Assets viewer.
- For additional work order reporting guidance see the Work Orders section of the Preface.

**NOTE:**

1) This activity shall NOT include pipe liners installed into pipes less than or equal to 36" in diameter. Pipe liner installed into pipes less than or equal to 36" in diameter shall be reported to Activity 2336.
2) Pipe extensions shall be reported to Activity 2390 (Other Drainage Maintenance)

| Crew Size | 4 Workers | QTY |
|---|---|---|
| Crew Leader | | 1 |
| Excavator Operator | | 1 |
| Truck Driver | | 1 |
| Laborer | | 1 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | |
|---|---|
| Excavator/Backhoe | 1 |
| Dump Truck | 2 |
| Crew Cab | 1 |
| Concrete Mixer | 1 |
| Grout Pump | 1 |

*Traffic Control Equipment is NOT shown here

**P.P.E.**

1) Base PPE
2) Approved APF 10 Respirator (See "Silicosis Awareness")

**Materials**

Pipe Liner - INDOT Spec Section 907.25
PVC (Vent/Grout Tubes)
Lumber
Grout Cone
Concrete - INDOT Spec Section 901
Cellular Grout - INDOT Spec Section 725
Geotextile - INDOT Spec Section 918.02
Riprap - INDOT Spec Section 904.04

**Other References**

- Spec Book: Section 725 – Slip Lining of Existing Pipe
- Operations Memorandum 11-06 *(Environmental & Hydraulic Requirements for In-House Pipe Work)*
- Silica Exposure Control Plan (WPS Preface)

**Sub Activities**

820 - Gravity Flow Grouting Pipe Liner; *Grouting pipe using gravity flow method completed with in-house forces*

821 - Pressure Grouting Pipe Liner; *Grouting pipe using pressure grout pump equipment completed with in-house forces*

| Average Daily Production | 30 Linear Feet | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Pipe Lining - Large Pipe (>36") | CODE | 2337 |
|---|---|---|---|

**Work Method**

1) Place signs and safety devices
2) Inspect host pipe for any protrusions or debris and clean if necessary.
3) Clean area around pipe inlet or outlet, whichever end the liner will be pushed in from
4) Excavate channel back the length of the pipe liner section plus 25%
5) If necessary, fasten lumber blocking on the interior crown of the existing pipe to prevent the liner pipe from floating during grouting

   Lumber blocking should be used when the annular space is greater than 4” and the diameter of the existing pipe is greater than 48”
6) Install vent tubes and grout tubes prior to installing liner
   (a) Fasten grout tubes, running 75%, 50%, and 25% of the total length of pipe, to crown of existing pipe every 20 feet using metal banding ***(See Figure 1 below)***
   (b) Strap vent tubes at three, nine and twelve o’clock at each of existing pipe, ensure the vent tubes are longer than the thickness of each header
7) Install liner pipe

   ****Be careful not to damage the ends or joints of pipe sections when installing pipe liner*
   (a) Install liner pipe sections with **female joint upstream**
   (b) Using a choker cable system, or sling, insert lead piece leaving approximately **4’ of liner pipe sticking out of existing pipe**
   (c) When joining two liner pipes, install all manufacturer recommended components and adhesives prior to pushing liner pipe in the existing pipe
   (d) Lower next piece of liner pipe into place. Align male and female joint square with each other and pull together the 2 pieces using approved mechanical equipment
   (e) Visually inspect joint on inside and outside to assure joint is complete
   (f) **Do not leave tail-end of pipe unsupported**
   (g) On lead piece of pipe, release first holding cable
   (h) Using choker cable, or sling, advance pipe into existing pipe
8) Repeat steps until existing structure is completely lined
9) Construct bulkheads using concrete materials to seal off annular space at the outlet and inlet of each pipe
   (a) Contact vendor or contractor if grouting is to be done with external labor

   **NOTE:** Ensure vent and grout tubes are not plugged or restricted prior to grouting
10) Once bulkheads have cured, grout the annular space between the existing and liner pipes
   (a) **Gravity Flow** grouting is a method where cellular grout is delivered into the annular space through a cone inserted into a hole cut from the crown of the existing pipe.
      i. Cut a hole in the crown of the inlet side of the existing pipe, this hole should be large enough to host a grout cone
      ii. Insert a Grout Cone in the hole
      iii. Deliver grout into the annular space through the grout cone until the space is completely filled with grout.

**Work Method**

(b) **Pressure grouting** is a method where cellular grout is delivered into the annular space via grout pumps and requires technical experience. This method requires specialized equipment and may require coordination with specialized technicians or vendors.

i. Pressure grouting should be delivered at the outlet side of structure through grout tubes placed during the install procedures

ii. Grout should be delivered through each of the grout tubes starting with the shortest grout tube and ending with the longest of the tubes

iii. Grout tubes and vent tubes should be plugged once grout is delivered past the point of the tube's extents

iv. Grouting should fill 100% of the annular space

11) After grouting, place riprap or other materials in ditch line or channel, as specified by the hydraulic analysis

12) Dress side slopes and ditch line or channel appropriately

13) Remove signs and safety devices

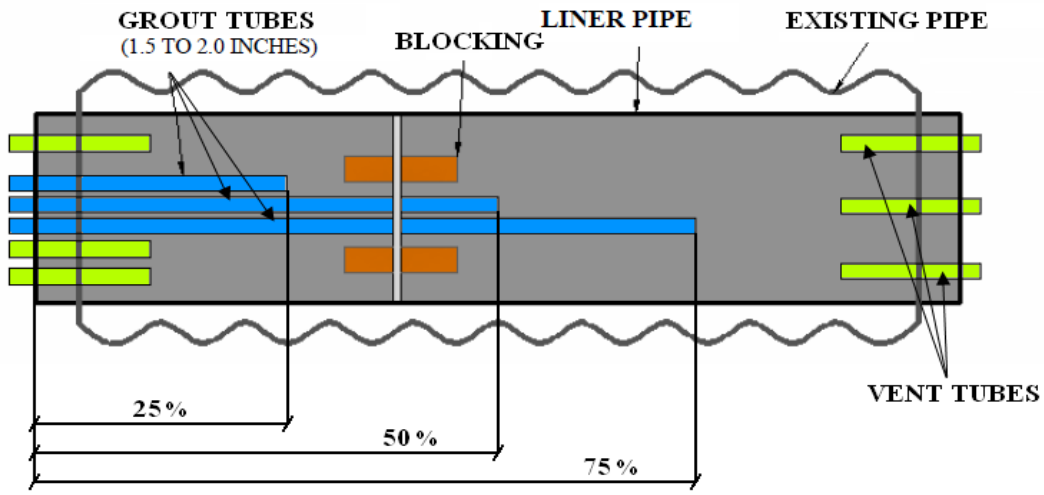


*Figure 1: Grout & Vent Tube Diagram*

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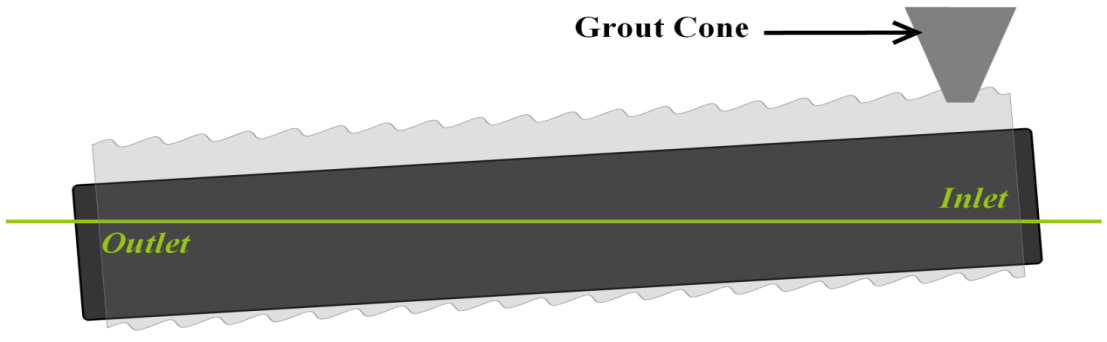



*Figure 2: Gravity Flow Diagram*

| ACTIVITY | Pipe Lining - Large Pipe (>36") | CODE | 2337 |
|---|---|---|---|

**Silicosis Awareness**

All efforts should be made to eliminate/reduce the generation of dust while performing this activity, specifically when mixing concrete or grout.

Workers adding dry materials into mixer and mixing concrete or grout, or those within 20' must wear an approved facepiece respirator that they are fit tested to wear.

**Special Considerations**

- Materials for a liner may be more expensive than for a replacement pipe. A cost analysis should be done to determine if a liner is more economical than total pipe replacement. Factors to consider are size, depth, average daily traffic, traffic control, right-of-way, special equipment needs, and hydraulic capacity.
- Obtain necessary right-of-entry if insufficient right-of-way exists.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 30 Linear Feet | EFFECTIVE DATE | 7/12/2023 |

Clear Form | Save as PDF

*Date of Submission:* _____ /_____ /_____

# SMALL STRUCTURE INVENTORY UPDATE - Activity 2331/2332/2336/2337

**INSTRUCTIONS:**
**THIS FORM SHALL BE COMPLETED;**
**(1) Any time repair work results in modifications to the structure of a small structure, or**
**(2) any time a small structure is replaced.**
**This form shall be completed for said work and submitted to the Senior Bridge Inspection Engineer if the culvert span is 48" or greater or to the Culvert Engineer if the culvert span is less than 48". In the event work on a structure was performed under contract, a copy shall also be kept with the project file.**

**Work Performed by:** *(Check One that Applies - ✓)*

☐ Contract ☐ INDOT Maintenance

**Responsible Party:** *(Please print the following)*

Name _____ Title _____

Phone _____ Email _____

Company *(or District/Dept.)* _____

**Type of Work:** *(Check One that Applies - ✓)* **Date Work Completed:** ____ /____ /_____

| | | |
|---|---|---|
| ☐ Repair | ☐ Extension | ☐ Removal / No Replacement |
| ☐ Replacement | ☐ Re-Line | ☐ New Installation |

**Work Description:** *(Describe specific Work Activities if applicable)*

**Location:**

Route _____ County _____ RP & Offset _____ Offset _____

*If Applicable*
Latitude _____ Longitude _____

**Structure Information:**

| Before Work | After Work |
|---|---|
| ☐ Small Culvert | ☐ Small Culvert |
| ☐ Large Culvert | ☐ Large Culvert |

Existing Structure Number _____ *If Applicable, and known*

New Structure Number _____ *If known*

Type _____

Opening _____ Size _____ Length _____ Cover _____

**Additional Comments:**

CC: District Construction Engineer
District Highway Maintenance Director
District Technical Services Director
District System Assessment Manager
District Bridge Asset Engineer
Sub District Manager

Operations Memorandum 13-02F

Effective: APR 2014

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Manual Drain Cleaning | CODE | 2350 |
|---|---|---|---|

**Purpose**

Manually clean drains of debris (leaves, ice, dirt or other debris) from drains or inlets to maintain proper drainage.

**Category**: Drainage Structures & Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

- Work can be performed throughout the year, typically after heavy rain or snow events.

| Reporting | | Asset to Report to | Various* | Reporting Units | Drains |
|---|---|---|---|---|---|

- Accomplishment is the total drains cleaned
- Mechanically cleaning a pipe, catch basin, or other drainage structure is reported to Activity 2351.
- Cleaning of paved side ditches is reported to Activity 2390, Sub-activity 819
- Manual drain cleaning performed as an emergency action to prevent flooding during a major storm event is reported to Activity 2610.
- For additional work order reporting guidance see the Work Orders section of the Preface.

*Reporting Options: (Report to specific small or large culvert asset. If asset is not in the WMS system, report to pavement key.)

- Pavement Keys
- Large Culverts
- Small Culverts

| Crew Size | 2 Workers | QTY |
|---|---|---|
| Laborer | | 2 |

*Traffic Control Personnel are NOT shown here

| Job Specific Equipment | QTY |
|---|---|
| Hand tools (shovel/rake) | 1 |

*Traffic Control Equipment is NOT shown here

**P.P.E.**

Base PPE

**Materials**

**Other References**

| Sub Activities | | | |
|---|---|---|---|
| Average Daily Production | 50 - 60 Drains | EFFECTIVE DATE | 7/12/2023 |

| ACTIVITY | Manual Drain Cleaning | CODE | 2350 |
|---|---|---|---|

**Work Method**

1) Set up safety devices
2) Observe appropriate safety precautions
3) Remove debris from drain grate and inlet
4) Load and haul debris and excess material away from worksite. Dispose of in a proper manner.
5) Remove signs and safety devices

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 50 - 60 Drains | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Mechanical Structure Cleaning | CODE | 2351 |
|---|---|---|---|

**Purpose**

Mechanically clean structures (<20' span) (i.e. box culverts, pipes, catch basins, and inlets) with a sewer jet, vacuum truck, backhoe or other mechanical means to maintain adequate drainage.

**Category**: Drainage Structures & Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

- Activity should be in coordination with recorded deficiencies identified via the deficiency app, Large Culvert Deficiency Reports, or as necessary to maintain adequate drainage.
- Designated disposal areas should be identified prior to the operation. If disposed of on private property, utilize the "Excavation Material Disposal Site" form.

| Reporting | | Asset to Report to | Various* | Reporting Units | Structures |
|---|---|---|---|---|---|

- Accomplishment is the total structures cleaned
- Report to the specific small culvert or large culvert assets. If asset is not in the WMS system, report to pavement key.
- This activity should be reported in WMS to the specific asset cleaned, ensure that the correct Inventory Asset(s) is selected when completing the work order.
- This activity is reported by the total number of Structures (also known as Inventory Assets) cleaned.
- Cleaning leaves, snow & ice or other debris from inlets is reported to Activity 2350, Manual Drain Cleaning.
- Cleaning of paved side ditches is reported to Activity 2390, Sub-activity 819
- Mechanical drain cleaning performed as an emergency action to prevent flooding during a major storm event is reported to Activity 2610.
- For additional work order reporting guidance see the Work Orders section of the Preface.

*Reporting Options: (Report to the specific small culvert or large culvert assets. If asset is not in the WMS system, report to pavement key.)

- Pavement Keys
- Large Culverts
- Small Culverts

| Crew Size | 4 Workers | QTY |
|---|---|---|
| Laborer | | 1 |
| Loader/Backhoe Operator | | 1 |
| Vacuum Truck Operator | | 1 |
| Truck Driver | | 1 |

*Traffic Control Personnel are NOT shown here

| Job Specific Equipment | QTY |
|---|---|
| Vacuum Truck | 1 |
| Loader/Backhoe | 1 |
| Dump Truck | 1 |

*Traffic Control Equipment is NOT shown here

**P.P.E.**

Base PPE

**Materials**

**Other References**

| Sub Activities | | | |
|---|---|---|---|
| Average Daily Production | 10 - 15 Structures | EFFECTIVE DATE | 7/12/2023 |

| ACTIVITY | Mechanical Structure Cleaning | CODE | 2351 |
|---|---|---|---|

**Work Method**

1) Place signs and safety devices
2) Remove debris and undesirable vegetation from inlet and outlet channels and restore inlet and outlet ditch flow lines
3) Clean out debris and silt from structure with sewer jet, vacuum truck, back hoe or other mechanical means.
4) Correct any eroded areas around the inlet and outlet pipes and paved ditches
5) Load and haul debris and excess material to designated disposal area
6) Clean work area
7) Remove signs and safety devices

**Special Considerations**

- Designated disposal areas should be identified prior to the operation

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 10 - 15 Structures | EFFECTIVE DATE | 7/12/2023 |

**Indiana Department of Transportation**
**Highway Maintenance Division**
**Excavation Material Disposal Site**

## A. Site Information

1. Name of the Property Owner: _____
2. Address/location of the Site: _____
   _____
3. Material to be disposed of at the Site:_____ Amount:_____
4. Date(s) of disposal operations: _____to _____
5. Intended material use: _____
6. Environmental Impacts:
   a. Will there be impacts to wetlands or waters of the US at the Site? ☐ Yes ☐ No
   b. Is the Site in a Floodway? ☐ Yes ☐ No
   c. Will more than one acre of land at the Site be disturbed by disposal activities? ☐ Yes ☐ No
7. Comments:
   _____
   _____
8. Site Drawing: (*In the space below, include a sketch of the proposed Site, including where material is being dumped and used, as well as the closest waterway, if it can be seen. i.e. 500 feet north of limestone branch,*)

## B. Certification

The Property Owner hereby certifies that the proposed disposal site, as described above, is in accordance with all local, state, and federal laws and that the Property Owner will only perform those operations at the site that are permitted and the material will be used only as stated above.

Signature of Property Owner: _____Date: _____

Signature of Unit Foreman: _____Date: _____

Signature of Subdistrict Manger: _____Date: _____

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Underdrain Cleaning & Inspection | CODE | 2360 |
|---|---|---|---|

**Purpose**

Clean inside and outside of underdrain outlet pipes to restore adequate drainage flow from pavement subsurface. Damaged or missing rodent screens shall also be replaced to ensure peak performance of drainage. Visual inspections of the underdrain components will also ensure deficiencies are recorded and accounted for.

**Category**: Drainage Structures & Drainage

- ☒ **PM**
- ☒ **QA**
- ☒ **Plan Location**

**Scheduling & Coordination**

- Schedule throughout the year when weather permits complete and thorough cleaning and inspection of the drains.
- 100% of inventory is to be cleaned and inspected annually.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Structures |
|---|---|---|---|---|---|

- Accomplishment is the total number of underdrains inspected and cleaned
- If any follow-up maintenance is required record a deficiency using the deficiency app.
- For additional work order reporting guidance see the Work Orders section of the Preface.

| Crew Size | 2-3 Workers | QTY |
|---|---|---|
| Truck Driver / Laborer | | 2-3 |

*Traffic Control Personnel are NOT shown here

| Job Specific Equipment | QTY |
|---|---|
| Drain pipe auger | 1 |
| Shovel | 1 |
| Tile spade | 1 |
| Flashlight | 1 |

*Traffic Control Equipment is NOT shown here

**P.P.E.**

Base PPE

**Materials**

Rodent Screens - INDOT Spec Section 718.02

**Other References**

Underdrain Cleaning & Inspection Form 2360-A

**Sub Activities**

| Average Daily Production | 50 Structures | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Underdrain Cleaning & Inspection | CODE | 2360 |
|---|---|---|---|

**Work Method**

1) Place signs and safety devices
2) Use hand shovel to remove undesirable vegetation and obstructions and to repair minor eroded areas
3) Remove the rodent screen and probe inside the pipe with drain auger to remove any debris inside the pipe
4) Visually inspect inside of outlet drain and outlet using flashlight
5) Replace the rodent screen
6) Record any deficiencies that need to be addressed using the Deficiency App.
7) Remove signs and safety devices

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 50 Structures | EFFECTIVE DATE | 7/12/2023 |

# Indiana Department of Transportation

## Activity 2360 QA Form - Underdrain Cleaning & Inspection

Pavement Key #:_____ District/Sub/Unit:_____
Work Order #:_____ Route:_____
Date completed:_____ Intersections:_____
Date inspected:_____ Limits:_____
Inspector:_____ RP Start/End:_____
QA Window: 0-2 months

**Observations:**

**Underdrain #1**
1. Is the rodent screen present and functioning as intended?
    5 Yes
    2.5 Present but damaged/not functioning as intended
    0 Missing
2. Is the underdrain clean?
    5 Yes
    0 No

**Underdrain #2**
1. Is the rodent screen present and functioning as intended?
    5 Yes
    2.5 Present but damaged/not functioning as intended
    0 Missing
2. Is the underdrain clean?
    5 Yes
    0 No

**Underdrain #3**
1. Is the rodent screen present and functioning as intended?
    5 Yes
    2.5 Present but damaged/not functioning as intended
    0 Missing
2. Is the underdrain clean?
    5 Yes
    0 No

**Underdrain #4**
1. Is the rodent screen present and functioning as intended?
    5 Yes
    2.5 Present but damaged/not functioning as intended
    0 Missing
2. Is the underdrain clean?
    5 Yes
    0 No

**Underdrain #5**

1. Is the rodent screen present and functioning as intended?
    - 5 Yes
    - 2.5 Present but damaged/not functioning as intended
    - 0 Missing
2. Is the underdrain clean?
    - 5 Yes
    - 0 No

**Underdrain #6**

1. Is the rodent screen present and functioning as intended?
    - 5 Yes
    - 2.5 Present but damaged/not functioning as intended
    - 0 Missing
2. Is the underdrain clean?
    - 5 Yes
    - 0 No

**Underdrain #7**

1. Is the rodent screen present and functioning as intended?
    - 5 Yes
    - 2.5 Present but damaged/not functioning as intended
    - 0 Missing
2. Is the underdrain clean?
    - 5 Yes
    - 0 No

**Underdrain #8**

1. Is the rodent screen present and functioning as intended?
    - 5 Yes
    - 2.5 Present but damaged/not functioning as intended
    - 0 Missing
2. Is the underdrain clean?
    - 5 Yes
    - 0 No

**Underdrain #9**

1. Is the rodent screen present and functioning as intended?
    - 5 Yes
    - 2.5 Present but damaged/not functioning as intended
    - 0 Missing
2. Is the underdrain clean?
    - 5 Yes
    - 0 No

**Underdrain #10**

1. Is the rodent screen present and functioning as intended?
   - 5 Yes
   - 2.5 Present but damaged/not functioning as intended
   - 0 Missing
2. Is the underdrain clean?
   - 5 Yes
   - 0 No

**Inspector Comments:**

**Score:**

| | Possible | Actual |
|---|---|---|
| **1** | 10 | |
| **2** | 10 | |
| **3** | 10 | |
| **4** | 10 | |
| **5** | 10 | |
| **6** | 10 | |
| **7** | 10 | |
| **8** | 10 | |
| **9** | 10 | |
| **10** | 10 | |
| **Total:** | 100 | |

**Final % score (divide Actual by Possible):_____**

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Other Drainage Maintenance | CODE | 2390 |
|---|---|---|---|

**Purpose**

Report drainage maintenance or repair that is not identified with a separate activity.

**Category** Drainage Structures & Drainage

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

- Schedule this work throughout the year as needed. Observe weather and temperature limitations for individual activities.
- District approval is required for installation/replacement of new driveway pipes.
- Submit a request for locate services at least 2 days prior to any excavation
  - ***Indiana811:*** *(800) 382-5544, http://indiana811.org/*

| Reporting | Asset to Report to | Various* | Reporting Units | Person Hours |
|---|---|---|---|---|

- Accomplishment is the total person hours worked
- Report to the specific drainage feature assets.
- Report to the specific drainage asset and not to the pavement key.
- Minor relocation of ditches, less than 200 feet of ditch relocation, shall be reported to **Activity 2311 (Spot Ditching)**
- For additional work order reporting guidance see the Work Orders section of the Preface.

*Reporting Options: (Review Sub-Activities and Work Method for specific reporting.)

- Pavement Keys
- Large Culverts
- Small Culverts

**Crew Size**

| Workers | QTY |
|---|---|

Crew size determined by sub-activity which will be performed

**Job Specific Equipment** QTY

Job specific equipment determined by sub-activity which will be performed

**P.P.E.**

Base PPE

**Materials**

Materials determined by sub-activity which will be performed

**Other References**

**Sub Activities** (Asset to Report to in parenthesis)

819- Cleaning paved side ditches (Pavement Key)
822 - Hand ditching (Pavement Key)
830 - Scour and washout repairs (<50 tons) (Pavement Key)
827 - Repair of minor drainage structures including paved side ditches (Pavement Key)
829 - Repair of SMALL culvert (<48") (Small Culvert)
826 - Repair of LARGE culvert (≥48") (Large Culvert)
828 - Repair of catch basin, grate, or inlet or outlet structures (Small Culvert)
824 - Installation of French drains (Pavement Key)
825 - ***Removal of unauthorized culvert pipes (Pavement Key)
823 - ***Installation of driveway pipe or other lateral pipe (Pavement Key)

****(Requires District approval)*

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Other Drainage Maintenance | CODE | 2390 |
|---|---|---|---|

**Work Method**

Work method determined by sub-activity which will be performed:

819 - Cleaning paved side ditches

822 - Hand ditching

830 - Scour and washout repairs (washouts less than approximately 50 tons of material, larger repairs should be reported to Activity 2291)

827 - Repair of minor drainage structures including paved side ditches

829 - Repair of SMALL culvert (<48")

826 - Repair of LARGE culvert (≥48")

828 - Repair of catch basin, grate, or inlet or outlet structures

824 - Installation of French drains

825 - Removal of unauthorized culvert pipes *(Requires District Approval)*

823 - Installation of driveway pipe or other lateral pipe *(Requires District Approval)*

Minor relocation of ditches, less than 200 feet of ditch relocation at any single location, shall be reported to **Activity 2311 (Spot Ditching)**

**Special Considerations**

*** District approval for new pipe installation at a new location must be attached to the work order.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Bridge Top Cleaning and Flushing | CODE | 2410 |
|---|---|---|---|

**Purpose**

This activity is done to forestall the development of structural deficiencies caused by corrosion and deterioration, preserve bridge components susceptible to the elements, and prolong the performance of the structure. Cleaning of bridge deck surfaces, expansion joints, drains, and sidewalks is accomplished by sweeping, vacuuming, hand shoveling, and air blasting to remove accumulation of sand, chemicals, and debris. Flushing of drains and expansion joints is accomplished by washing with water to remove accumulation of sand, chemicals, and debris. Only bridges with curbs or railings will require this activity.

**Category** Bridge

- ☒ **PM**
- ☒ **QA**
- ☒ **Plan Location**

**Scheduling & Coordination**

- Schedule in the spring following snow removal activities.
- Activity 2440 (Bridge Superstructure/Substructure Cleaning and Flushing) is often done at the same time as this activity.

| Reporting | | Asset to Report to | Bridge Structures | Reporting Units | Bridges |
|---|---|---|---|---|---|

- Accomplishment is the total number of bridge tops cleaned and flushed.
- Report to the specific bridge asset each time the bridge top of the asset is cleaned and flushed.
- For additional work order reporting guidance see the Work Orders section of the Preface.

| Crew Size | 5-6 Workers | QTY |
|---|---|---|
| Truck Driver / Laborer | | 3 |
| Laborer | | 2-3 |

*Traffic Control Personnel are NOT shown here

| Job Specific Equipment | QTY** |
|---|---|
| Air Compressor | 1 |
| Dump Truck | 1 |
| Sweeper/Broom/Vacuum Truck | 1 |
| Water Tank | 1 |
| Water Pump/Power Washer | 1 |

**Traffic Control Equipment is NOT shown here

**P.P.E.**

- Base PPE
- Respiratory Protection (1 strap dust mask)

**Materials**

**Other References**

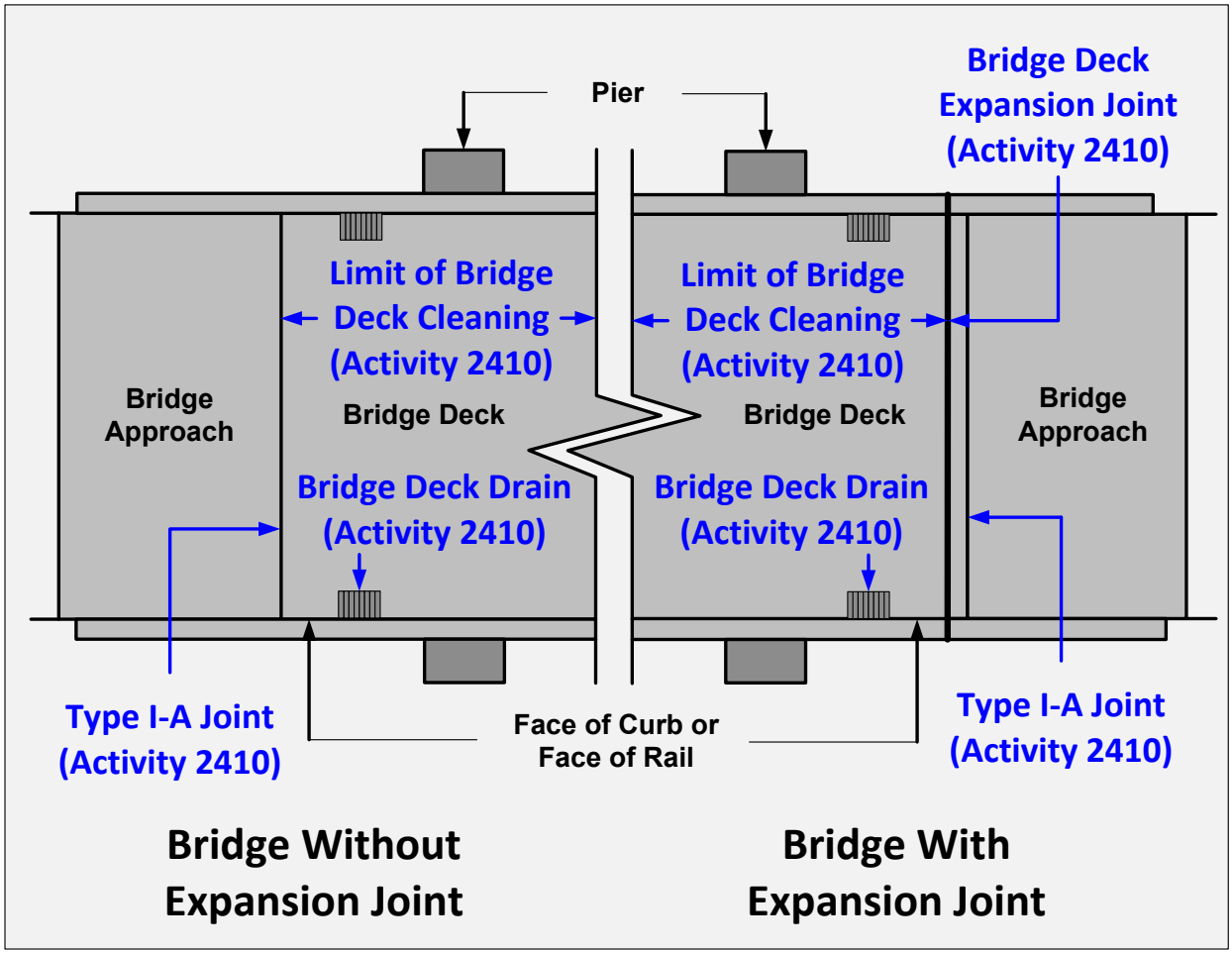
**Sub Activities**

| Average Daily Production | 6 Bridges | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Bridge Top Cleaning and Flushing | CODE | 2410 |
|---|---|---|---|

**Work Method**

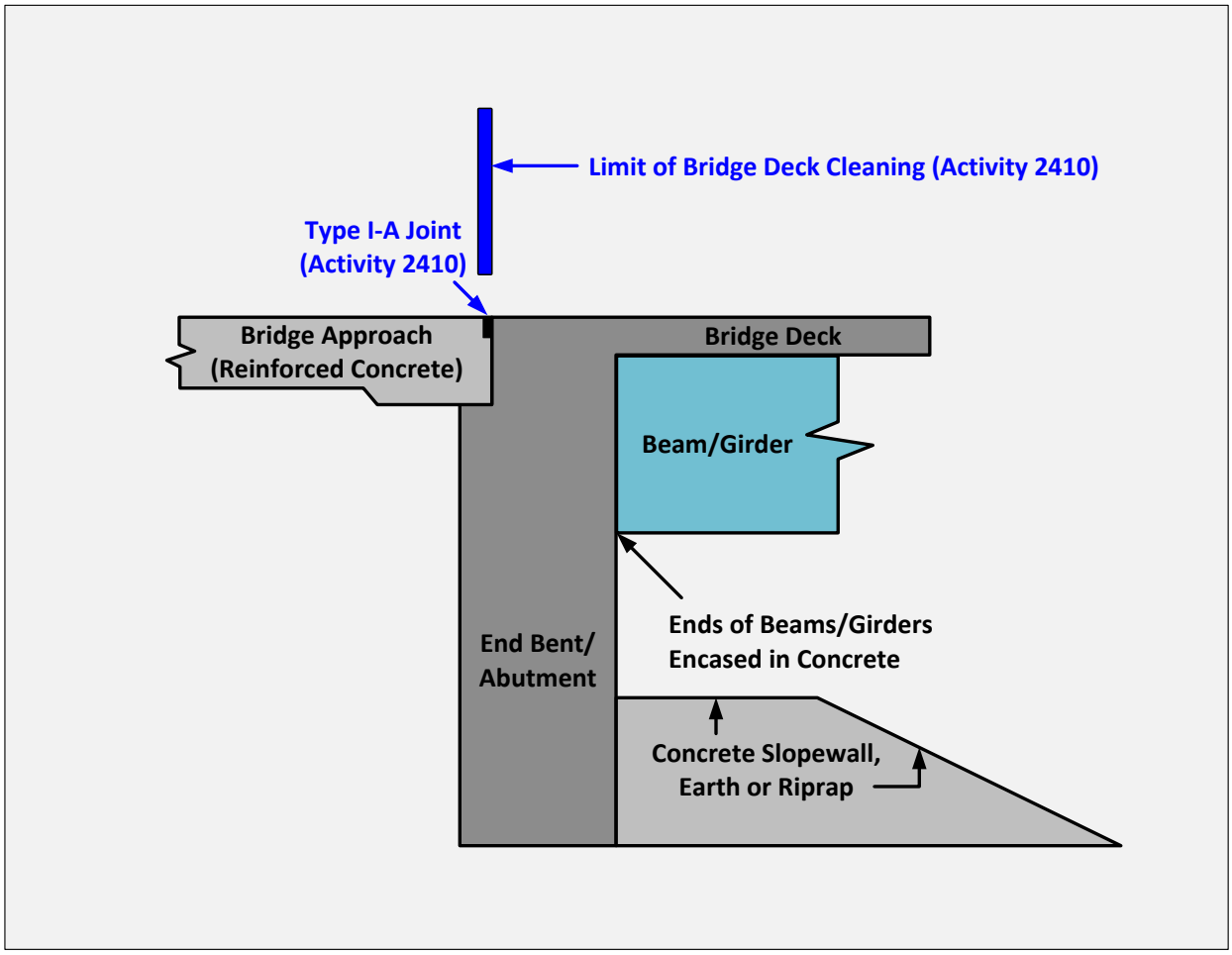
1) Place signs and safety devices
2) Using Sweeper/Broom/Vacuum Truck equipment clean bridge deck surfaces
3) Use hand tools to loosen debris from joints, drains, gutter lines, sidewalks and other areas where dirt or debris has collected
4) Blow out joints and drains where debris has collected
5) Sweep or vacuum materials to be removed
6) Load materials into haul vehicles
7) Using water pump/power washer flush bridge deck expansion joints and drains
8) Dump waste materials at a designated dump location only
9) Remove signs and safety devices




**Plan View of Bridge Deck**

| ACTIVITY | Bridge Top Cleaning and Flushing | CODE | 2410 |
|---|---|---|---|

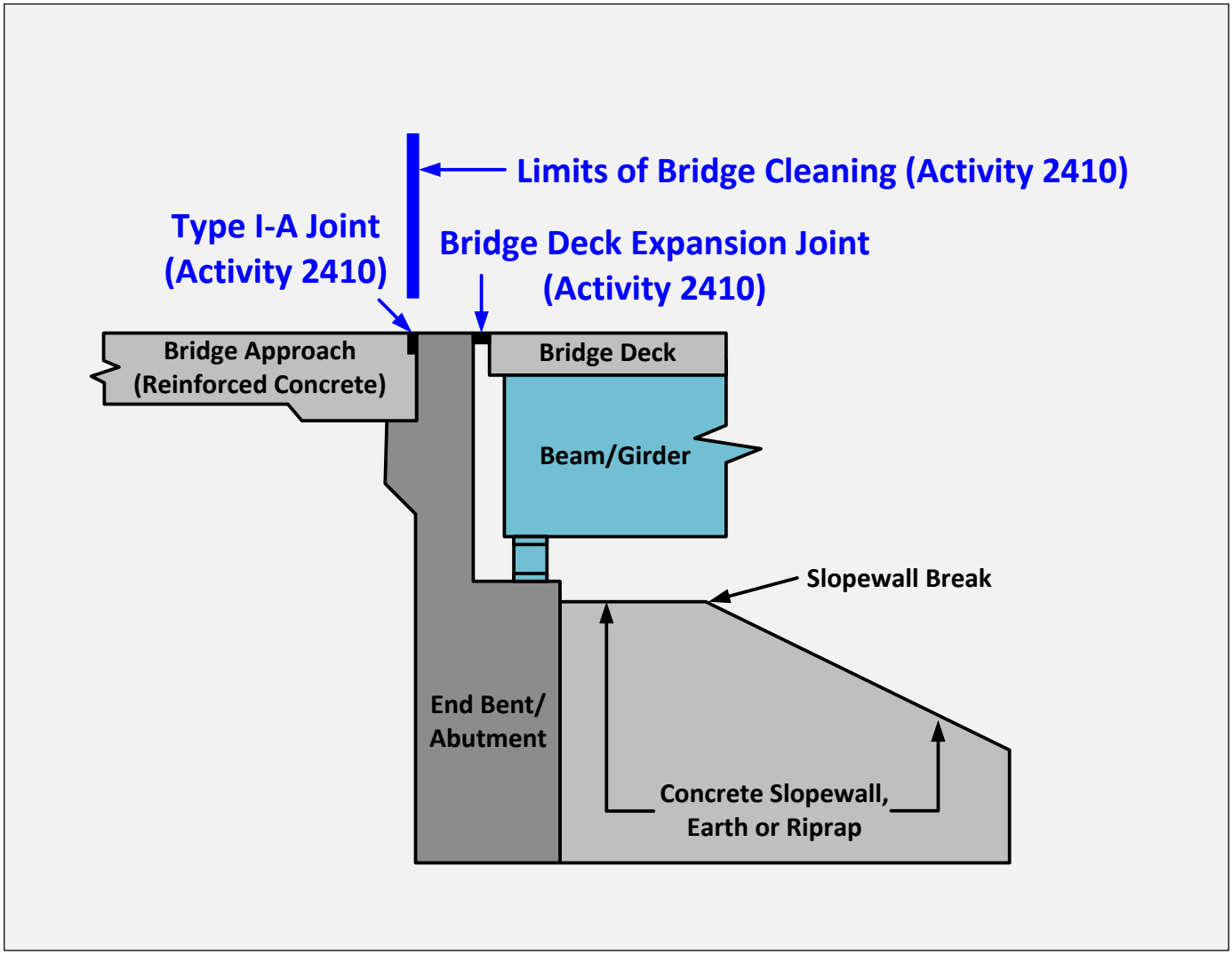
Work Method




**Section View of End Bent/Abutment without Bridge Deck Expansion Joint**

| ACTIVITY | Bridge Top Cleaning and Flushing | CODE | 2410 |
|---|---|---|---|

**Work Method**




**Section View of End Bent/Abutment with Bridge Deck Expansion Joint**

**Special Considerations**

- Key components to clean and flush are most often expansion joints and drains.
- When using water tanks following winter activities be sure tanks are free of chlorides and chemicals prior to this activity.
- Water tanks should be filled from locations where INDOT has metered service.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 6 Bridges | EFFECTIVE DATE | 7/12/2023 |

# Indiana Department of Transportation

## Activity 2410/40 QA Form - Bridge Cleaning & Flushing

NBI #:_____ District/Sub/Unit:_____
Work Order #:_____ Route:_____
Date completed:_____ Intersections:_____
Date inspected:_____ Structure:_____
Inspector:_____ RP Start/End:_____
QA Window: 0-1 month

**Observations:**

1. Truss members

| | |
|---|---|
| N/A | Not applicable to this structure |
| 0 | > 50% of truss members full of debris |
| 10 | ≤ 50% of truss members have debris |
| 20 | All truss members free of debris |

2. Abutments and bearing assemblies

| | |
|---|---|
| N/A | Not applicable to this structure |
| 0 | > 50% of abutments and bearing assemblies have debris |
| 10 | ≤ 50% of abutments and bearing assemblies have debris |
| 20 | All abutments and bearing assemblies are free of debris |

3. Joints

| | |
|---|---|
| N/A | Not applicable to this structure |
| 0 | > 50% of joints full of debris |
| 5 | ≤ 50% of joints have debris |
| 10 | All joints free of debris |

4. Drains

| | |
|---|---|
| N/A | Not applicable to this structure |
| 0 | > 50% of drains full of debris |
| 5 | ≤ 50% of drains have debris |
| 10 | All drains free of debris |

5. Bridge side slopes/slope walls

| | |
|---|---|
| N/A | Not applicable to this structure |
| 0 | Side slopes and slope walls have debris |
| 5 | All side slopes and slope walls are free of debris |

6. Debris disposal

| | |
|---|---|
| 0 | Debris found thrown over side of bridge |
| 5 | No debris found thrown over side of bridge |

| 7. Overall deck condition (edge to edge) | |
|---|---|
| 0 | Deck has debris that is clearly aged (growing weeds, hard pack, etc.) |
| 5 | Deck is free of debris that is clearly aged |

**Inspector Comments:**

**Score:**

| | **Possible** | **Actual** |
|---|---|---|
| **1** | N/A *or* 20 | |
| **2** | N/A or 20 | |
| **3** | N/A *or* 10 | |
| **4** | N/A *or* 10 | |
| **5** | N/A *or* 5 | |
| **6** | 5 | |
| **7** | 5 | |
| **Total:** | | |

**Final % score (divide Actual by Possible):_____**

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Superstructure/Substructure Cleaning and Flushing | CODE | 2440 |
|---|---|---|---|

**Purpose**

This activity is done to forestall the development of structural deficiencies caused by corrosion and deterioration, preserve bridge components susceptible to the elements, and prolong the performance of the structure. Cleaning bridge seats, bearings, beam/girder ends, slopewalls, and truss members is accomplished by sweeping, hand shoveling, and air blasting to remove accumulation of sand, chemicals, and debris. Flushing bridge seats, bearings, beam/girder ends, mudwalls, and truss members is accomplished by washing with water to remove accumulation of sand, chemicals, and debris. No work is required on underfill structures or structures without bridge deck expansion joints. Truss members should be cleaned and flushed from bottom chord to approximately 6 feet above bridge deck.

**Category** Bridge

- ☒ **PM**
- ☒ **QA**
- ☒ **Plan Location**

**Scheduling & Coordination**

- Schedule in the spring following snow removal activities.
- Truss bridges should be cleaned and flushed twice per year, once in spring and once in fall.
- Activity 2410 (Bridge Top Cleaning and Flushing) can be scheduled in conjunction with this activity.

| Reporting | | Asset to Report to | Bridge Structures | Reporting Units | Bridges |
|---|---|---|---|---|---|

- Accomplishment is the total number of bridge superstructures/substructures cleaned and flushed.
- Report to the specific bridge asset each time the asset's superstructure/substructure is cleaned and flushed.
- For additional work order reporting guidance see the Work Orders section of the Preface.

| Crew Size | 4 – 6 Workers | QTY* |
|---|---|---|
| Truck Driver/Laborer | | 2 |
| Laborer | | 2-4 |

*Traffic Control Personnel are NOT shown here

| Job Specific Equipment | QTY** |
|---|---|
| Water Tank | 1 |
| Water Pump/Power Washer | 1 |
| Air Compressor | 1 |
| Dump Truck | 1 |

**Traffic Control Equipment is NOT shown here

**P.P.E.**

- Base PPE
- Respiratory Protection (1 strap dust mask)

**Materials**

**Other References**

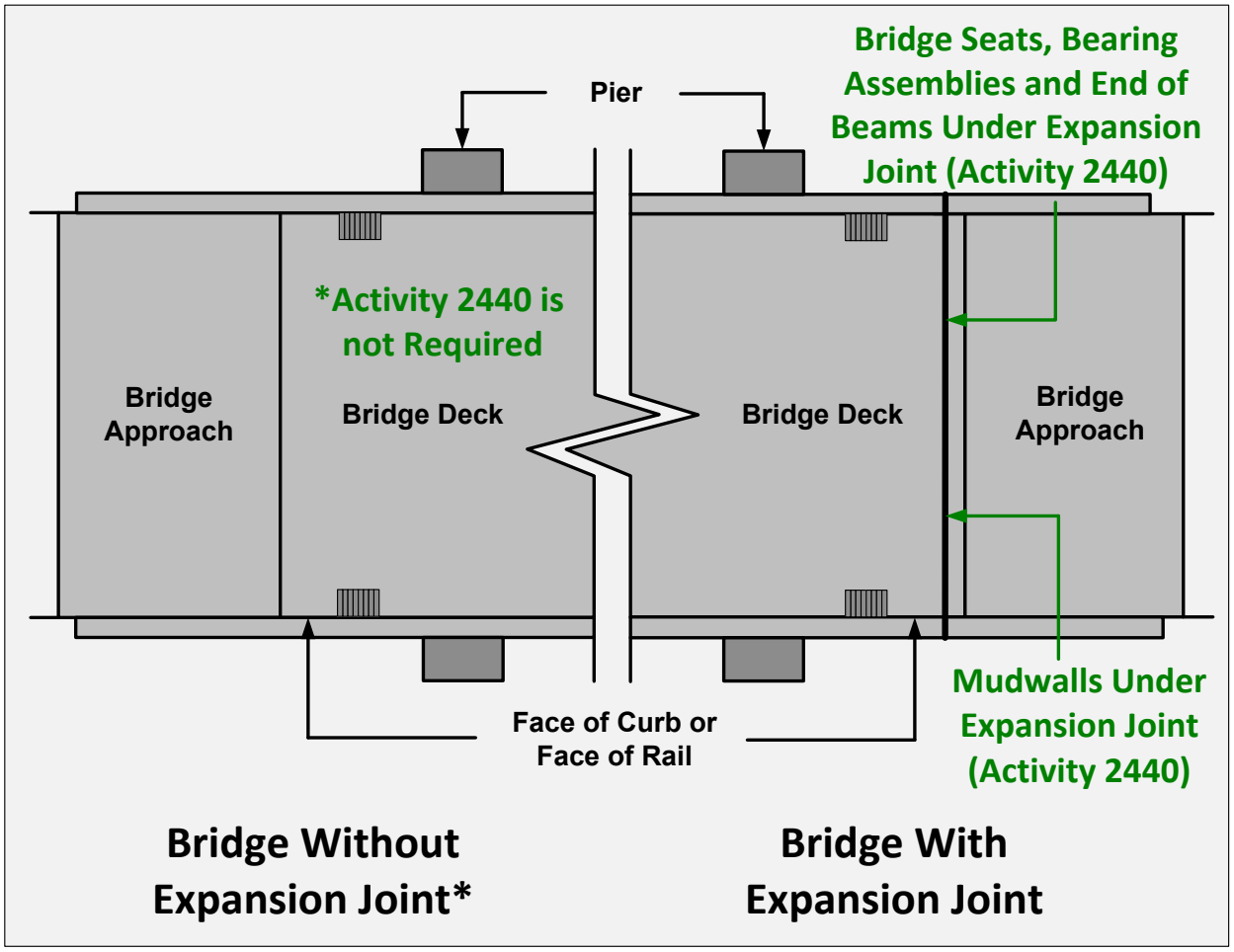
**Sub Activities**

| Average Daily Production | 4 Bridges | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Superstructure/Substructure Cleaning and Flushing | CODE | 2440 |
|---|---|---|---|

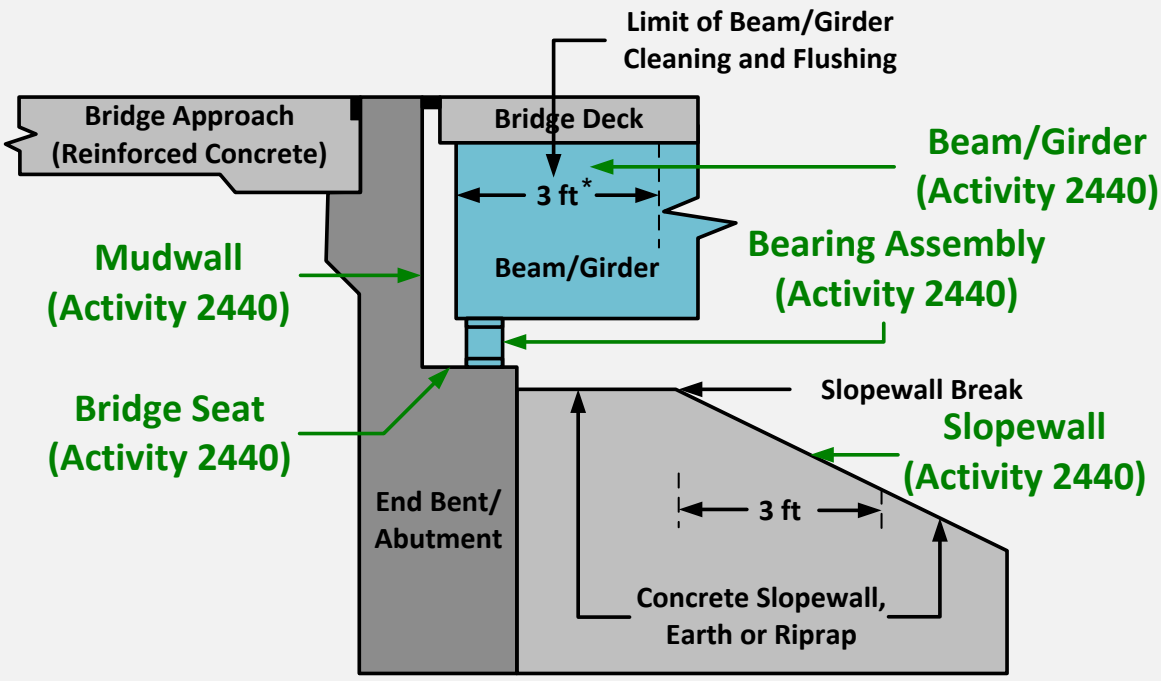
**Work Method**

1) Place signs and safety devices
2) Hand clean around bridge seats, mudwalls, bearing assemblies, beam/girder ends, and slopewalls
3) Blow out truss members where debris has collected
4) Load materials into haul vehicles
5) Using water pump/power washer flush around bridge seats, mudwalls, bearing assemblies, beam/girder ends, and truss members
6) Dump waste materials at a designated dump location only
7) Remove signs and safety devices




**Plan View of Bridge Deck**

| ACTIVITY<br>Work Method | Superstructure/Substructure Cleaning and Flushing | CODE | 2440 |
|---|---|---|---|

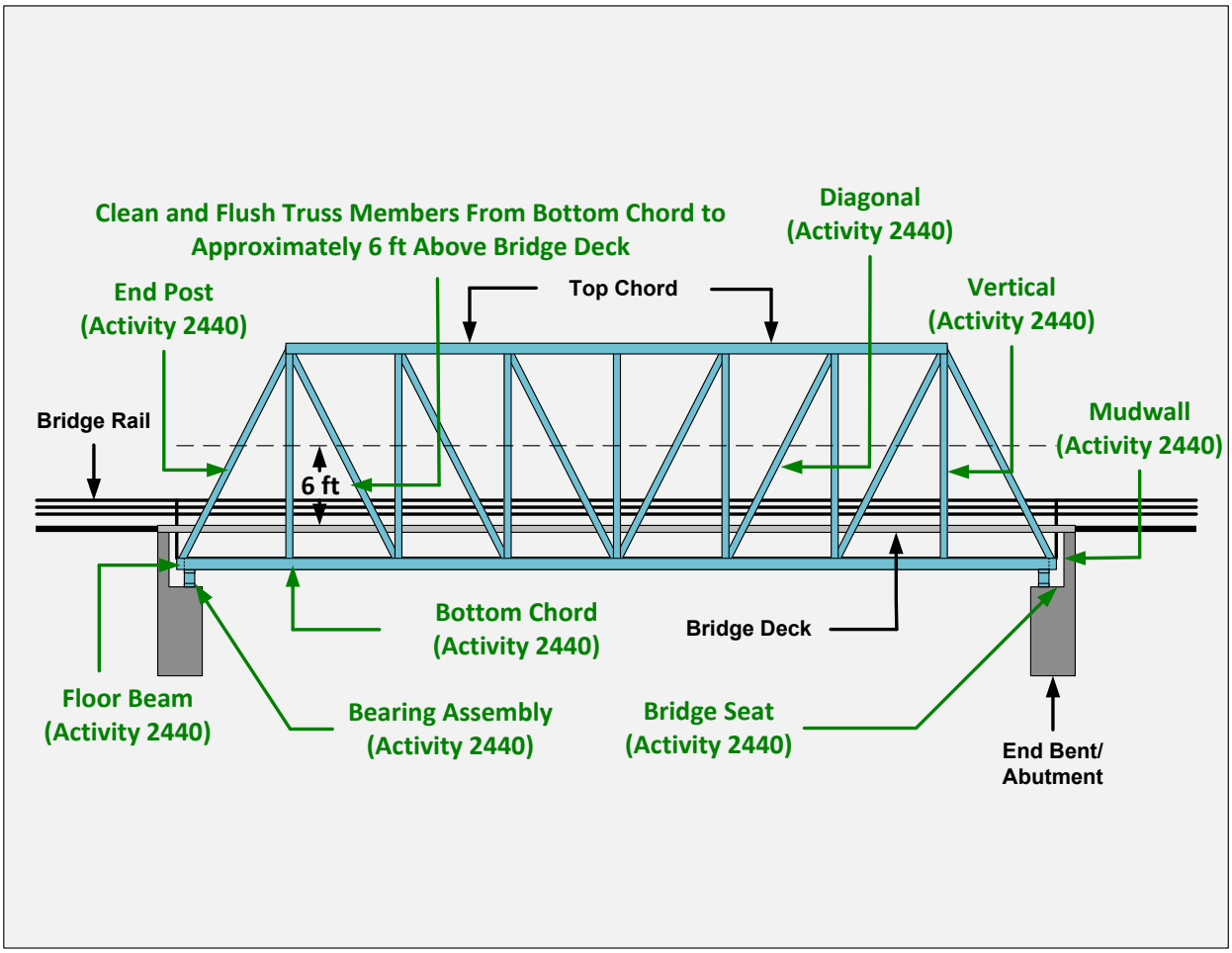



**Note: Concrete slopewall should be cleaned and flushed from end bent/abutment to 3 ft beyond the slopewall break.**

*** Limits of Beam/Girder cleaning and flushing**

**Section View of End Bent/Abutment with Bridge Deck Expansion Joint**

| ACTIVITY | Superstructure/Substructure Cleaning and Flushing | CODE | 2440 |
|---|---|---|---|
| Work Method | | | |




**Elevation View of Truss Bridge**

**Special Considerations**

- Key components to clean and flush are often bearing assemblies, beam/girder ends, bridge seats, and truss members.
- When using water tanks following winter activities, be sure tanks are free of chlorides and chemicals prior to this activity
- Water tanks should be filled from locations where INDOT has metered service.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 4 Bridges | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION

DIVISION OF MAINTENANCE

# BRIDGE CLEANING AND FLUSHING

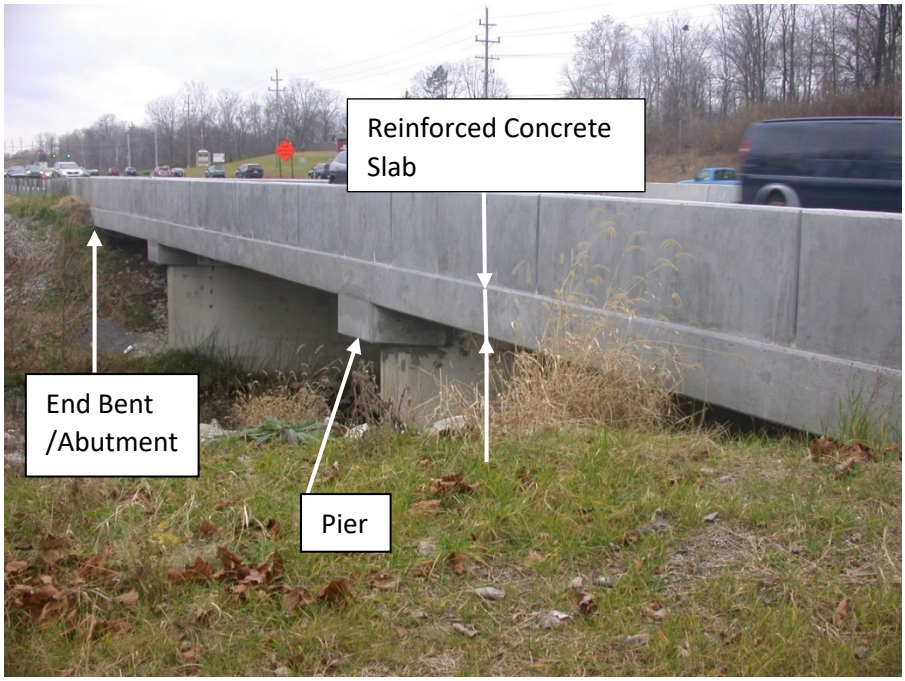
## ACTIVITIES 2410/2440 – January 11, 2017

General:

Only bridges that have curbs or railings along the outsides of the bridge deck will require Activity 2410. Only bridges that have bridge deck expansion joints at the end bents/abutments and truss bridges will require Activity 2440.

The photograph diagrams below illustrate various bridge components and where cleaning, flushing, and cleaning and flushing are required.

**RCS-1**

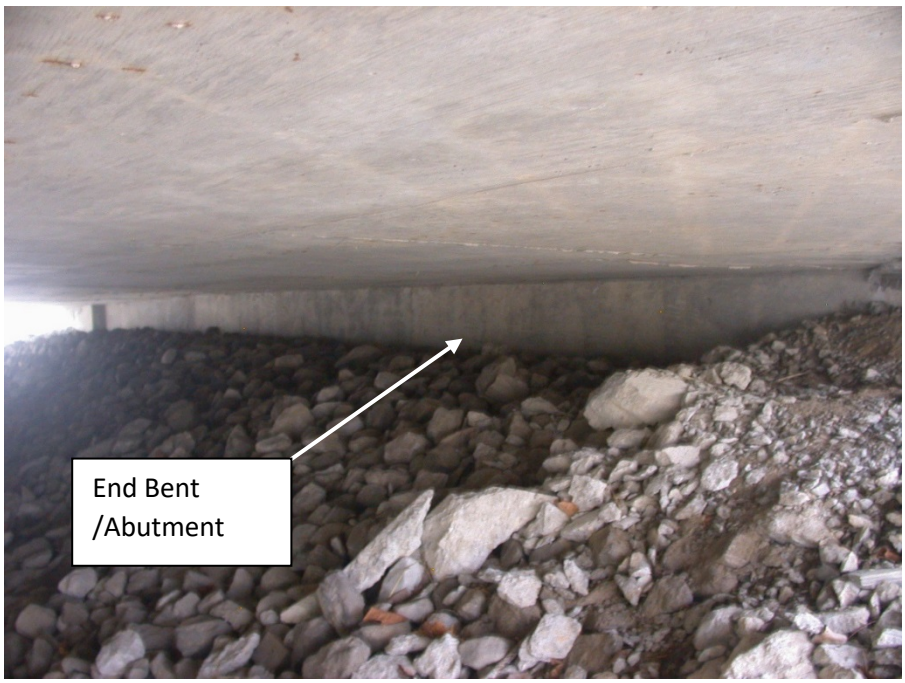



Reinforced Concrete Slab Bridge without bridge deck expansion joints and without mudwalls, bridge seats, beam/girder ends, or bearings to be cleaned and flushed. There are bridge railings so Activity 2410 is required once a year.

# BRIDGE CLEANING AND FLUSHING

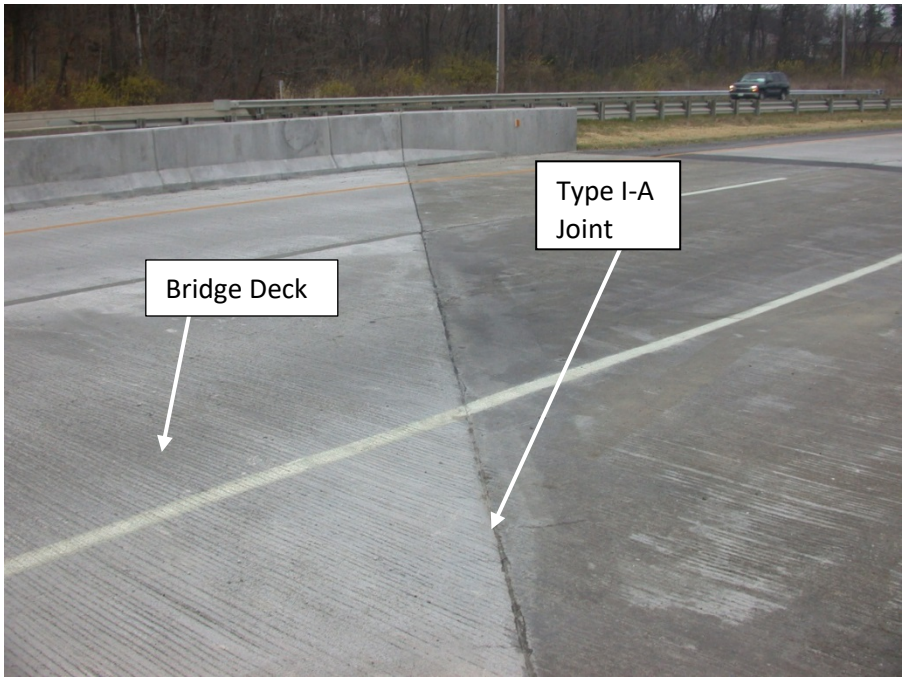
## ACTIVITIES 2410/2440 – January 11, 2017

**RCS-1**




Underside of this Reinforced Concrete Slab Bridge at end bent/abutment, no bridge seats, bearing assemblies, beam/girder ends, or mudwalls to clean or flush.

**RCS-1**

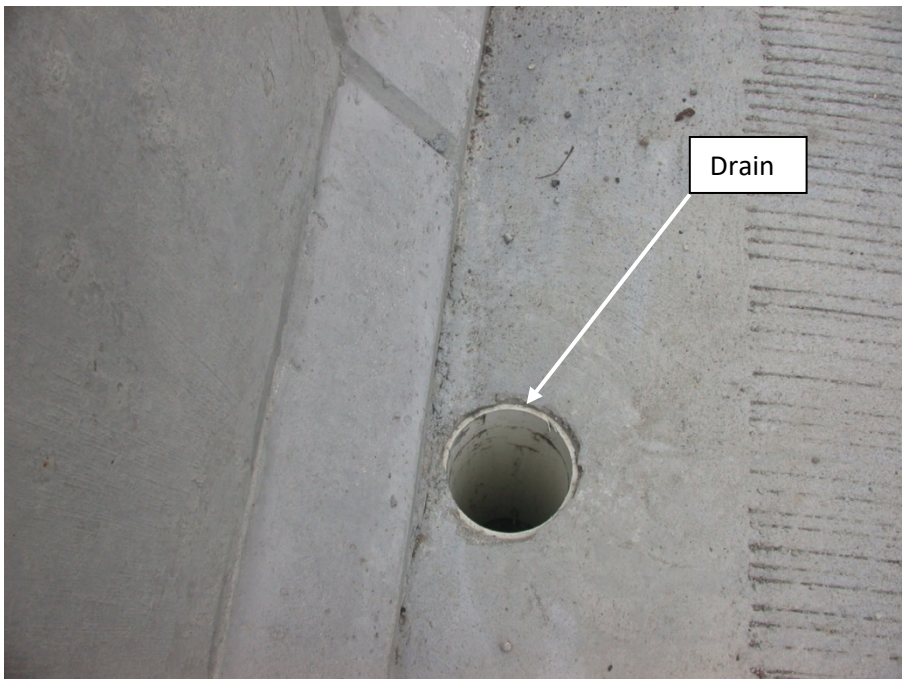



Type I-A joint and bridge deck should be cleaned but no need to flush on this Reinforced Concrete Slab Bridge. (Activity 2410)

# BRIDGE CLEANING AND FLUSHING

## ACTIVITIES 2410/2440 – January 11, 2017

**RCS-1**

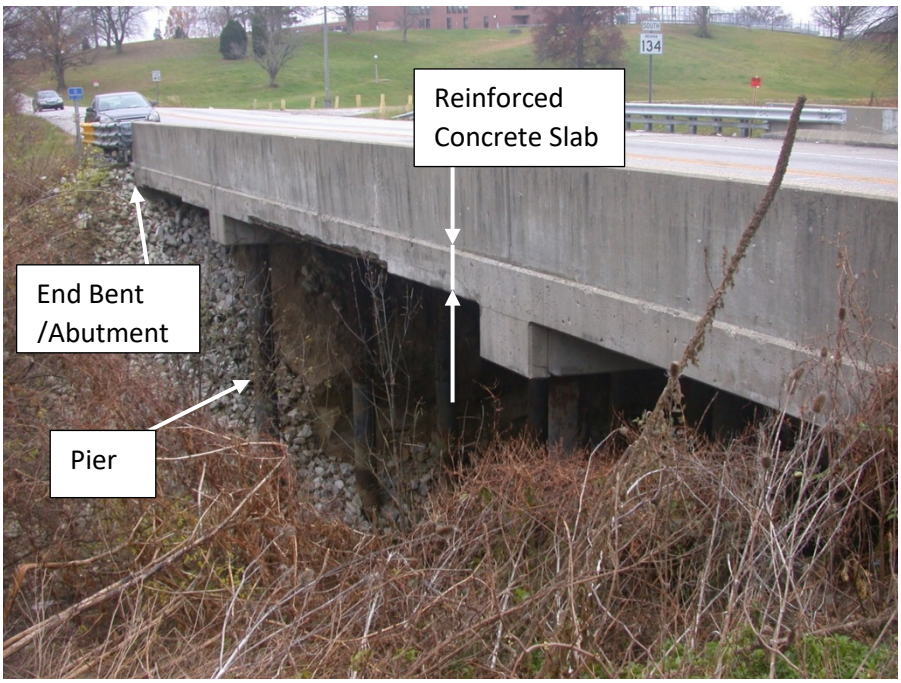



Drain in Reinforced Concrete Slab Bridge, should be cleaned and flushed. (Activity 2410)

# BRIDGE CLEANING AND FLUSHING

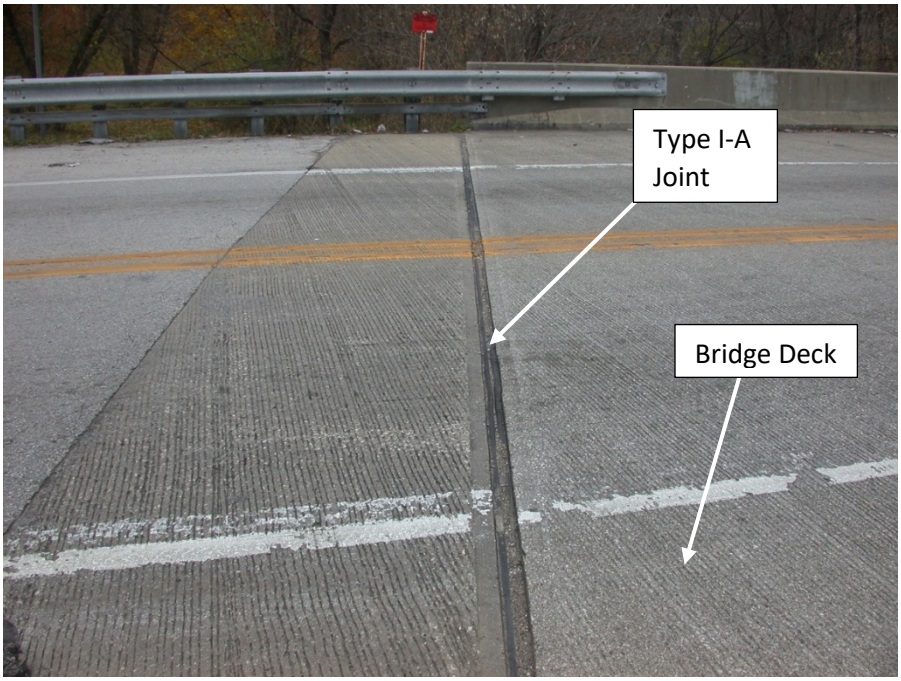
## ACTIVITIES 2410/2440 – January 11, 2017

**RCS-2**




Reinforced Concrete Slab Bridge without bridge deck expansion joints and without mudwalls, bridge seats, beam/girder ends, or bearings to be cleaned and flushed. There are bridge railings so Activity 2410 is required once a year.

**RCS-2**




Type I-A joint and bridge deck should be cleaned but no need to flush on this Reinforced Concrete Slab Bridge. (Activity 2410)

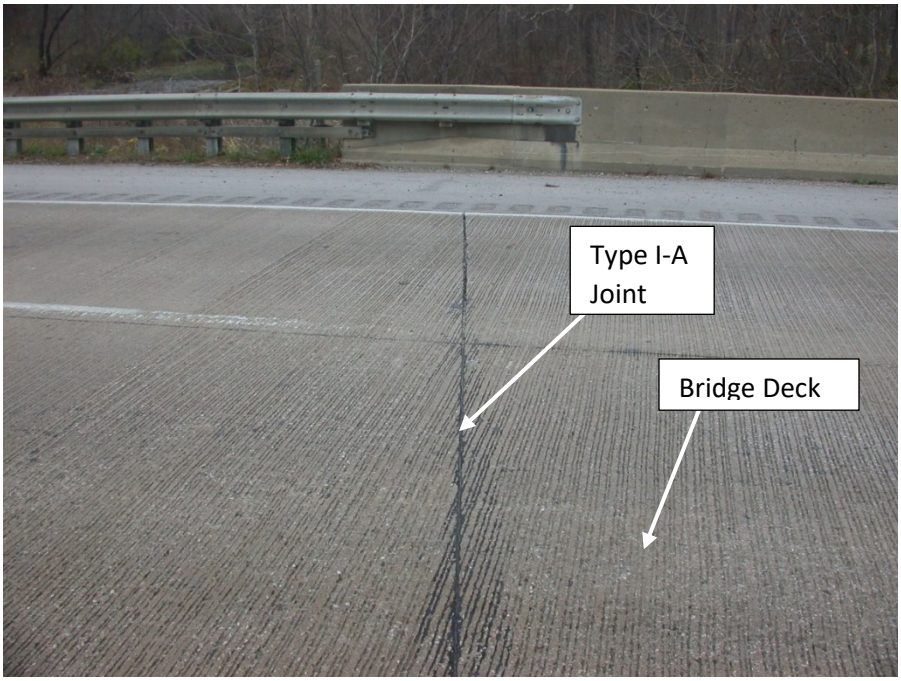
# BRIDGE CLEANING AND FLUSHING

## ACTIVITIES 2410/2440 – January 11, 2017

**RCA-1**


Reinforced Concrete Arch Bridge without bridge deck expansion joints and without mudwalls, bridge seats, beam/girder ends, or bearings to be cleaned and flushed. There are bridge railings so Activity 2410 is required once a year.

**RCA-1**




Type I-A joint and bridge deck should be cleaned but no need to flush on this Reinforced Concrete Arch Bridge. (Activity 2410)

# BRIDGE CLEANING AND FLUSHING

## ACTIVITIES 2410/2440 – January 11, 2017

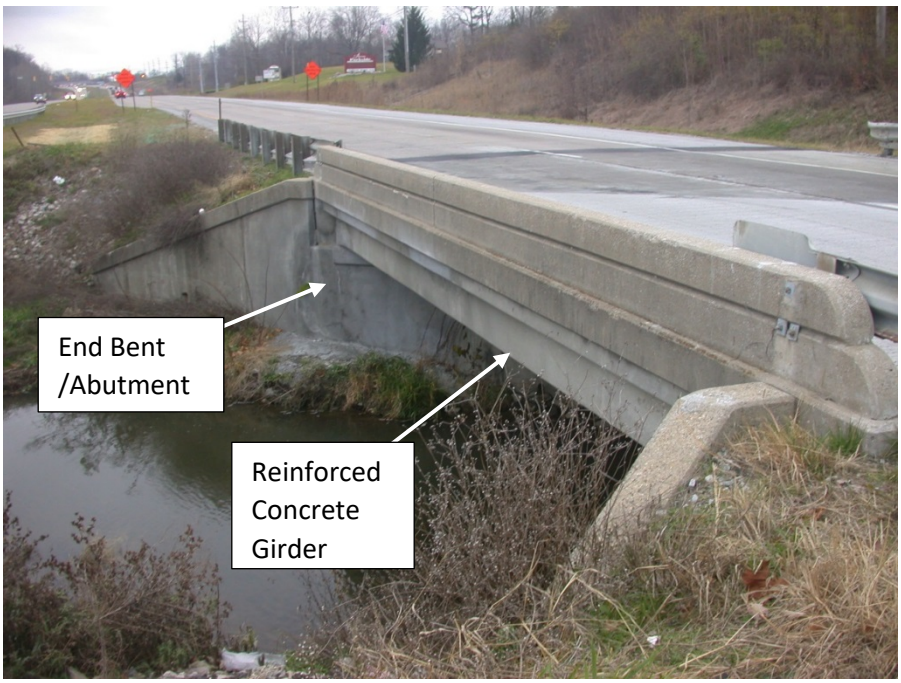
**RCA-1**


Drain in Reinforced Concrete Arch Bridge, cleaning and flushing required. (Activity 2410)

# BRIDGE CLEANING AND FLUSHING

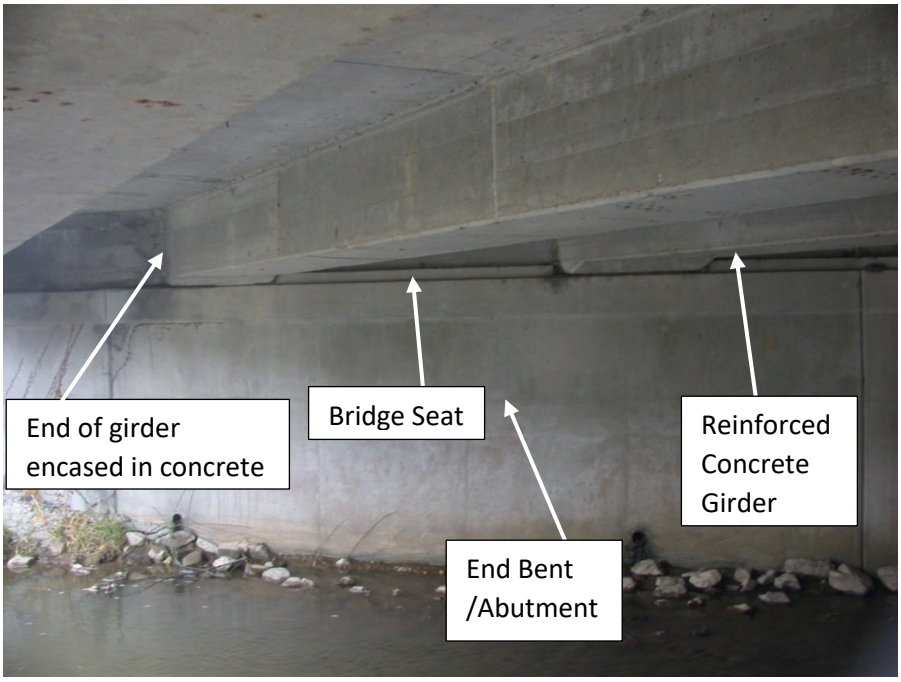
## ACTIVITIES 2410/2440 – January 11, 2017

**RCG-1**




Reinforced Concrete Girder Bridge without bridge deck expansion joints. There are bridge railings so Activity 2410 is required once a year.

**RCG-1**

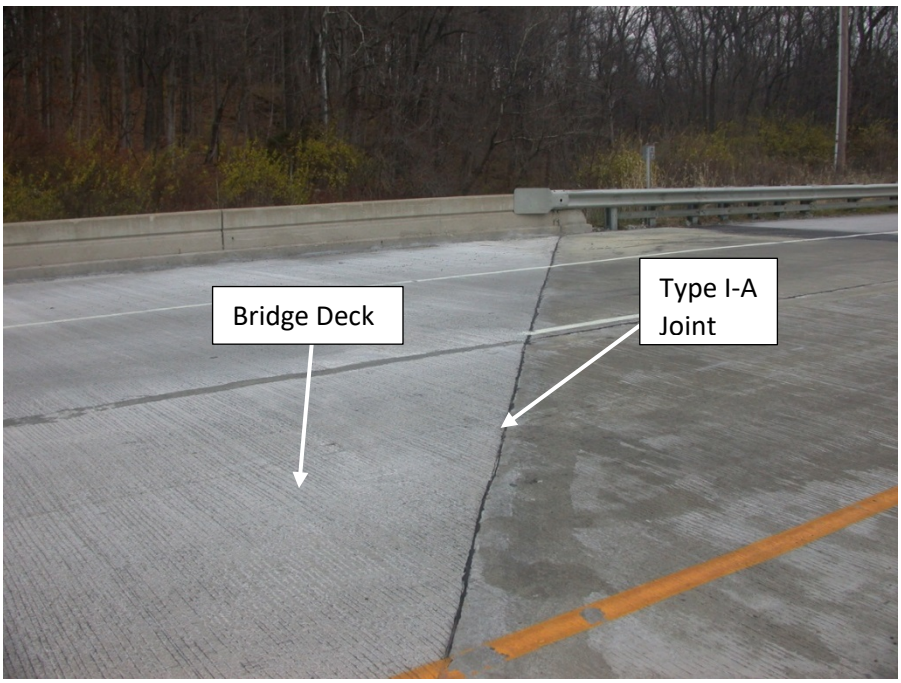



Underside of this Reinforced Concrete Girder Bridge at end bent/abutment, no cleaning or flushing required because there is not a bridge deck expansion joint over these components.

# BRIDGE CLEANING AND FLUSHING

## ACTIVITIES 2410/2440 – January 11, 2017

**RCG-1**

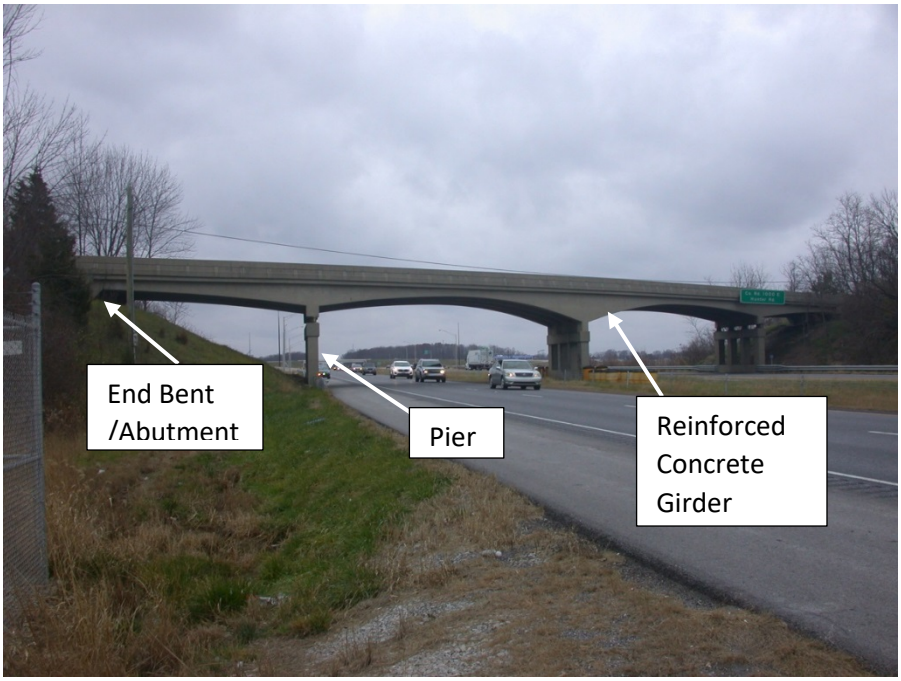



Type I-A joint and bridge deck should be cleaned but no need to flush on this Reinforced Concrete Girder Bridge. (Activity 2410)

# BRIDGE CLEANING AND FLUSHING

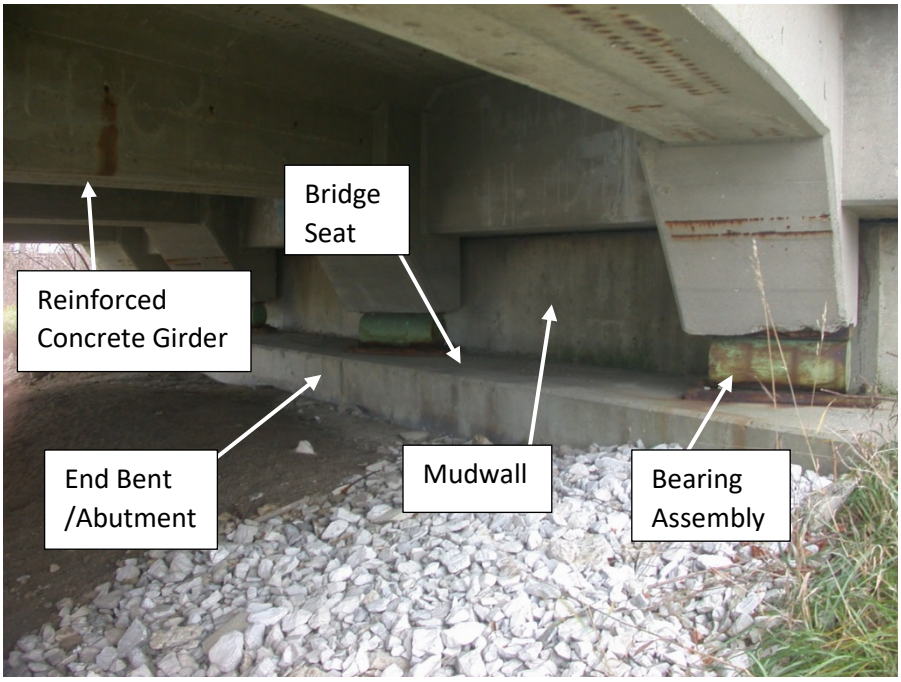
## ACTIVITIES 2410/2440 – January 11, 2017

**RCG-2**




Reinforced Concrete Girder Bridge with bridge deck expansion joints, mudwalls, bridge seats, girder ends, and bearing assemblies to be cleaned and flushed. There are bridge railings also so Activities 2410 and 2440 required once a year.

**RCG-2**

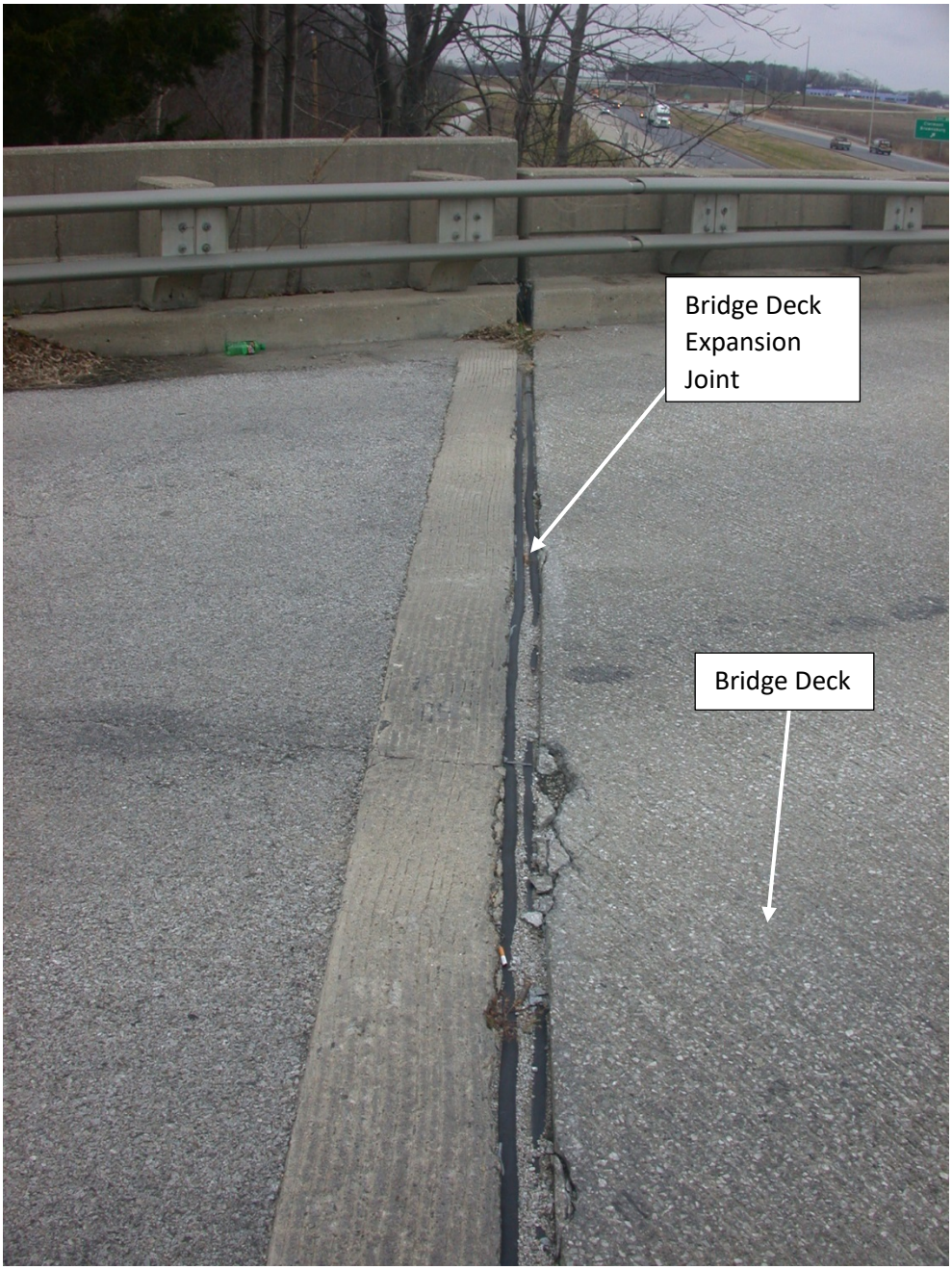



Underside of this Reinforced Concrete Girder Bridge at end bent/abutment showing bridge seat, bearing assemblies, and end of girders which should be cleaned and flushed and mudwall which should be flushed. (Activity 2440)

# BRIDGE CLEANING AND FLUSHING

## ACTIVITIES 2410/2440 – January 11, 2017

**RCG-2**

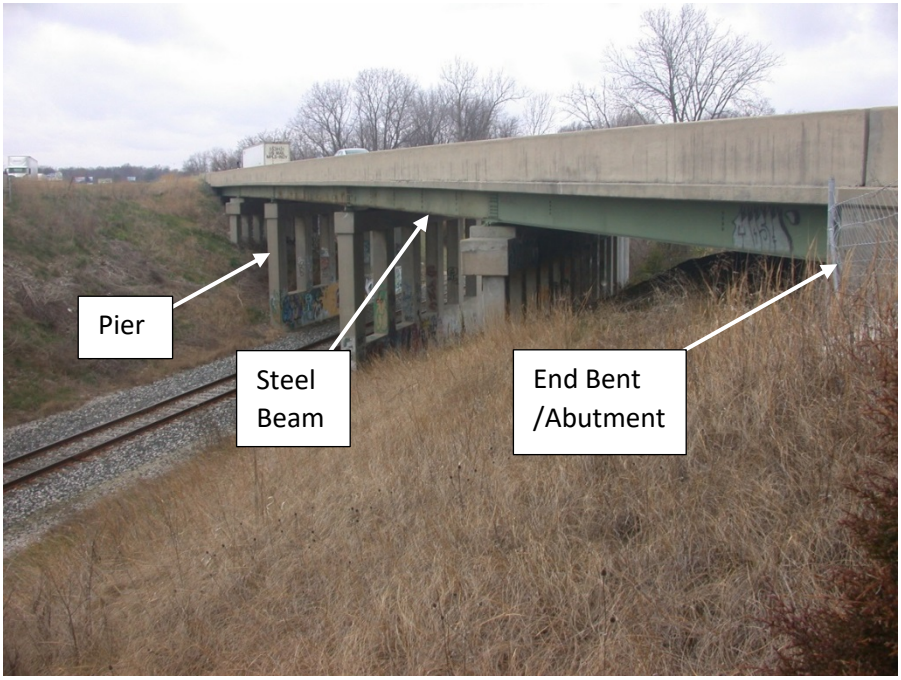



Bridge deck expansion joint should be cleaned and flushed and bridge deck should be cleaned but no need to flush on this Reinforced Concrete Girder Bridge. (Activity 2410)

# BRIDGE CLEANING AND FLUSHING

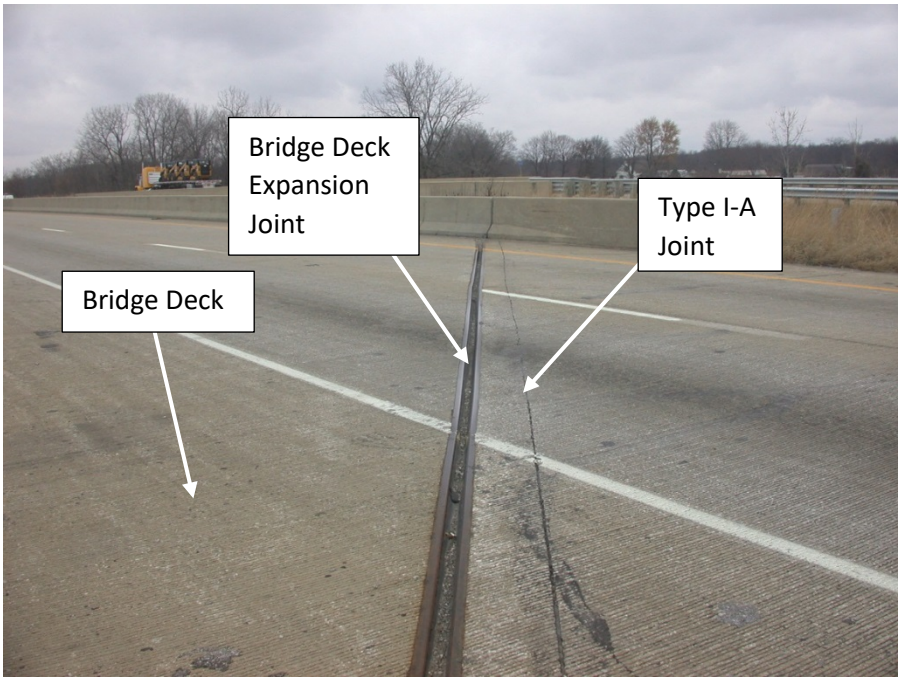
## ACTIVITIES 2410/2440 – January 11, 2017

**CSB-1**




Continuous Steel Beam Bridge with bridge deck expansion joints, mudwalls, bridge seats, beam ends, and bearing assemblies to be cleaned and flushed. There are bridge railings also so Activities 2410 and 2440 required once a year.

**CSB-1**

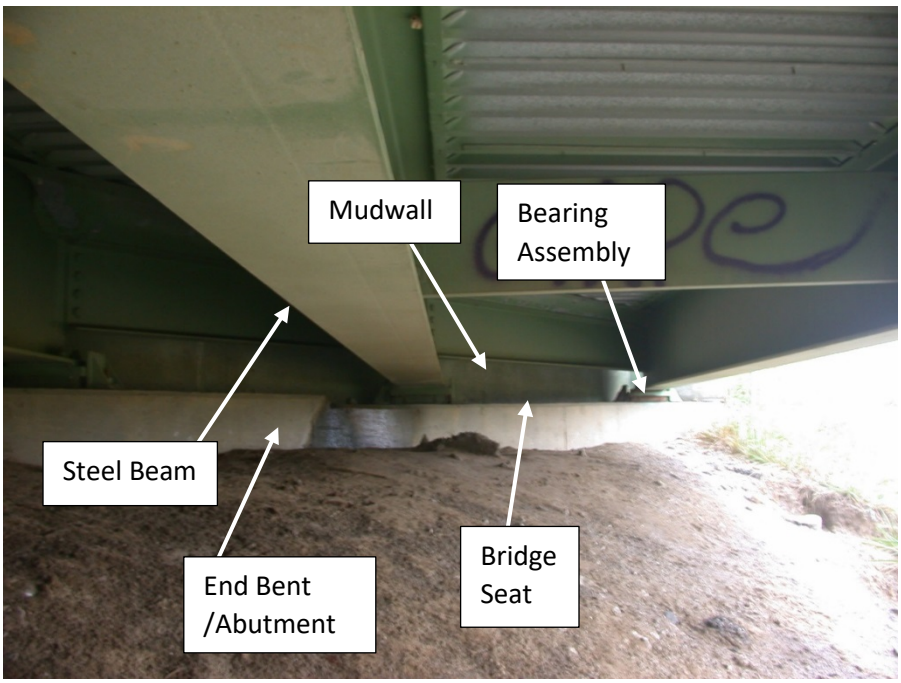



Type I-A joint and bridge deck should be cleaned but no need to flush and the bridge deck expansion joint should be cleaned and flushed on this Continuous Steel Beam Bridge. (Activity 2410)

# BRIDGE CLEANING AND FLUSHING

## ACTIVITIES 2410/2440 – January 11, 2017

**CSB-1**

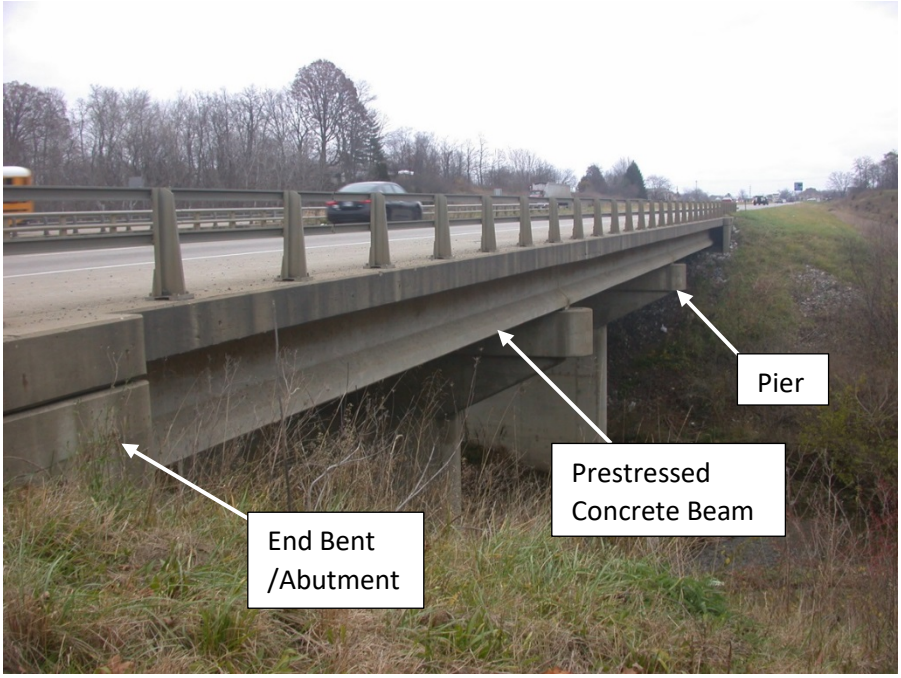



Underside of this Continuous Steel Beam Bridge at end bent/abutment with bridge seat, bearing assemblies, and end of beams which should be cleaned and flushed and mudwall which should be flushed. (Activity 2440)

# BRIDGE CLEANING AND FLUSHING

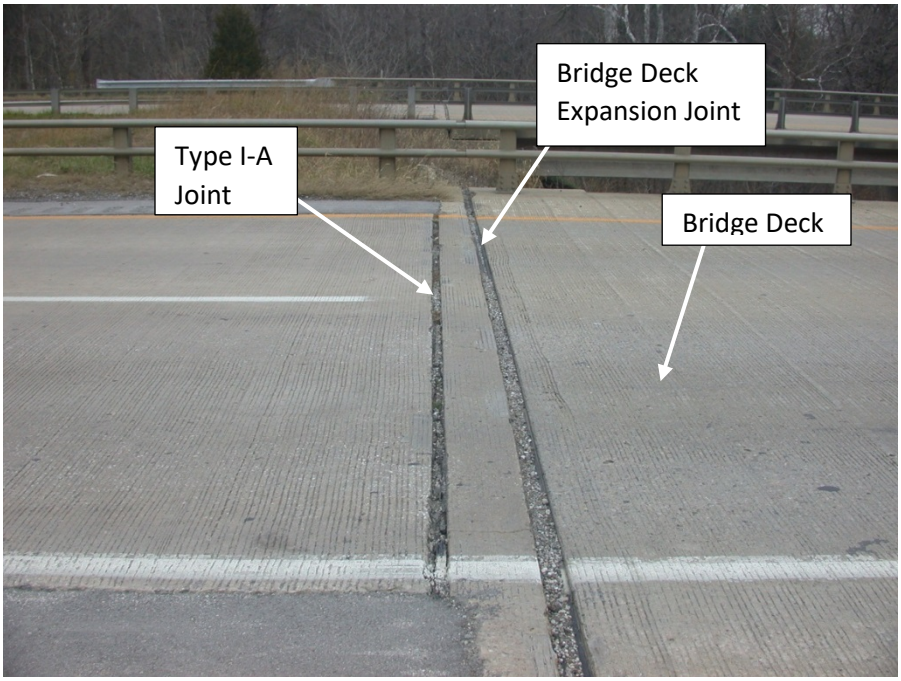
## ACTIVITIES 2410/2440 – January 11, 2017

**PCB-1**




Prestressed Concrete Beam Bridge with bridge deck expansion joints, mudwalls, bridge seats, beam ends, and bearing assemblies to be cleaned and flushed. There are bridge railings also so Activities 2410 and 2440 are required once a year.

**PCB-1**

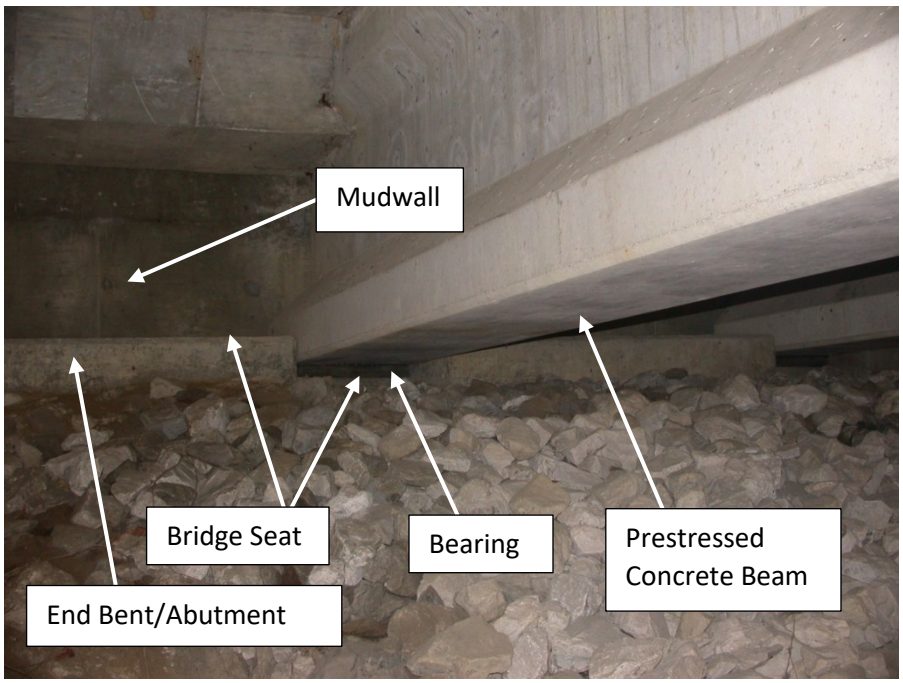



Type I-A joint and bridge deck should be cleaned but no need to flush and the bridge deck expansion joint should be cleaned and flushed on this Prestressed Concrete Beam Bridge. (Activity 2410)

# BRIDGE CLEANING AND FLUSHING

## ACTIVITIES 2410/2440 – January 11, 2017

**PCB-1**




Underside of this Prestressed Concrete Beam Bridge at end bent/abutment with bridge seat, bearings, and end of beams which should be cleaned and flushed and mudwall which should be flushed. (Activity 2440)

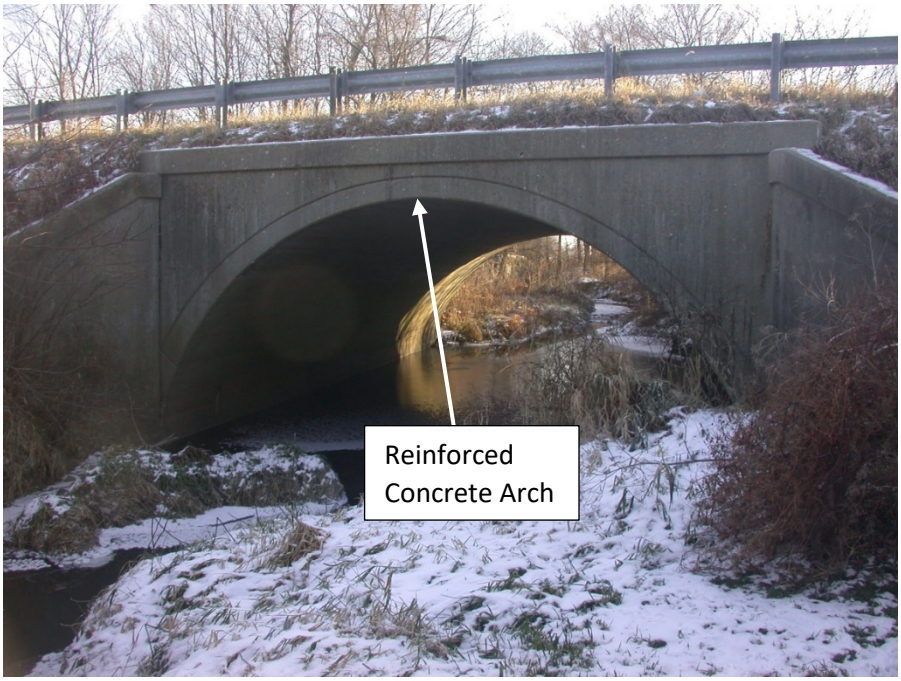
# BRIDGE CLEANING AND FLUSHING

## ACTIVITIES 2410/2440 – January 11, 2017

**RCA-2**


Reinforced Concrete Arch Bridge (Under Fill) with no bridge railings, curbs, or bridge deck expansion joints so no cleaning or flushing activities required.

**RCA-2**




Reinforced Concrete Arch Bridge (Under Fill) with no cleaning or flushing activities required.

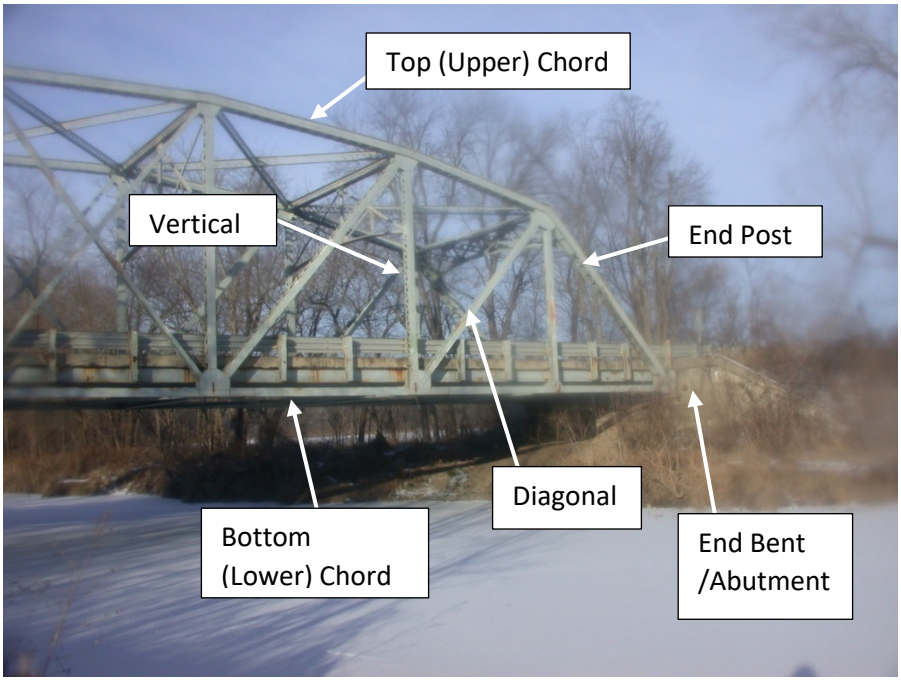
# BRIDGE CLEANING AND FLUSHING

## ACTIVITIES 2410/2440 – January 11, 2017

**STT-1**


Steel Thru Truss Bridge with bridge railings so Activity 2410 required once a year and Activity 2440 required twice a year.

**STT-1**

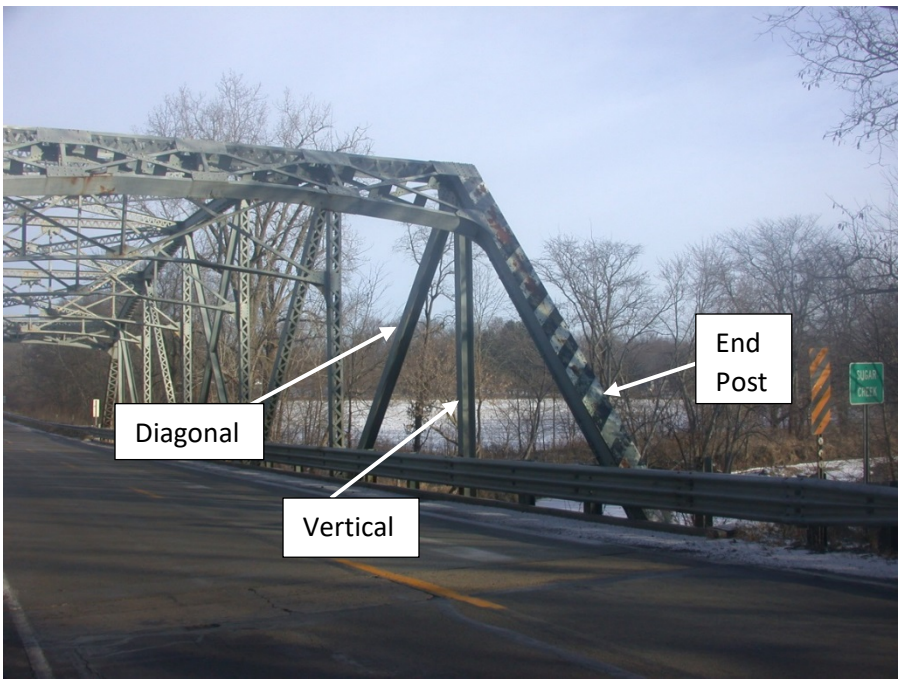



The diagonals, verticals and end posts from approximately 6 ft. above the bridge deck to the bottom chord and the bottom chord should be cleaned and flushed twice a year on this Steel Thru Truss Bridge. (Activity 2440)

# BRIDGE CLEANING AND FLUSHING

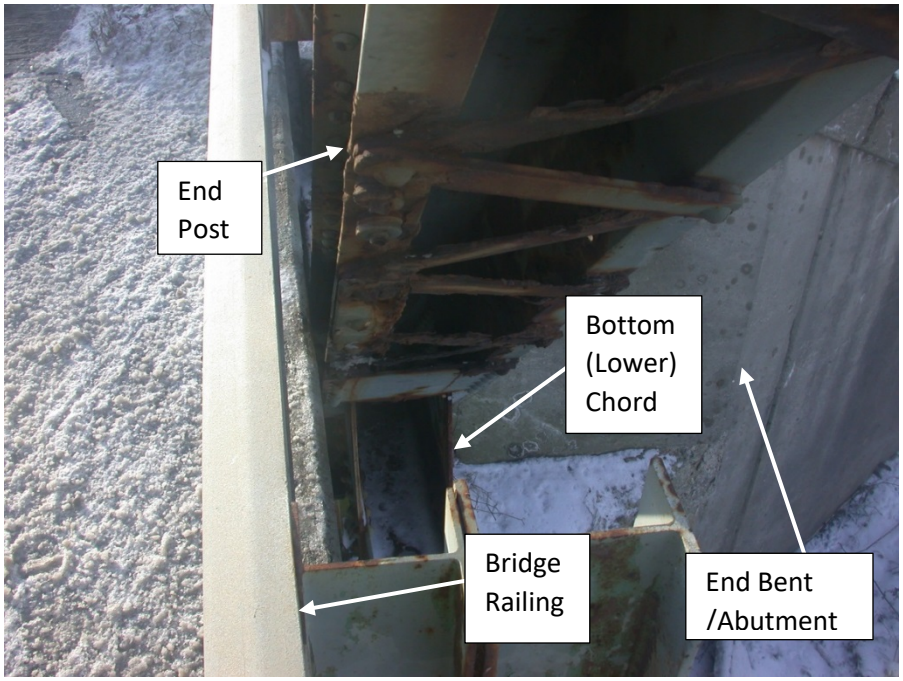
## ACTIVITIES 2410/2440 – January 11, 2017

**STT-1**




The diagonals, verticals and end posts from approximately 6 ft. above the bridge deck to the bottom chord should be cleaned and flushed twice a year on this Steel Thru Truss Bridge. (Activity 2440)

**STT-1**

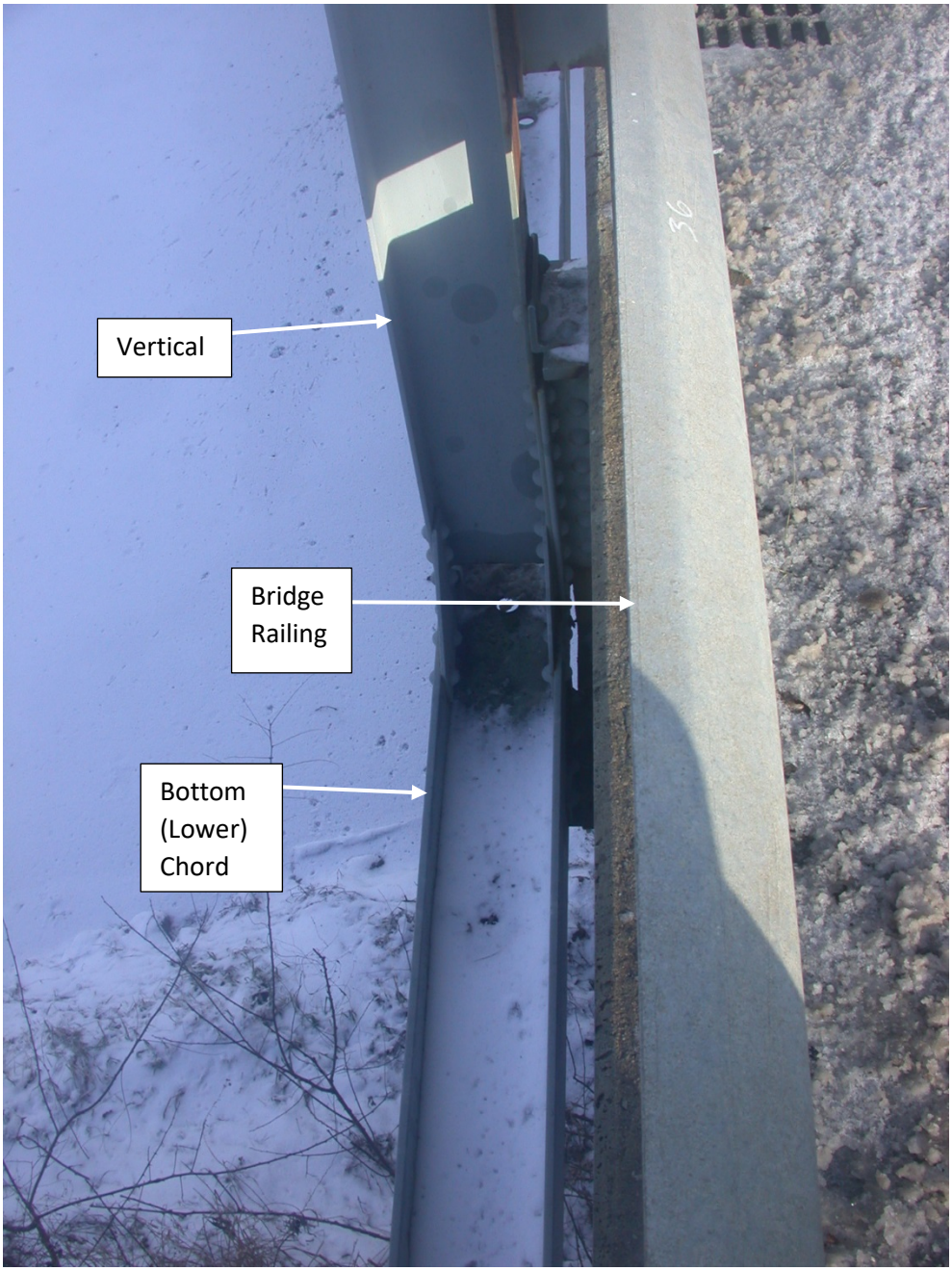



The end post from approximately 6 ft. above the bridge deck to the bottom chord and the bottom chord should be cleaned and flushed twice a year on this Steel Thru Truss Bridge. (Activity 2440)

# BRIDGE CLEANING AND FLUSHING

## ACTIVITIES 2410/2440 – January 11, 2017

**STT-1**

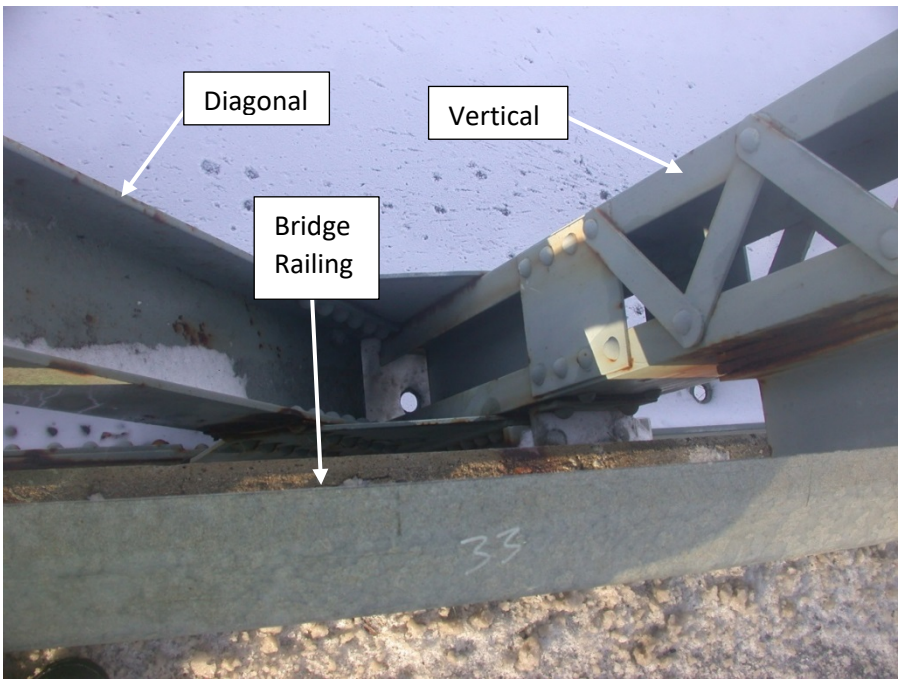



The vertical from approximately 6 ft. above the bridge deck to the bottom chord and the bottom chord should be cleaned and flushed twice a year on this Steel Thru Truss Bridge. (Activity 2440)

# BRIDGE CLEANING AND FLUSHING

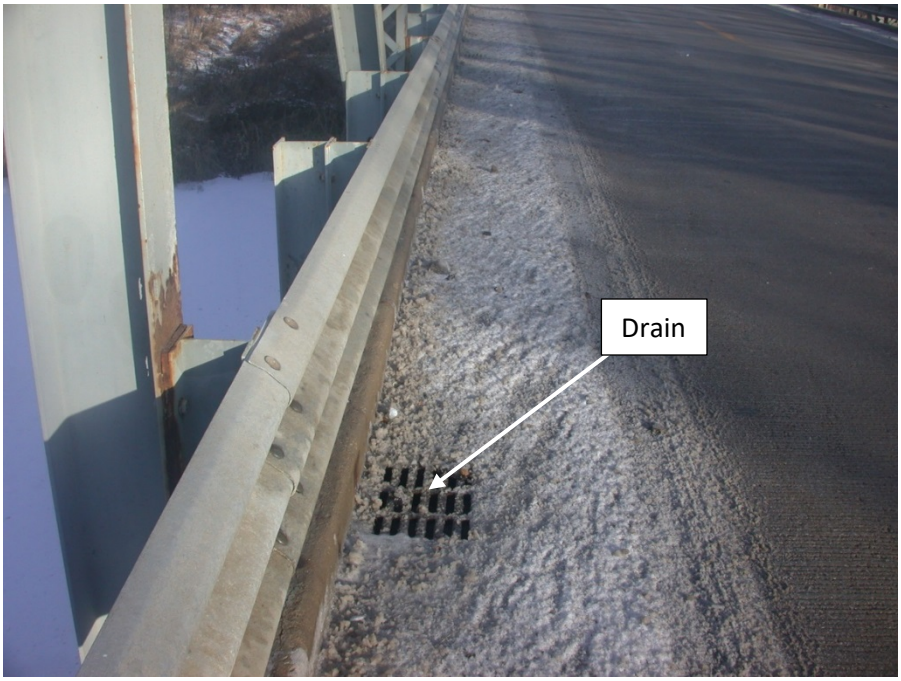
## ACTIVITIES 2410/2440 – January 11, 2017

**STT-1**




The diagonal and vertical from approximately 6 ft. above the bridge deck to the bottom chord should be cleaned and flushed twice a year on this Steel Thru Truss Bridge. (Activity 2440)

**STT-1**

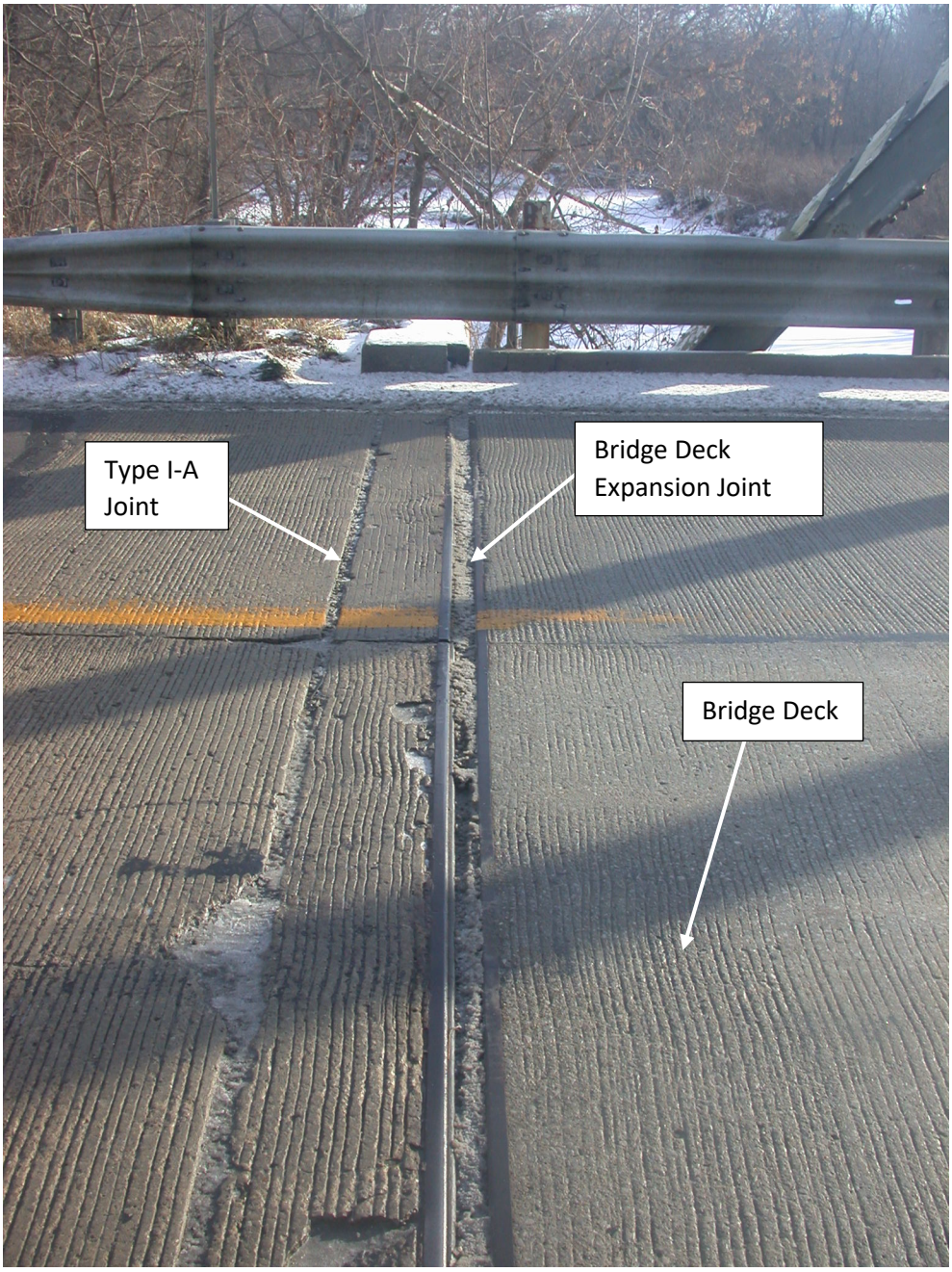



The drain should be cleaned and flushed once a year on this Steel Thru Truss Bridge. (Activity 2410)

# BRIDGE CLEANING AND FLUSHING

## ACTIVITIES 2410/2440 – January 11, 2017

**STT-1**

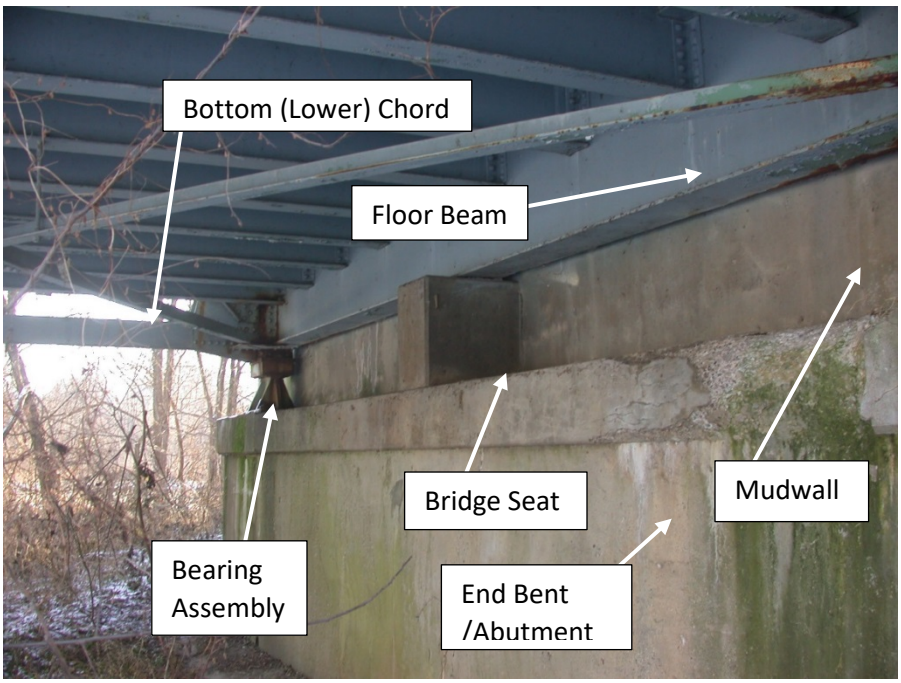



Type I-A joint and bridge deck should be cleaned but no need to flush and the bridge deck expansion joint should be cleaned and flushed once a year on this Steel Thru Truss Bridge. (Activity 2410)

# BRIDGE CLEANING AND FLUSHING

## ACTIVITIES 2410/2440 – January 11, 2017

**STT-1**




Underside of this Steel Thru Truss Bridge with a bottom chord, floor beam, bridge seat, and bearing assemblies which should be cleaned and flushed and a mudwall which should be flushed twice a year. (Activity 2440)

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Temporary Bridge Deck Patching | CODE | 2450 |
|---|---|---|---|

**Purpose**

Temporary patching is performed to reduce impact loading, reduce roadway hazards and until proper patching can be scheduled and weather conditions are conducive to a permanent patch. This activity will not result in any permanent patching solution on bridge decks. This is done by patching areas on bridge deck using hot or cold bituminous mixtures or other materials available which are not intended for permanent bridge deck patching.

**Category** Bridge

- ☐ **PM**
- ☐ **QA**
- ☒ **Plan Location**

**Scheduling & Coordination**

- Temporary patching is done when weather conditions and scheduling does not allow for Activity 2451 (Permanent Bridge Deck Patching) to be performed.
- This activity is one that is temporary. Activity 2451 (Permanent Bridge Deck Patching) should be scheduled when weather conditions are conducive to complete.

| Reporting | | Asset to Report to | Bridge Structures | Reporting Units | Square Feet |
|---|---|---|---|---|---|

- Accomplishment is reported in Square Feet of deck patched
- Report to the specific bridge asset each time this activity is performed.
- Once this activity has been completed, a **Work Request** for **Activity 2451** (Permanent Bridge Deck Patching) shall be created by the **Subdistrict Manager** and assigned to appropriate Management Unit. Be sure the specific Bridge Asset is selected when creating the Work Request.
- For additional work order reporting guidance see the Work Orders section of the Preface.

| Crew Size | 3-4 Workers | QTY |
|---|---|---|
| Truck Driver / Laborer | | 1 |
| Laborer | | 2-3 |

*Traffic Control Personnel are NOT shown here

| Job Specific Equipment | QTY |
|---|---|
| Blower / Air Compressor | 1 |

*Traffic Control Equipment is NOT shown here

**P.P.E.**

Base PPE

Additional PPE per Safety Data Sheet

**Materials**

HMA Surface (Type B) - INDOT Spec Section 902.01(a)
Cold Mix Bituminous for Patching
Aggregate - INDOT Spec Section 904
Liquid Bituminous - INDOT Spec Section 902.01(b)
Cold Applied Concrete Patch

**Other References**

**Sub Activities**

| Average Daily Production | 50 Square Feet | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Temporary Bridge Deck Patching | CODE | 2450 |
|---|---|---|---|

## Work Method

1) Place signs and safety devices
2) Remove dirt, debris, and water from patch area with air compressor or blower
3) Place bituminous or other materials in distressed or spalled areas of bridge deck
4) Compact material thoroughly by hand
5) Use straight edge after final compaction to ensure patch material is level and smooth with existing bridge deck
6) If sealer material is used, place sand on sealer
7) Remove signs and safety devices

**NOTE:**

Once this activity has been completed a **Work Request** for **Activity 2451** (Permanent Bridge Deck Patching) shall be created by the **Subdistrict Manager** and assigned to appropriate Management Unit. Ensure the specific Bridge Asset is selected when creating the Work Request.

## Special Considerations

- This activity is usually completed to reduce hazards until proper patching can be scheduled and weather conditions are conducive to a permanent patch. This Activity will not result in any permanent patching solution on bridge decks.

- Once this activity has been completed a Work Request for Activity 2451 (Permanent Bridge Deck Patching) shall be created by the Subdistrict Manager and assigned to appropriate Management Unit. Ensure the specific Bridge Asset is select when creating the Work Request.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 50 Square Feet | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Permanent Bridge Deck Patching | CODE | 2451 |
|---|---|---|---|

**Purpose**

This activity is performed to permanently repair spalled, delaminated and other deficient areas of a bridge deck. This is done by patching areas on bridge deck using cementitious materials intended for permanent bridge deck patching.

**Category** Bridge

- ☐ PM
- ☒ QA
- ☒ Plan Location

**Scheduling & Coordination**

- This activity should be performed when weather conditions and scheduling allows.
- If Activity 2450 (Temporary Bridge Deck Patching) has been completed then the temporary materials should be replaced with permanent materials used when performing this activity.

| Reporting | | Asset to Report to | Bridge Structures | Reporting Units | Square Feet |
|---|---|---|---|---|---|

- Accomplishment is reported in Square Feet of deck patched
- Report to the specific bridge asset each time this activity is performed.
- For additional work order reporting guidance see the Work Orders section of the Preface.

| Crew Size | 4-6 Workers | QTY |
|---|---|---|
| Supervisor | | 1 |
| Laborer | | 3-5 |

*Traffic Control Personnel are NOT shown here

| Job Specific Equipment | QTY |
|---|---|
| Concrete Saw | 1 |
| Jack Hammer | 2 |
| Air Compressor | 1 |
| Concrete Mixer | 1 |
| Water Tank | 1 |

*Traffic Control Equipment is NOT shown here

**P.P.E.**

1) Base PPE
2) Approved APF 10 Respirator (See "Silicosis Awareness")
3) Additional PPE per Safety Data Sheet

**Materials**

Rapid Setting Patch Materials/Cement (INDOT Standard Specifications 901.07)
Aggregate (INDOT Standard Specifications 904)
Polyester Polymer Concrete

**Other References**

**INDOT Standard Specifications:**

- 722.06 Patching of the Bridge Floor
- 710.03 Patching Concrete Structures

Silica Exposure Control Plan (WPS Preface)

**Sub Activities**

831 - Patching includes Bridge Expansion Joint

| Average Daily Production | 50 Square Feet | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Permanent Bridge Deck Patching | CODE | 2451 |
|---|---|---|---|

**Work Method**

1) Place signs and safety devices
2) Identify and mark extent of damaged or failing concrete by sounding bridge deck
3) Saw cut 1" outside the deteriorated area using concrete saw (saw cuts should result in straight, smooth edges and patch should be of rectangular shape)

**Partial Depth Patch with Rapid Setting Patch Material**

4) Hammer and remove deteriorated concrete using pneumatic hammers and hand tools to a minimum of 1" below rebar

**Partial Depth Patch with Polyester Polymer Concrete**

4) Hammer and remove deteriorated concrete use pneumatic hammers and hand tools to depth recommended by manufacturer.

**Full Depth Patch**

4) Form underside of deck for any Full-Depth repairs

**NOTE:**

Jack hammers shall not be heavier than nominal 45 lb class and chipping hammers shall not be heavier than nominal 15 lb class. Only chipping hammers shall be used when removing concrete within 1 in. of the reinforcement.

5) Periodically sound the remaining concrete to ensure deteriorated concrete is not left in place
6) Wire brush exposed rebar to remove rust and other contaminants
7) Clean the area using sandblasting, water-blasting, or air
8) Load and dispose of materials in a designated and approved disposal area
9) Fasten additional reinforcing steel to the existing steel if section loss is 20% or greater
10) Apply bonding agent or epoxy coatings to surface as required
11) Mix and place cementitious patch materials

**NOTE:**

Follow manufacturer's mixing instructions. Mixing may vary depending on contents of bag, aggregates and weather conditions.

12) Finish and broom/tine patch materials surface
13) Scribe the month and year the patch was performed.
    - ✓ If the patch was placed in March of 2013, then the patch should be scribed with '*03 – 13*'
14) Allow patched area(s) to sufficiently cure before releasing traffic
15) Remove signs and safety devices

**Silicosis Awareness**

All efforts should be made to eliminate/reduce the generation of dust while performing this activity, specifically when sawing and mixing concrete or grout. A wet saw should be used, or if not available, manually spray water to control dust.
Workers adding dry materials into mixer and mixing concrete or grout, or those within 20' must wear an approved facepiece respirator that they are fit tested to wear.

**Special Considerations**

- Jack hammers shall not be heavier than nominal 45 lb class and chipping hammers shall not be heavier than nominal 15 lb class. Only chipping hammers shall be used when removing concrete within 1 in. of the reinforcement.

**APPROVED BY**

Director, Highway Maintenance

| Average Daily Production | 50 Square Feet | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

# Indiana Department of Transportation

## Activity 2451 QA Form - Permanent Bridge Deck Patching

NBI #:_____ District/Sub/Unit:_____
Work Order #:_____ Route:_____
Date completed:_____ Intersections:_____
Date inspected:_____ Structure:_____
Inspector:_____ RP Start/End:_____
QA Window: 0-2 months

**Observations:**

1. Patch squared with adjacent concrete? (excludes areas < 1')
   - 0 More than one side not squared
   - 5 One side not squared
   - 10 All sides squared

2. Patch covers distressed area?
   - 0 More than one side
   - 7 One side
   - 14 All sides

3. Was a cementious material used?
   - 0 No
   - 18 Yes

4. All deficient areas patched?
   - 0 There are many areas in the SAME lane not completed
   - 5 Some areas in OTHER lanes were not patched
   - 25 Yes, all deficient areas have been patched

5. Disposal of excavated materials?
   - 0 Excavated materials found on site
   - 3 No excavated materials found

6. Joint material in state of good repair?
   - N/A Patching did not affect the joint material, or no joint present
   - 0 Joint material not maintained or replaced, left open & not sealed
   - 6 Joint material maintained or replaced, sealed

7. Patch performance
   - 0 Not working well, cracking, spalling, or loose material visible
   - 10 Yes, patching material is in place and no signs of defects

8. Patch identification - date written on patch? (unscored question)
   - Yes
   - No

**Inspector Comments:**

| |
|---|
| |

**Score:**

| | Possible | Actual |
|---|---|---|
| **1** | 10 | |
| **2** | 14 | |
| **3** | 18 | |
| **4** | 25 | |
| **5** | 3 | |
| **6** | N/A *or* 6 | |
| **7** | 10 | |
| **Total:** | | |

**Final % score (divide Actual by Possible):_____**

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Bridge Deck Crack Filling | CODE | 2470 |
|---|---|---|---|

**Purpose**

This activity is performed to seal bridge deck cracks to prevent intrusion of water and chlorides into bridge deck or overlay.

**Category** Bridge

- ☒ **PM**
- ☐ **QA**
- ☒ **Plan Location**

**Scheduling & Coordination**

- The work should be performed in March, April, May, September, and October weather permitting with temperatures above 40 degrees and below 90 degrees.
- A list of bridges to be scheduled should be provided by Technical Services and the District Bridge Asset Engineer.

| Reporting | | Asset to Report to | Bridge Structures | Reporting Units | Square Feet |
|---|---|---|---|---|---|

- Accomplishment is reported in Square Feet of deck treated
- Report to the specific bridge asset each time this activity is performed.
- For additional work order reporting guidance see the Work Orders section of the Preface.

| Crew Size | 4 Workers | QTY** |
|---|---|---|
| Crew Leader | | 1 |
| Laborer | | 3 |

**Traffic Control Personnel are NOT shown here

| Job Specific Equipment | QTY*** |
|---|---|
| Crew Cab | 1 |
| Air Compressor | 1 |

***Traffic Control Equipment is NOT shown here

**P.P.E.**

Base PPE

Additional PPE per Safety Data Sheet

**Materials**

Epoxy *
Modified Epoxies *
Methyl Methacrylates *
High Molecular Weight Methacrylates *
Polyester *
Urethane*

*Materials may vary based on Engineer's recommendations

**Other References**

**Sub Activities**

| Average Daily Production | 12,000 – 17,000 Sq Ft | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Bridge Deck Crack Filling | CODE | 2470 |
|---|---|---|---|

**Work Method**

1. Place signs and safety devices.
2. Deck should be relatively dry; some dampness is permissible but no standing water. Do not apply if rain is imminent.
3. Using compressed air, blow cracks out.
4. Make sure area around cracks are clean by removing dirt and debris.
5. Cracks of 0.30 mm (0.012 in.) in width and wider should be sealed.
6. Material should be poured along crack, keeping the bead on the surface no wider than ½ inch. If crack is ¼ inch or wider, fill crack with dry sand prior to applying material.
7. Allow product to seep into crack for 10 to 15 minutes.
   a. If necessary, repeat application.
8. Allow material to dry and if necessary apply sand to the surface to blot excess material to prevent tracking by traffic.
9. Remove signs and safety devices.

**Special Considerations**

Filling cracks in the bridge deck can occur prior to or after performing Activity 2471, Bridge Deck Broadcast Sealing.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 12,000 – 17,000 Sq Ft | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Bridge Deck Broadcast Sealing | CODE | 2471 |
|---|---|---|---|

**Purpose**

This activity is performed to seal top surface of concrete bridge deck to prevent intrusion of water and chlorides into bridge deck.

**Category** Bridge

- ☒ **PM**
- ☐ **QA**
- ☒ **Plan Location**

**Scheduling & Coordination**

- The work should be performed when the temperatures are within the limits of the manufacturer's recommendations for the material being placed.
- A list of bridges to be scheduled to have the bridge decks sealed should be provided by Technical Services and the District Bridge Asset Engineer.

| Reporting | | Asset to Report to | Bridge Structures | Reporting Units | Square Feet |
|---|---|---|---|---|---|

- Accomplishment is reported in Square Feet of deck treated
- Report to the specific bridge asset each time this activity is performed.
- For additional work order reporting guidance see the Work Orders section of the Preface.

| Crew Size | 4 Workers | QTY** |
|---|---|---|
| Crew Leader | | 1 |
| Laborer | | 3 |

**Traffic Control Personnel are NOT shown here

| Job Specific Equipment | QTY*** |
|---|---|
| Crew Cab | 1 |
| Air Compressor | 1 |

***Traffic Control Equipment is NOT shown here

**P.P.E.**

Base PPE

Additional PPE per Safety Data Sheet

**Materials**

Silane *
Siloxane *

*Materials may vary based on Engineer's recommendations

**Other References**

**Sub Activities**

| Average Daily Production | 12,000 – 17,000 Sq Ft | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Bridge Deck Broadcast Sealing | CODE | 2471 |
|---|---|---|---|

## Work Method

1) Place signs and safety devices

2) Review application documentation from vendor documentation to identify difference in surface prep, application rates, and mixing instructions.

3) Ensure concrete surfaces are clean and completely dry.
   - ✓ Concrete surfaces must be clean, dry and free of oil, dirt, loose scale and any other contaminants. Surfaces shall be swept clean by hand or by mechanical means. Remove oil and grease as completely as possible.
   - ✓ If water is necessary to remove oil, dirt, loose scale, or other contaminants, high pressure power washing is recommended.

4) Blow off any loose particles with compressed air before applying sealing materials, and wash any oil

5) Cover expansion devices or other features that are not to be sealed over. Bridge approach slabs do not require sealing. Do not place sealant on asphalt.

6) Material should be sprayed onto the surface by using a spray bar or applied by other means. The tips on the sprayer bar should be approximately 6” above the bridge deck surface. Uniformly distribute product on the deck surface, making sure to not leave any puddles.
   - ✓ If material fills the tining texturing, broom parallel along the existing tine markings to remove excess.
   - ✓ Frequently go back and broom out any puddles that may redevelop.

7) Allow product to stand until completely dry before turning traffic onto the surface.
   - ✓ If necessary, apply sand to the surface while material is still tacky, to help blot excess material, prevent tracking and improve short-term skid resistance.
   - ✓ This is especially recommended in higher traffic volume areas where decks are worn smooth or where braking action may be anticipated.

8) Clean equipment often and completely in order to reduce buildup.

9) Remove signs and safety devices.

## Special Considerations

Activity 2470, Bridge Deck Crack Filling, can occur prior to or after placing broadcast sealant.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 12,000 – 17,000 Sq Ft | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Bridge Deck Epoxy Injection | CODE | 2480 |
|---|---|---|---|

**Purpose**

Inject two-part epoxy material into voids formed where a rigid bridge deck overlay has debonded from the bridge deck underneath. The epoxy material will cure and fill voids, supporting the overlay and preventing moisture intrusion. Extends service life of overlay and prevents the need for expensive future repairs to the overlay.

**Category** Bridge

- ☒ **PM**
- ☐ **QA**
- ☒ **Plan Location**

**Scheduling & Coordination**

Epoxy injection trailer must be reserved using the Central Equipment yard online reservation system. The system can be found at the following link:
https://centralequipmentyard.myturn.com/library/inventory/browse?requestedFormat=&offset=0&max=15

Pavement surface temperature must be above 65 degrees Fahrenheit for this activity to be performed. This activity cannot be performed in the rain – water can infiltrate drilled port holes and become trapped in delaminated portions of the bridge deck.

| Reporting | | Asset to Report to | Bridge Structures | Reporting Units | Square Feet |
|---|---|---|---|---|---|

- Accomplishment is reported in square feet of bridge deck treated
- Report to the specific bridge asset each time this activity is performed
- For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** 4-6 Workers

| | QTY |
|---|---|
| Supervisor | 1 |
| Laborer | 3-5 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

- Epoxy Injection Trailer (following equipment is included on trailer)
  - Hammer drill
  - Shop vacuum with drill attachment
  - Generator
  - Electric air compressor

*Traffic Control Equipment is NOT shown here

**P.P.E.**

1) Base PPE
2) Eye protection
3) Rubber gloves

**Materials**

- Epoxy Injection Material (2 part, 100% solids, low viscosity epoxy adhesive suitable for high pressure injection)

**Other References**

- ASTM D 2393 (Liquid epoxy viscosity)
- ASTM D 792 (Liquid epoxy density)
- ASTM D 2471 (Liquid epoxy pot life)
- ASTM D 2240 (Cured epoxy hardness)
- ASTM D 638 (Cured epoxy tensile strength)
- ASTM D 790 (Cured epoxy tensile modulus, flexural strength, flexural modulus)
- ASTM D 695 (Cured epoxy compressive strength, compressive modulus)

**Sub Activities**

**Overview**

- An overview video detailing the equipment and procedures used with the epoxy injection trailer can be found here: https://web.microsoftstream.com/video/39b373d7-a0b2-487f-afb0-2f7f19796992

**Setup and Pre-Injection Procedures**

- Reserve epoxy injection trailer on Central Equipment Yard website prior to the scheduled time of use of the trailer
    - Central Equipment Yard website can be found at the following link: https://centralequipmentyard.myturn.com/library/inventory/browse?requestedFormat=&offset=0&max=15
- Set up traffic control according to the traffic control plan
    - Epoxy injection process may be performed on one lane of bridge at a time, so it is not necessary to close all lanes on a bridge
    - Epoxy injection process may be performed at nighttime, performing work at night should be considered for busy routes.
- Ensure that weather conditions are appropriate
    - Epoxy injection cannot be performed in the rain – water can infiltrate the port holes and become trapped within the delaminated portions of the deck. The vacuum bit on the hammer drill can also easily become clogged.
    - The bridge deck temperature must be above 65 degrees Fahrenheit to perform epoxy injection procedure. The temperature can be checked using the laser thermometer that is stored on the epoxy trailer (see Figure 1 below).


Figure 1: Laser Thermometer

- Identify Locations requiring Epoxy Injection:
    - Identify the extents of overlay delaminated areas using Impact Echo NDT Scanner or Chain Drag
    - Use rod/hammer sounding to locate the exact perimeters of overlay delaminated areas and mark the perimeters with spray paint.
- Seal cracks over and adjacent to the delaminated areas. Use bridge deck crack filling material.
- Ensure all air and resin lines are connected and tightened down.
- Connect Dispenser Lines, Shut-Off valves, and connect-its (connect-its are small gold connectors that are used to attach the injection nozzles to the end of the hoses – see Figure 2 below).

Figure 2: Connect-Its

- Fill out field record worksheet (attached below) to track amount of work done and epoxy material used.
- Wear proper clothing, eyewear, gloves, and other appropriate equipment, along with PPE, to ensure protection from epoxy resin and associated materials.

**Start-Up Procedures**

- Start generator – check oil and gas prior to beginning operation.
- Connect only one extension cord to each outlet on generator Shop vacuum will be run off one outlet and drill will be run off the other outlet.
- Mark Injection and viewing port locations:
    - Using the hammer, one should identify the areas within the voided region that have an apparent higher degree of delamination – areas that have the most distinct hollow sound. These areas should be marked as injection port locations. Additional ports should be marked approximately 8" - 12" apart depending on the size of the delaminated area. Ensure outer holes remain 6" from the perimeter of delaminated areas.

- Drill Port Locations
  - Using a 1/2" vacuum concrete drill bit, hammer drill, and shop vacuum, drill at each port location until the void is penetrated. It may be obvious when the drill bit reaches the void at some locations as there could be a noticeable and immediate drop of the drill into the voided area. At other locations, the penetration might not be as obvious. Generally, drill 4" down as guide. It is helpful to measure and mark the drill bit at the 4" depth. Do not exceed 6” in drilling depth
  - Ensure the shop vacuum is connected to the drill bit to collect cement/concrete fine particles.
  - Place crimps on the ports before the ports are inserted in the drilled holes, but do not tighten crimps.
- Check oil level in the lift pumps.
  - The lift pumps are located on the back wall of the trailer (to the right as you enter the side door of the trailer). There are two lift pumps, one for the A side which is yellow and one for the B side which is blue (see box in Figure 3 below).

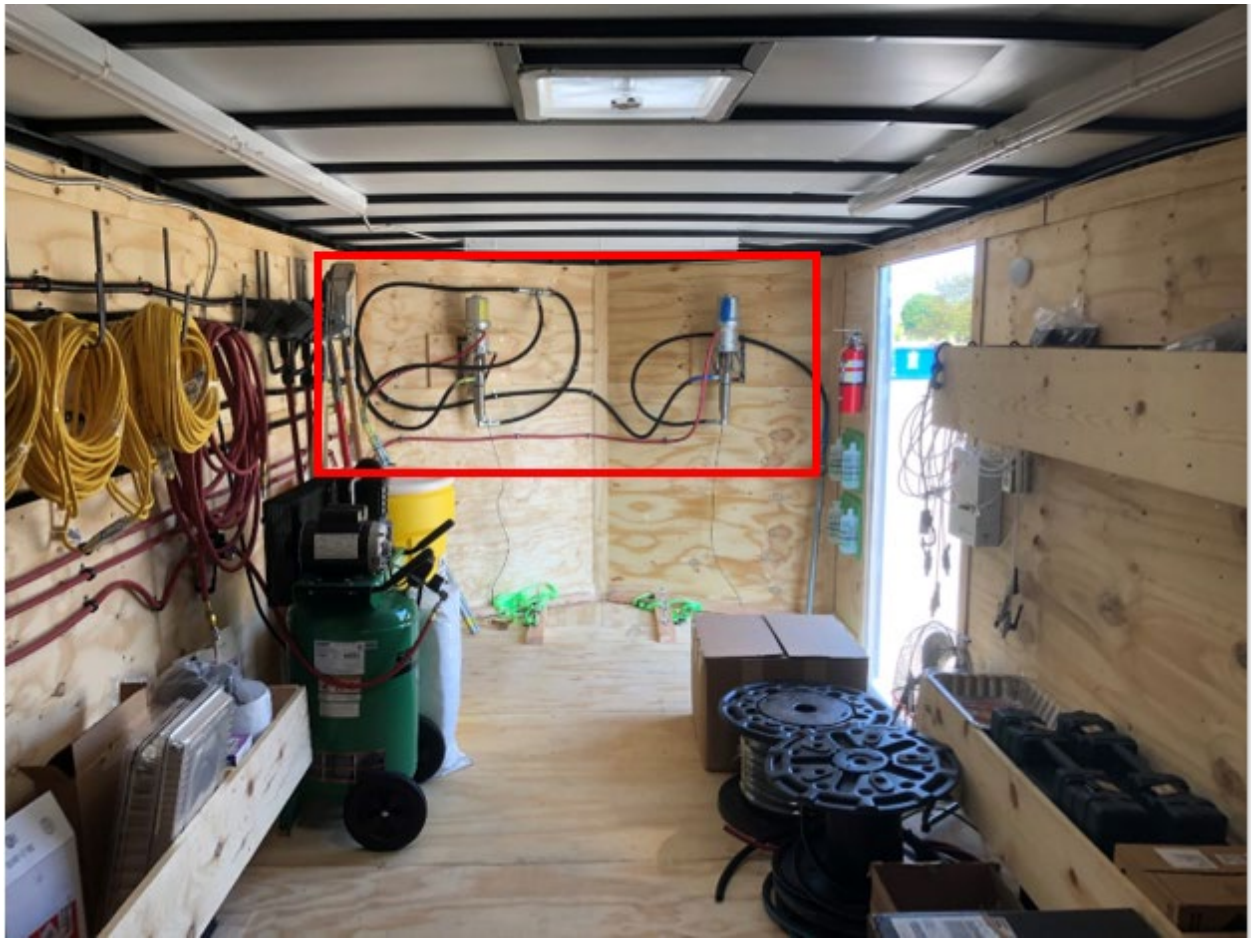


Figure 3: Location of lift pumps and oil containers

- There are two locations that need to be checked for oil levels: the pump oil containers and the seal lubricant containers
- The oil containers for the pumps are on the wall opposite the side door to the trailer (see box in Figure 4 below). There are two identical oil containers here: one for each pump.

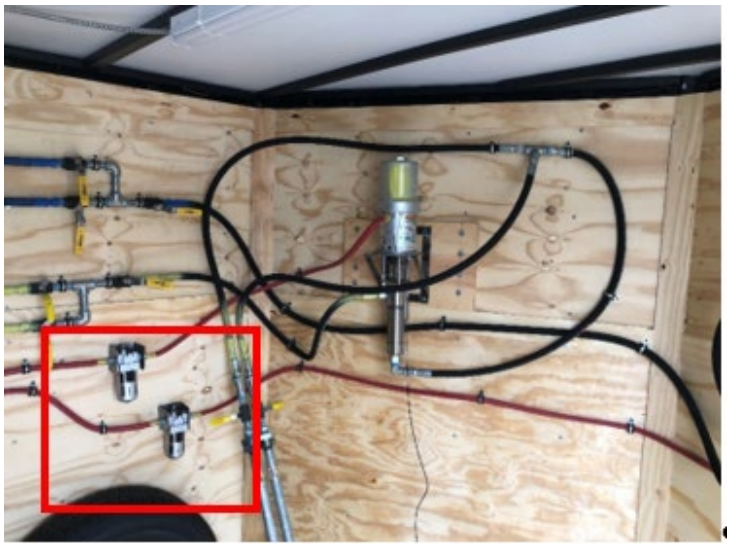


Figure 4: Lift pump oil containers

- The oil level for the pumps can be checked by looking at the viewing windows on either side of the oil containers. The oil level should be above the silver midpoint line on the viewing window (see arrow in Figure 5 below).


Figure 5: Oil level in lift pump container

- If the oil level is low (below the silver midpoint line) in either or both pumps, add the Napa 756-1400 Air Tool Lubricant oil (see Figure 6) that is stored in the trailer to the oil container(s) until the oil level is near the top of the viewing window.


Figure 6: Napa 756-1400 Air Tool Lubricant oil for lift pumps

- The seal lubricant containers are located on the pumps themselves. The containers are small open cups located directly below the main body of each pump (see arrows in Figure 7 below).

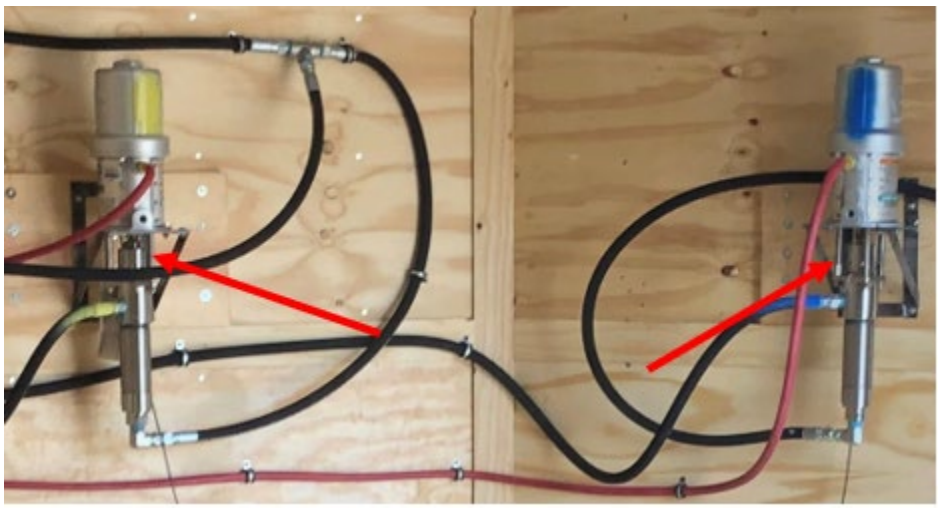


Figure 7: Location of seal lubricant containers

- The seal lubricant is poured directly into the cup; the level of lubricant in the cup should be just slightly below the top of the cup. Check the lubricant levels on both pumps. If the level of lubricant is low, pour the Graco Throat Seal Liquid that is stored in the trailer directly into the cup until the level of lubricant is slightly below the top of the cup (see Figure 8 below).


Figure 8: Filling of seal lubricant cap with Graco Throat Seal

- Turn on both ball valves on the lift rods inserted in the Yellow Epoxy Barrels (see box 2 in Figure 9 below)
- Turn on ball valve on the lift rod inserted in the Blue Epoxy Barrel

- Turn on main valves (see box 1 in Figure 9). Note, the valves to be turned on will be based on whether you are using only one Lily Dispenser or both dispensers. The use of one or two of the dispensers depends on the area of bridge deck being injected and the number of laborers on hand. The use of two dispensers will allow for there to be two sets of injection nozzles in use (two sets of three nozzles for six total), while using one dispenser will allow for only one set of three injection nozzles to be in use.

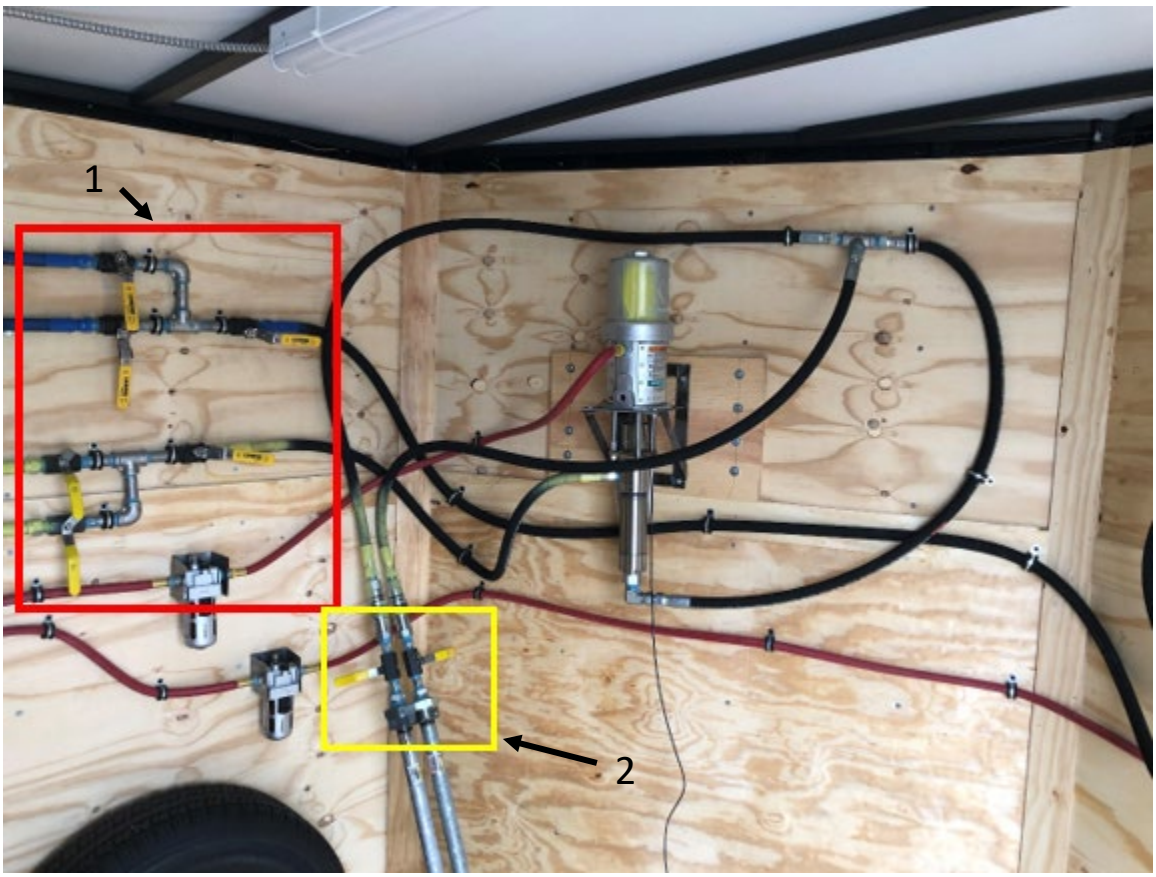



Figure 9: Main resin lines valves and valves on lift rods going into the resin barrels

- Turn on Lily Dispenser pumps for both Yellow and Blue Resin lines. The dispenser pumps are located near the rear door of the trailer on the wall opposite the side door (see arrow in Figure 10 below). See the arrows in Figure 11 for the location of the on/off switches on the two pumps.

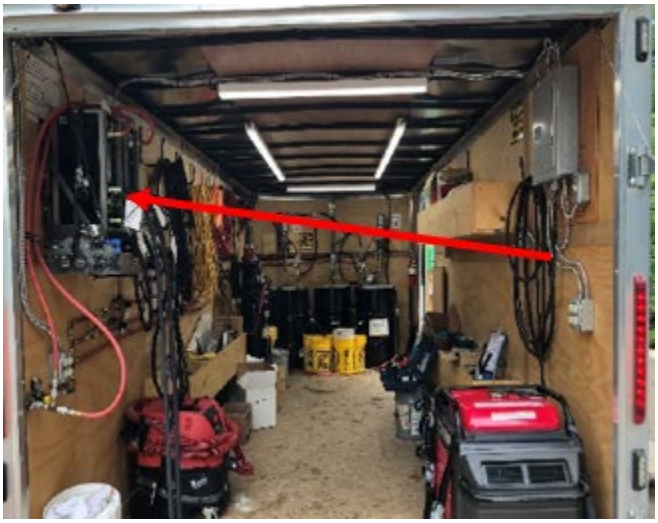


Figure 10: Location of Lily Dispensers

Figure 11: Location of the on/off switches on the two Lily Dispensers

- Turn on air compressor. The air compressor is electric and should be plugged into one of the wall sockets located in the trailer.

- Reset Lily Dispenser to help record the number of cycles properly. This can be done by pressing the small gray button on the cycle counter on each of the two dispensers; see the arrow in Figure 12 below for the location of the reset button. This is needed to calculate the volume of epoxy used at the end of the injection process.


Figure 12: Location of cycle counter reset

- Pull hoses for both A and B side materials out to the bridge deck. Make sure to pull the full length of each hose out on to the deck and to straighten the hoses out to their full length to avoid kinks or tangles.
- Use only metal 5-gallon buckets to purge air from the material lines (one bucket for yellow line and another bucket for blue line). Metal buckets must be used due to the heat of the epoxy material that will be dispensed from the hose.
- Uncap hoses and bleed hoses for 20-30 seconds into metal buckets

- Connect A and B hoses to the Tempest mixing block (Yellow line in side A and Blue line in side B; see box in Figure 13 below). Connect ¼" outlet hose to the Outlet Port of the mixing block (see arrow 2 in Figure 13 below). Install the gauge to the mixing block after installing the A and B side hoses and the ¼" outlet hose (see arrow 1 in Figure 13 below). If using both dispensers, two mixing blocks will be used.

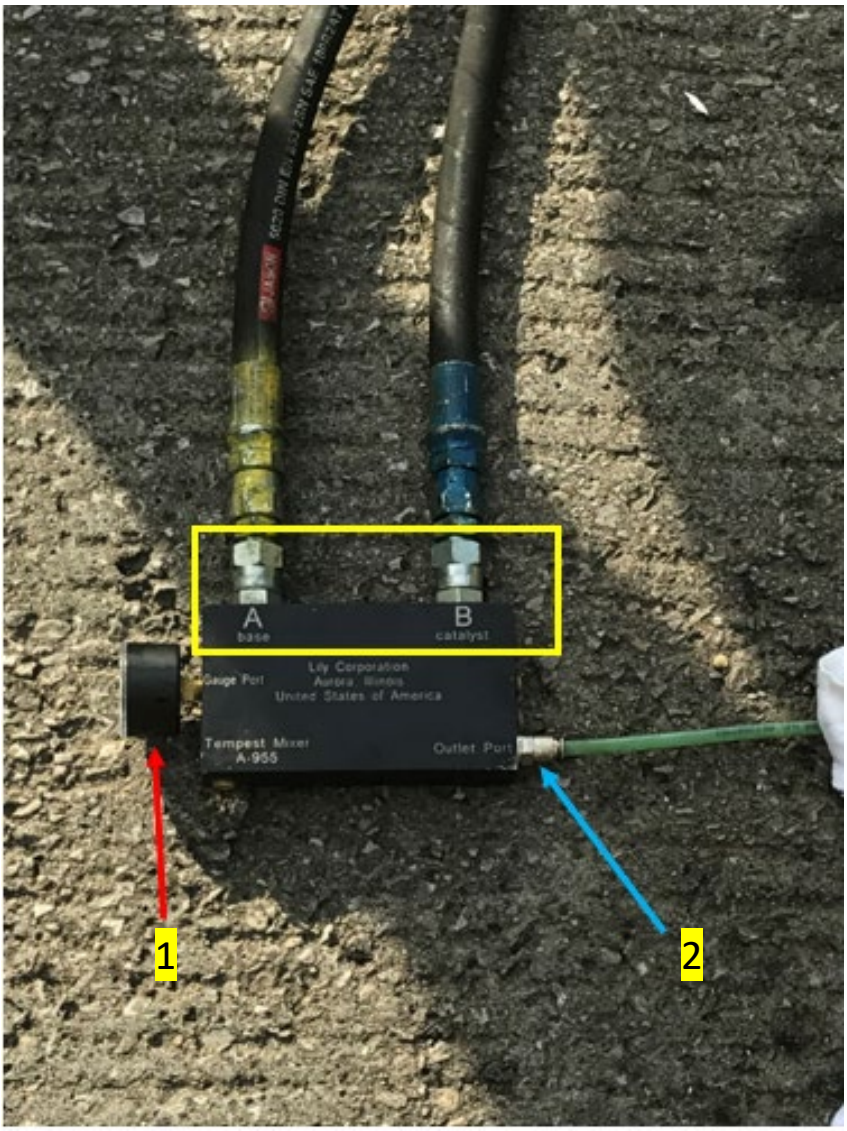



Figure 13: Tempest mixing block connections

- Connect the four-way manifold connector to the end of the outlet hose (See Figure 14). Connect the three ¼" hoses with nozzles on the ends to the other three ports of the manifold connector.



Figure 14: Manifold connections

- Put all three nozzles into a metal bucket and open the valves on the nozzles. Turn on the dispenser pump and pump epoxy into the bucket until the epoxy output is a consistent green color. This should be done by turning on the pump and then watching the epoxy coming out of the nozzles to view its color.
- Shut off Lily Dispenser and connect the three nozzles to the port locations furthest from the trailer

- Turn on Lily Dispenser to pressure close to but not exceeding 20 psi. The pressure can be read on the Cylinder Pressure gauge on the dispenser pump (see arrow 1 in Figure 15 below) and can be adjusted by turning the Regulator knob on the dispenser pump (see arrow 2 in Figure 15 below).
    - Note: a 20 psi pressure on the Lily Dispenser will be equivalent to about 4 – 5 times pressure (80 - 100 psi) recorded at the injection port on the deck.


Figure 15: Cylinder gauge and regulator

**Epoxy Injection Procedures**

- One person should remain in the trailer to monitor the cycling rate on the Lily Dispenser. The cycling rate can be monitored with the cycling rate gauges that are on the side of the dispensers that faces the back wall of the trailer (see Figure 16 below).


Figure 16: Cycling rate gauges

- Begin injection of epoxy at the port of most significant delamination (to be determined by hammer tapping) and cap adjacent ports as epoxy appears. Attach each of the three nozzles to three of ports in a delaminated region. Initially, turn of valves for each of the 3 nozzles. Turn on one nozzle at a time to check that the epoxy is flowing into a void. The cycling rate on the dispenser will indicate how quickly the deck is receiving the epoxy, and if there is a void being filled at the location of the port being injected. The speed of the up and down motion of the cycling rate gauge indicates the speed at which the epoxy is being dispensed. Where the cycling is relative steady and quick the injection can simply be monitored periodically to ensure the injection is progressing. When the cycling is very slow or not progressing at all, move to adjacent injection port. If epoxy is flowing at a port, leave that nozzle opened. If no epoxy is flowing at a port, close the valve on that particular nozzle and move it to a different port in the same delaminated region. Continue in the same manner until all ports have been occupied and the delamination has been filled in that region. It is important to keep an eye on all ports in this injected area. Firstly, cap ports as epoxy comes out and later crimp the ports (click crimps twice, one on each side to prevent epoxy from gushing out when the ports are trimmed). Note that epoxy resin will not always extend to all viewing ports (ports that are not currently having epoxy injected into them) or to the perimeter of the delaminated area. It is up to the judgment of the user to drill additional ports to fill that remaining area. Generally, if the vast majority of the delaminated area has been filled and only a small voided area is thought to remain, the void can be left without injection.

- Don't rush to cut off ports not taking epoxy early. Leave till all the injection in that region is done.
- In the event that epoxy flows out of the bridge deck at a location that does not have a port inserted (a crack or joint, for example), immediately stop injection at current port. Clear the epoxy that has leaked onto the deck by placing sand on top of the filled epoxy, mixing the sand with the epoxy to absorb it. Let the sand sit on the epoxy for several minutes and then remove the sand with shovels and put it into a metal waste bucket.
- Monitor the bottom of the deck during the injection process to ensure epoxy resin is not leaking through the deck. Leakage must be abated before injection can continue.
- To verify effective injection, re-sound injected areas by broadcasting sand on the area of interest and hammer tapping. An unfilled area will sound hollow. Areas with voids will experience appreciable bouncing of the sand particles. Filled areas will sound solid and experience less movement of the sand particles. A video of the re-sounding procedure can be found here: https://web.microsoftstream.com/video/762a56c2-ac47-4f85-aa8c-013b4cedae7d.
- Clean any area where epoxy has leaked onto the deck using sand with the method described above
- Move to another marked delaminated/debonded region to repeat the process.
- Cut off part of the ports extension beyond the crimps upon completion of the epoxy injection.
- Cut off all ports at the surface of the bridge deck and make sure that all sand has been removed from the bridge deck by shoveling or sweeping.
- Perform equipment clean-up steps listed below
- Bridge can be opened to traffic approximately one hour after the epoxy injection process is completed
- Remove all traffic control signs or devices

**Equipment Clean Up**

- Disconnect pump hoses from mixer and drain excess epoxy from the hoses into a bucket
  - Leave thin tubing leading to nozzles attached to mixer
  - Pour sand into waste epoxy bucket to cool down hot epoxy
- It is very important to clean all hoses and the tempest mixing block that held any mixed epoxy resin after the epoxy injection is completed for the day. This process is easily done using the pressurized purge assembly that accompanies the tempest mixing block. Once pressurized, a solution of acetone is passed through the mixer thereby removing any epoxy remnants. Hand tools and short hoses can be placed directly into the purge assembly for cleaning before storage. A video of this process can be viewed here: https://web.microsoftstream.com/video/84fc7191-6d5c-4e48-a8fa-a83628a816d0.
- Neatly wind up A and B side hoses, and all extension cords and hang them on the hooks on the walls of the epoxy trailer.
- Place generator, shop vac, and air compressor back in trailer and strap down.
- The procedures for cleaning and storing the epoxy injection trailer equipment at the end of the season or before a long period of inactivity (3-4 weeks) are outlined in a video at the following link: https://web.microsoftstream.com/video/038dfe47-1996-4e42-9e6c-acc6d6223845.

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Other Bridge Maintenance | CODE | 2490 |
|---|---|---|---|

**Purpose**

Complete other bridge maintenance or repair that is not identified with a separate activity.

**Category** Bridge

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule this work throughout the year as needed. Observe weather and temperature limitations for individual activities.

| Reporting | | Asset to Report to | Bridge Structures | Reporting Units | Person Hours |
|---|---|---|---|---|---|

- Accomplishment is the total person hours worked.
- Report to the specific bridge asset each time this activity is performed.
- For additional work order reporting guidance see the Work Orders section of the Preface.

| Crew Size | Workers | QTY |
|---|---|---|
| **Crew size determined by sub-activity being performed** | | |

**P.P.E.**

**PPE determined by sub-activity to which will be performed**

**Materials**

Materials determined by sub-activity to which will be performed

| Job Specific Equipment | QTY |
|---|---|
| **Job specific equipment determined by sub-activity being performed** | |

**Other References**

Silica Exposure Plan (WPS Preface)

**Sub Activities**

830 – Scour repair (Rip Rap placement)

832 – Bearing Assembly / Bridge Seat repair

(bearing lubrication, reset bearings, mudwall repair,

Seal abutment)

833 - Channel maintenance (log jam removal, debris removal, etc.)

834 - Graffiti Removal

835 – Joint replacement

836 – Repair joint material

837 – Repair of slopewall

838 - Repair to drainage component (curb and gutter, drains, drain extensions)

839 -Repair to traffic safety component (handrail, sidewalk, guardrail attachments, bridge barrier)

840 – Replacing riprap

940 – Bridge Approach Repair

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Other Bridge Maintenance | CODE | 2490 |
|---|---|---|---|

**Work Method**

**Work method determined by sub-activity to which will be performed:**

830 – Scour repair (Riprap placement)

832 – Bearing Assembly / Bridge Seat repair (bearing lubrication, reset bearings, mudwall repair, seal abutment)

833 – Channel maintenance (log jam removal, debris removal, etc.)

834 – Graffiti Removal

835 – Joint REPLACEMENT

836 – Repair joint material

837 – Repair of slopewall

838 – Repair to drainage component (curb and gutter, drains, drain extensions)

839 – Repair to traffic safety component (handrail, sidewalk, guardrail attachments, bridge barrier)

840 – Replacing riprap

940 – Bridge Approach Repair

**Silicosis Awareness**

All efforts should be made to eliminate/reduce the generation of dust while performing this activity. Depending on the specific work, this activity may involve sawing, drilling, sand blasting, or mixing concrete or grout.

If the generation of dust cannot be eliminated through use of water or other controls, then workers involved in the specific dust generating activity, or within 20’ must wear an approved facepiece respirator that they are fit tested to wear.

**Special Considerations**

- Obtain necessary right-of-entry if insufficient right-of-way exists.
- Ensure appropriate hydraulic and environmental approvals have been obtained prior to the activity field work.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Noise Wall Repair | CODE | 2510 |
|---|---|---|---|

**Purpose**

To maintain or restore proper functioning of noise wall. Includes graffiti removal, greasing hinges on doors, minor patching, and panel or beam replacement.

**Category** Right-of-Way

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule work as required throughout the year. Damage that is hazardous to traffic should be repaired as soon as possible.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Work is reported in person hours. Note specific work being performed in the comment section.

This activity does NOT include repair to concrete barrier wall - report this type work to Activity 2590.

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** **2-3 Workers**

| | QTY |
|---|---|
| Laborers | 2-3 |

*Traffic Control Personnel are NOT shown here

**P.P.E.**

1. Base PPE
2. Eye Protection
3. Hearing Protection
4. Gloves

**Materials**

Dependent upon specific work being performed

**Job Specific Equipment**

Dependent upon specific work being performed.

**Other References**

INDOT RSP 620-R-483 “Sound Barrier System”

**Sub Activities**

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Noise Wall Repair | CODE | 2510 |
|---|---|---|---|

## Work Method

1. Set up appropriate traffic control
2. Clean up any debris
3. Perform work as required
4. Properly dispose of debris
5. Remove traffic control

## Special Considerations

Noise wall panels are fragile. Spare/replacement panels must be stored in an upright/vertical position.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Cable Barrier Repair | CODE | 2530 |
|---|---|---|---|

**Purpose**

To restore safe driving conditions due to accident damage, vandalism, or normal deterioration. Includes repair, realignment, removal, replacement, or retensioning of cable barrier posts and components.

**Category** Safety Devices

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule this work as required throughout the year. Damage will typically be higher in the winter months as barrier is hit due to vehicle slide-offs.

Damage should be repaired as soon as possible. Damaged posts or anchors will not allow the system to perform properly.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Linear Feet |
|---|---|---|---|---|---|

Accomplishment is reported as the linear feet of cable between consecutive damaged posts. Cable retensioning only, such as if emergency responders have released an anchor, has 0 accomplishment. Note specific work performed in the comments.

Ensure accurate reporting of labor, materials, and equipment for Damage to State Property reimbursement.

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** 2-3 Workers

| | QTY |
|---|---|
| Laborer | 2-3 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

Cable spacer bar
Cable barrier repair hydraulic winch
Cable barrier hydraulic post puller
Cable barrier sheared post puller
Cable rail spreader (Brifen only)
Impact driver
Dump truck
Cable tension meter

*Traffic Control Equipment is NOT shown here

**P.P.E.**

1. Base PPE

**Materials**

Cable Barrier Posts (note specific system)
Mounting hardware (note specific system)
Cable

**Other References**

INDOT RSP 627-R-546

System specific plans (available at the Subdistrict or District Construction)

**Sub Activities**

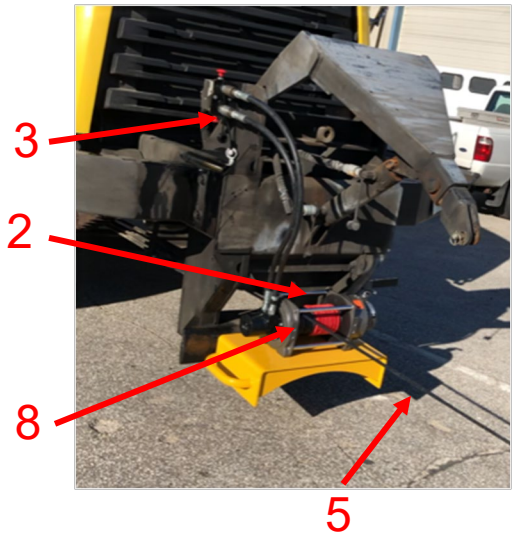
| Average Daily Production | 400 - 500 Linear Feet | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Cable Barrier Repair | CODE | 2530 |
|---|---|---|---|

**Specialty Tools**

Cable Barrier Repair Hydraulic Winch:

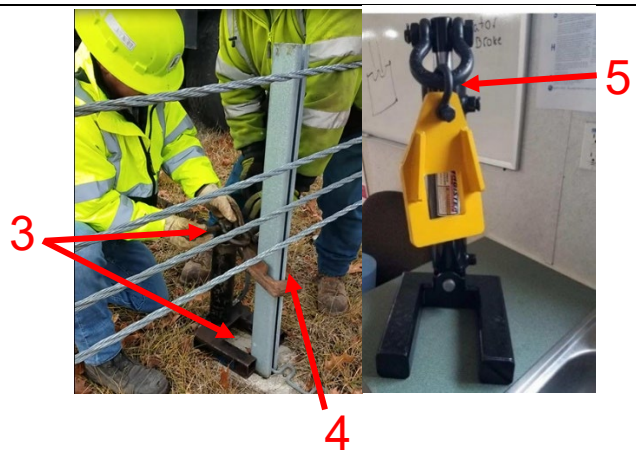
1. Attach winch and winch mount into snowplow hitch of dump truck. The winch must be attached to a Freightliner dump truck with round style plow retaining pin.
2. Close plow retaining pin. See Arrow #2.
3. Attach hydraulic lines from winch to hydraulic remotes on front of dump truck as you would attach snowplow. See Arrow #3.
4. Be sure all winch connections are properly secured.
5. Winch rope should be in straight alignment or as near as possible with cable being tensioned. See Arrow #5. The winch rope in the photo is in straight alignment.
6. Apply sufficient tension to achieve tension requirements denoted in Tension Charts below.
7. Do not stand near rope while in use.
8. Respool winch rope onto drum with adequate tension. See Arrow #8.




Cable Barrier Hydraulic Post Puller:

1. Attach hydraulic lines from the hydraulic cable barrier post puller to hydraulic remotes on front of dump truck as you would attach snowplow.
2. Feet of hydraulic cable barrier post puller should be positioned on each side of post to be pulled and ram should be detracted prior to use. See Arrow #3.
3. Slide square over post. See Arrow #4
4. Attach clevis hooks from square to cylinder. See Arrow #5 for location of the clevis hooks.
5. Actuate plow left and/or plow right joystick to raise and lower cylinder which pulls stuck post from the ground.

Note: The cable barrier hydraulic post puller device is only needed to remove stuck or frozen posts.



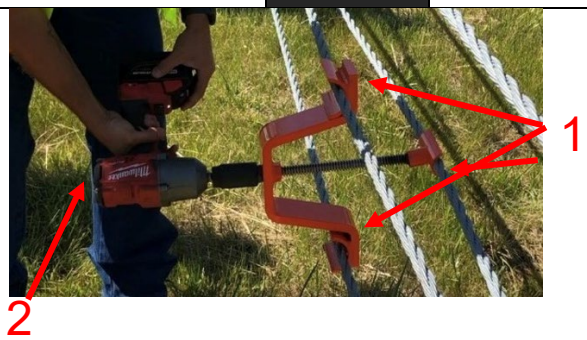

Cable Barrier Sheared Post Puller:

1. Place teeth of jaw into the corners of sheared post. See Arrow #1.
2. Post may be pulled by hand or attach hook to upper plow lift arm to pull sheared post out.

| ACTIVITY | Cable Barrier Repair | CODE | 2530 |
|---|---|---|---|

Cable Rail Spreader (Brifen only) with electric impact driver:

1. Separate bottom three cables into cups of spreader. See Arrow #1.
2. Use electric impact driver to advance the pin attached to the middle cable. This will separate the cables. See Arrow #2.
3. Slide new post between cables.
4. Reverse the impact driver to release the pin and cup from the center cable. The 3 cables can then be removed from the cups of the spreader device.



| ACTIVITY | Cable Barrier Repair | CODE | 2530 |
|---|---|---|---|

**Work Method**

Follow manufactures install and repair instructions. Below is a general guide for the repairs.

1. Place signs and other safety devices.
2. Check for damaged parts. There may be damaged parts beyond the immediate impact area.
3. Remove all debris and damaged parts.
4. If a cable is broken, cut frayed / damaged sections from the ends and splice in a new section using a turnbuckle.
5. If foundations are damaged or misaligned, they will need to be replaced.
6. Install new posts in existing sleeves.
7. Install cable onto posts with appropriate hardware for the system.
8. Check cable tension with tension meter at nearest turnbuckle. Adjust turnbuckle until tension is correct based on vendors tension chart. If the impact occurs greater than 300' away from a turnbuckle, check the tension at the nearest turnbuckle in both directions. Note: tension requirements are temperature dependent.
9. Ensure a yellow reflective sheeting delineator is placed on the traffic side of every fourth post.
10. Clean up debris and work area.
11. Remove sign and safety devices.

Below are the possible cable barriers used along with the unit specific tension chart and where to find the product manuals.

**Presentations from Gibraltar, Gregory, and Nucor may be found at**
https://ingov.sharepoint.com/sites/INDOTIntranet/SitePages/Training-Videos.aspx

**Gibraltar**:
https://gibraltarglobal.com/products/tl-4-four-cable/

https://gibraltarglobal.com/nchrp-350-installation-and-maintenance/

https://gibraltarglobal.com/videos/

The Gibraltar system has a square shaped post, with all the cables attached to one side.

| Gibraltar Tension Chart | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Degree F | -10 | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 |
| Tension (lbs) | 8000 | 7600 | 7200 | 6800 | 6400 | 6000 | 5600 | 5200 | 4800 | 4400 | 4000 | 3600 | 3200 |

| ACTIVITY | Cable Barrier Repair | CODE | 2530 |
|---|---|---|---|

**Gregory SaFence TL 4 Four Cable**:
https://www.gregorycorp.com/highway_safence.cfm

Other manuals and videos for SaFence are also located at:
Y:\Div.Highway Operations\Performance Standards\Activity 2530 SaFence

The Safefence has a "C" shaped post, with all 4 cables running through a slot in the center and blue inserts.

| Gregory SaFence Tension Chart | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Degree F | -40 | -22 | -4 | 14 | 32 | 50 | 68 | 86 | 104 |
| Tension (lbs) | 4700 | 4300 | 3800 | 3400 | 3000 | 2500 | 2100 | 1700 | 1200 |

**Brifen**:

http://www.brifenusa.com/files/brifen_wrsf.html

The Brifen cable system is easily identified by it's "Z" shaped posts, and the weaving of the cables between posts (front to back to front etc).

Brifen does not post a manual online. The manual may be found here:

Y:\Div.Highway Operations\Performance Standards\Activity 2530 - Brifen Installation Manual.pdf

| Brifen Tension Chart | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Degree F | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 |
| Tension (lbs) | 5700 | 5400 | 5100 | 4800 | 4500 | 4200 | 3900 | 3600 | 3300 | 3000 | 2700 | 2400 |

| ACTIVITY | Cable Barrier Repair | CODE | 2530 |
|---|---|---|---|

**Valtir (formerly Trinity) CASS TL-4**:

https://www.valtir.com/product/cass-tl4/

I shaped posts with cables running through slots in the middle of the post.

| Valtir CASS Tension Chart | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Degree F | -10 | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 |
| Tension (lbs) | 7300 | 7000 | 6600 | 6300 | 6000 | 5600 | 5300 | 5000 | 4600 | 4300 | 4000 | 3600 | 3300 |

**Nucor Nu-Cable TL-4** (no longer on approved list for new installations):

http://www.nucorhighway.com/cable-barrier-products/nu-cable-high-tension/

The Nu-Cable system consists of a U channel post, with the cables attached 2 on each side.

| Nucor Tension Chart | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Degree F | -10 | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 |
| Tension (lbs) | 10654 | 10022 | 9391 | 8759 | 8127 | 7495 | 6864 | 6232 | 5600 | 5284 | 4968 | 4652 | 4336 |

**Special Considerations**

INDOT maintains an approved list of cable barrier systems. Ensure that the replacement parts match the existing system

**APPROVED BY**

Director, Highway Maintenance

| Average Daily Production | 400 - 500 Linear Feet | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF OPERATIONS SUPPORT

# PERFORMANCE STANDARD

| ACTIVITY | Impact Attenuator/Guardrail End Treatment/Gravel Barrel Repair | CODE | 2550 |
|---|---|---|---|

**Purpose**

To restore safe driving conditions due to accident damage, vandalism, or normal deterioration of the unit. Includes repair, realignment, removal, replacement, or installation of a new unit.

Impact attenuators/guardrail end treatments/gravel barrels behind cable barrier or guardrail are to be maintained in good condition. They are considered secondary protection of obstacles.

**Category** Safety Device

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule this work as required throughout the year. Damage that is hazardous to traffic should be repaired within 48 hours.

| Reporting | | Asset to Report to | Attenuator | Reporting Units | Units |
|---|---|---|---|---|---|

Accomplishment is the number of units repaired. Report the specific unit to the appropriate sub activity. If a new unit is replacing the damaged one, report the sub activity as the new unit. If the new end treatment requires a height transition on the guardrail, that work will be captured in this activity.

Report accomplishment to the attenuator, end treatment, or gravel barrel inventory asset. If the asset is not in the WMS inventory, report to pavement key.

If an attenuator/end treatment is being removed only, and not replaced or repaired, report as an accomplishment with detailed notes in the comments section as to why the unit is not being replaced.

Report routine inspections to Activity 2551

Report guardrail repair to Activity 2580

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** 2-3 Workers

| | QTY |
|---|---|
| Laborers | 2-3 |

At least one crewmember shall be certified on the unit being repaired. Certified installers can be found at https://www.in.gov/indot/doing-business-with-indot/contractorsconstruction/training-and-certifications/

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

Trailer

*Traffic Control Equipment is NOT shown here

**P.P.E.**

Base PPE

**Materials**

Attenuator replacement parts
Guardrail End Treatment replacement parts
Gravel barrel fill material (coarse aggregate size 93PG, Class F or higher)

**Other References**

INDOT Standard Specification section 601
INDOT Standard Specifications section 904.03 (a)
Indiana Design Manual Chapter 49-8.0
Operating Procedure 6
System specific plans and manuals

**Sub Activities**

| | | |
|---|---|---|
| 50 - QUADGUARD (350 Atten) | 58 - TRACC (350 Atten) | 55 - Barrel Array (Atten) |
| 562 – QUADGUARD M10 (MASH Atten) | 559 - SCI 100 GM (MASH Atten) | 69 – REACT(350 Atten) |
| 53 - ET 2000/ET Plus (350 GR End) | 564 – SoftStop (MASH GR End) | 561 - TAU II (350 Atten) |
| 159 - SKT 350 (350 GR End) | 52 - CAT (350 GR End) | |
| 563 – MSKT (MASH GR End) | 158 - Other Unit (specify in comments) | |

| Average Daily Production | 2 Units | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Impact Attenuator/Guardrail End Treatment/Gravel Barrel Repair | CODE | 2550 |
|---|---|---|---|

**Work Method**

Safety standards as of June 2018 require the MASH compliant devices be used for new installs. Minor repairs (above-ground work) on existing end treatments and attenuators are allowed, similar to repairing other obsolete treatments like the Sentre or GREAT Attenuator.

Where an existing end treatment is damaged beyond repair, a new MASH-compliant end treatment shall be used. If the existing guardrail run is w-beam guardrail with a rail height less than 31", an MGS height transition should be used upstream of the new MASH end treatment.

Note that a MASH-compliant end treatment has a rail height of 31". Most existing end treatments will have a rail height of 27 ¾", so a guardrail height transition will be required.

1. Place signs and safety devices
2. Clean up and remove all debris and accident damage
3. Inspect for damaged parts - note there may be damaged parts away from the actual impact area
4. Remove all damaged parts
5. Reset the unit per manufacturer's recommendations
6. Replace all damaged parts
7. Check that all gravel barrels are filled to the level indicated in the Standard Drawings. Add coarse aggregate fill material (size 93PG, Class F or higher) to barrels as necessary.
8. Ensure that gravel barrel lids are properly installed to eliminate water infiltrating and freezing of gravel. If lids are missing install new lids.
9. Inspect unit to ensure proper installation
10. Place appropriate delineation markings on nose
11. Remove all tools and debris
12. Remove signs and other safety devices

Links to manufacturers' product manuals and information for attenuators and guardrail end treatments are listed in the table below:

| Unit | Manufacturer Website |
|---|---|
| ET Plus, SoftStop, CAT, Tracc | https://www.valtir.com/product-category/end-terminals/ |
| REACT, QuadGuard | https://www.valtir.com/product-category/crash-cushions/ |
| SKT, MSKT | https://roadsystems.com/ |
| SCI | https://hillandsmith.com/products/smart-cushion/ |
| TAU | https://www.lindsay.com/usca/en/infrastructure/brands/barrier-systems/solutions/crash-cushions/tau/ |

Links to manufacturers' product manuals and information for gravel barrels are listed in the table below. Refer to the linked files for information on identifying types of gravel barrel units and for drawings of manufacturer recommended arrangements of barrels, weights, and insert cones for the listed types of barrel arrays.

| Unit | Manufacturer Website |
|---|---|
| CrashGard | https://pss-innovations.com/PSS_Innovations/media/PSS-Innovations/Products/Resources/Crashgard-12-27-2018-Update.pdf |
| Traffix | https://www.traffixdevices.com/docs/attenuators/big-sandy/traffix-big-sandy_manual_rev-a1.pdf |
| Energite | https://www.valtir.com/wp-content/uploads/2022/10/Energite-III-627702.pdf |

## Special Considerations

Guardrail end treatments or impact attenuators should typically not be removed unless a designer has reviewed the location and determined the unit is no longer necessary.

Ensure all bolts are torqued to manufacturer's recommendations.

Repair or installation shall be conducted under supervision of a person certified by the manufacturer for the unit being worked on.

INDOT maintains an approved list of impact attenuators and guardrail end treatments. Ensure that the replacement parts match the existing system. INDOT has repair parts QPA's for each unit which list the specific parts.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| **Average Daily Production** | **2 Units** | **EFFECTIVE DATE** | **7/12/2023** |

**Guardrail End Treatments, Impact Attenuators and Cable Barrier Systems Guide**

This guide is divided into 3 sections. It shows all Impact attenuators and guardrail end treatments (GRET) that exist on state highways. It will be grouped as follows:

- MASH Compliant
- NCHRP 350 Compliant
- NCHRP 230 Compliant
- Not crash tested

**<u>MASH Compliant</u>**

SoftStop:

MSKT:

Note that the MSKT is virtually identical to the SKT 350 shown under NCHRP 350 compliant end treatments, except that the impact head is solid and is stamped “SKT”.

**<u>NCHRP 350 Compliant Guardrail End Treatments</u>**

Guardrail end treatments (GRET) are always installed at the ends of guardrail runs.

Outside shoulder (OS) GRET’s will almost always be installed where there is no traffic on the other side. The ET Plus can be distinguished from the SKT 350 by its impact head being rectangular, whereas the SKT 350 is square. Older versions of the ET Plus, the ET 2000, look very similar to the SKT 350 below.


The original version of the ET Plus was the ET 2000. It was redesigned over 10 years ago into the ET Plus above. From the video log, it would be nearly impossible to differentiate an ET 2000 from an SKT 350, with the exception of the original ET 2000’s installed in the mid 1990’s. Instead of the yellow/black cross hatching, the impact head had 2 rubber pads as shown below.


Median Shoulder (MS) GRET's are installed where there is traffic on both sides. The FLEAT MT will always be in those situations. There are many CAT's that were originally installed as OS, or areas with traffic on only one side. The FLEAT MT is easily differentiated with the CAT as the FLEAT MT has a double impact head.


**NCHRP 350 Compliant Impact Attenuators**

Impact attenuators are installed at the ends of concrete barrier wall, bridge piers, sign supports, or overhead structure foundations. They are much larger than GRET's.




The QUADGUARD, TAU II, TRACC, and SCI 100 GM all look similar at first glance. The TRACC and SCI 100 GM can be easily separated from the others as have quad beam panels and no energy absorbing cartridges (the bays are empty). The TRACC has a rounded nose piece and rounded quad beam panels, whereas the SCI 100 GM has a blunt nose and square quad beam panels.

The TAU II can be distinguished from the QUADGUARD as the TAU II has thrie beam panels and capsule shaped cartridges, whereas the QUADGUARD has quad beam panels and cubical cartridges.



There may only be a few ADIEM's left in Indiana.

**<u>NCHRP 230 Compliant Guardrail End Treatments</u>**


Both the SENTRE and the BRAKEMASTER are very rare in Indiana now.

**NCHRP 230 Compliant Impact Attenuators**


GREAT's are still very common in Indiana. They look similar to both the QUADGUARD and the TAU II. They can be distinguished in that they have thrie beam panels, whereas the QUADGUARD has quad beam panels, and cubical cartridges, whereas the TAU II's are capsule shaped .

**Non-Crash Tested Guardrail End Treatments (These units DO NOT require inspections):**

**Breakaway Cable Terminal**

**Buried End (Type I)**

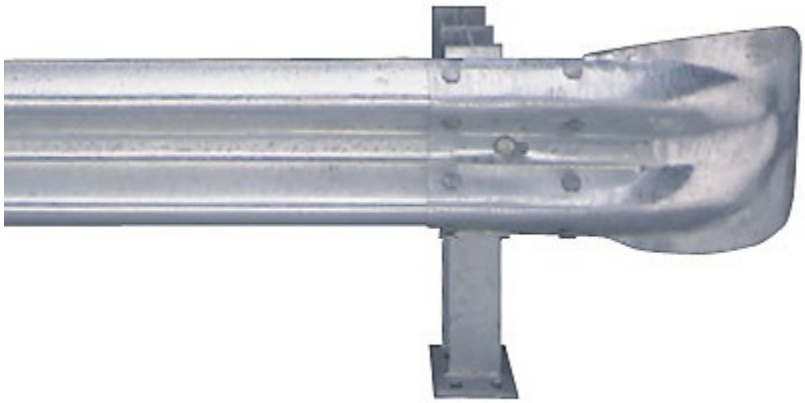
**Buried End (Type II)**

The difference between a Type 1 and Type II buried end is a Type 1 angles down into the ground.  A Type II flares back and is buried into the backslope.  A Type II does not turn down.

**Turn Down**

A turn down is similar to a Type I buried end, except that the W beam rail itself twists around and is flat where it meets the ground.

**No Terminal**



INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Impact Attenuator/Guardrail End Treatment/Gravel Barrel Inspection | CODE | 2551 |
|---|---|---|---|

**Purpose**

To ensure proper function of units after new installation or routine walk-up inspection to monitor for damage or deterioration. Ensure unit is installed per manufacturer's requirements, components are in working condition, bolts are properly torqued, there is no damage, and check for age-related deterioration.

**Category** Safety Device

- ☒ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule throughout the year per the frequency in the work method, or when called upon by Construction to inspect a contract installation.

All attenuators and guardrail end treatments should have drive-by inspections performed to look for evidence of impact damage as part of the foreman's routine road patrols

| Reporting | Asset to Report to | Pavement Keys | Reporting Units | Units |
|---|---|---|---|---|

Accomplishment is the number of units inspected during a walk-up inspection.

Report accomplishment to the attenuator, end treatment, or gravel barrel inventory asset and note any needed repairs in the comments section. If the asset is not in the WMS inventory, report to pavement key. Create a work request for Activity 2550 for any needed repairs identified.

Inventory information entered into the Guardrail and Countermeasures ArcGIS map will be imported into WMS through an automated process.

Major repair of units is reported to Activity 2550.

Routine drive-by inspections are not reported to this activity.

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** 2 Workers

| | QTY |
|---|---|
| Laborer | 2 |

**P.P.E.**

Base PPE

**Materials**

**Job Specific Equipment**

Shovel

Sockets/Wrench

**Other References**

INDOT Spec 601

Indiana Design Manual Chapter 49-8.0

System specific plans and manuals

Attachment - How to Identify ET Plus and SKT 350

**Sub Activities**

| Average Daily Production | 15 - 25 Units | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Impact Attenuator/Guardrail End Treatment/Gravel Barrel Inspection | CODE | 2551 |
|---|---|---|---|

## Work Method

1. Follow appropriate safety precautions
2. Inspection must be conducted hands on, not from a vehicle.
3. Refer to inventory information on the Guardrail and Countermeasures ArcGIS map for impact attenuators/end treatments/gravel barrels to be inspected
4. Visually inspect unit per the schedule below
5. Enter inspection/inventory data into the Guardrail and Countermeasures ArcGIS map
6. Verify inventory accuracy and record any inventory modifications on the Guardrail and Countermeasures ArcGIS map
7. Clean debris from around the unit.

Any needed repairs identified during inspection will need to be corrected with either in-house forces or contract. A work request for such repairs should be created for Activity 2550.

| System | Hands-On Inspection Frequency | What to Look For |
|---|---|---|
| Guardrail End Treatments | 4 Years | Cable taught, bracket properly engaged, nuts tight |
| | | Blockouts and posts not deteriorated or damaged |
| | | Rail panels not deteriorated or damaged |
| | | All bolts and nuts snug |
| | | Ground under and in front of unit free of debris |
| | | Delineation Panel present, visible, no deterioration |
| | | Ensure extruder head is properly attached to rail |
| | | Ensure extruder head is correct type for the assembly (see attachment) |
| Gravel Barrels | 4 Years | Barrels show no signs of cracks |
| | | All lids locked down |
| | | Ground under and in front of unit free of debris |
| Impact Attenuators | 1 Year | Cables taught, not sagging |
| | | Diaphragms and bays all straight |
| | | All rail panels tight, not deteriorated or damaged |
| | | Cartridges/Rip Plates not deteriorated or damaged |
| | | Cylinders show no signs of cracks |
| | | All bolts and nuts snug |
| | | No misaligned parts |
| | | Ground under and in front of unit free of debris |
| | | Delineation Panel present, visible, no deterioration |

## Special Considerations

For inspecting contract new installations or repairs, the inspector shall be certified on the unit being inspected.

Minor repairs, such as tightening bolts, may be done during inspection.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 15 - 25 Units | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# GUARDRAIL END TREATMENT I.D.

## ACTIVITY 2551 – November 18, 2016

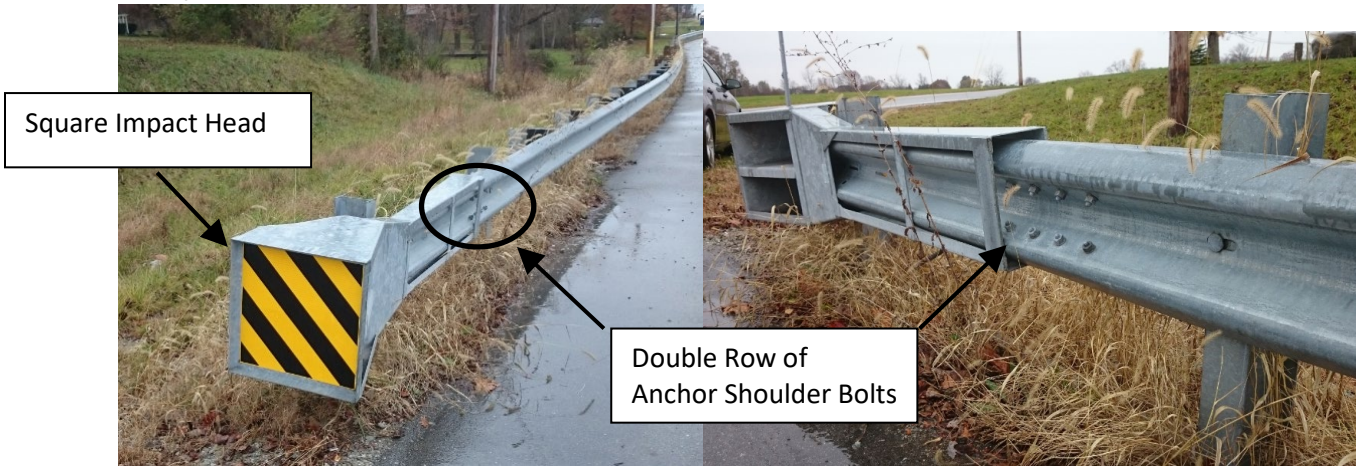
General:

The ET Plus (Trinity) and SKT 350 (Road Systems) are energy absorbing guardrail end treatments. They both absorb energy by extruding W-Beam guardrail through their impact heads. The impact heads should not be interchanged between systems, meaning an SKT head should not be put on an ET assembly.

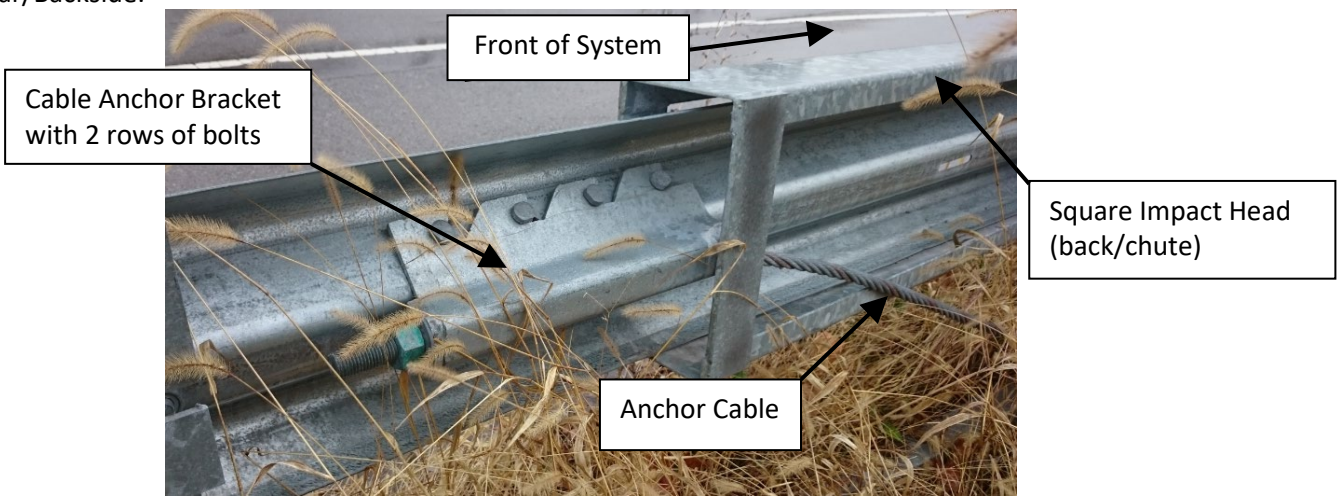
To ensure the correct head is on the correct assembly, the following instructions will help easily distinguish between the two.

## SKT 350:

**Front/Traffic Side:**




Rear/Backside:




SKT 350 Features:

- Square Impact Head
- Cable Anchor Bracket has two horizontal rows of shoulder bolts

# ET Plus:

**Front/Traffic Side:**


Rear/Backside:


ET Plus Features:

- Rectangular Impact Head
- Cable Anchor Bracket has one horizontal row of slots

If either of these scenarios exist, the unit is potentially mismatched.

1. A rectangular impact head with 2 rows of anchor bolts
2. A square impact head with a single row of anchor slots

**If either case is observed, notify supervisor immediately. Unit should be scheduled to have the correct head installed as soon as possible.**

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Raised Pavement Marker Maintenance | CODE | 2560 |
|---|---|---|---|

**Purpose**

To inspect RPM castings to ensure they are in good condition, maintaining reflectivity, and not loose or damaged in the pavement. Loose RPM's can create a safety hazard if they come out under traffic. This activity includes replacing any RPM's or reflectors, and the visual nighttime inspection of RPMs to evaluate their reflectivity.

**Category** Safety Devices

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Roads with RPM's should be inspected when traffic control is in place for another activity. RPMs inspected during performance of another activity is still reported to Activity 2560.

RPM nighttime visual inspection should be scheduled once a year and should be performed when there is no snow, ice, or moisture present.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | RPM Miles |
|---|---|---|---|---|---|

Accomplishment is the number of continuous miles where RPMs were inspected.

Protecting/cleaning RPMs as part of a chip seal or fog seal should NOT be reported to this activity. Report to Activity 2050 or 2051.

The attached RPM inspection report should be used to record deficiencies.

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** 1-2 Workers

| | QTY |
|---|---|
| Laborer | 1-2 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

*Traffic Control Equipment is NOT shown here

**P.P.E.**

Base PPE

**Materials**

Patching material

RPM reflectors

**Other References**

**Sub Activities**

| Average Daily Production | 10 RPM Miles | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Raised Pavement Marker Maintenance | CODE | 2560 |
|---|---|---|---|

**Work Method**

For RPM Casting Inspection:

1. Place signs and safety devices
2. Manually check all RPM castings to ensure they are tight and secure in the pavement
3. Remove loose RPM castings
4. Record missing or removed reflectors
4. Patch holes left by removed or missing castings
5. Remove signs and safety devices

Properly dispose of all removed castings.

For RPM Reflectivity Inspection:

1. Drive roads with RPMs at night in dry weather.
2. Note how far reflectors are visible. Note number of missing reflectors.
3. Note condition on attached form.

**Note:** A copy of the report generated from the inspection of RPMs should be provided to your district's Technical Services traffic group.

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 10 RPM Miles | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# RPM Inspection Report

## Activity 2560

| Subdistrict/Unit | RPM Inspection Report | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Contract Number | Road | From: (reference marker) | To: (reference marker) | RPM deficiency categories 1 | 2 | 3 | 4 | Date |
| | | | | | | | | |
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Legend: 1- # of castings missing 2 - # of castings removed 3 - # of lenses to be replaced 4 - # other

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Guardrail Maintenance | CODE | 2580 |
|---|---|---|---|

**Purpose**

To restore safe driving conditions due to accident damage, vandalism, or normal deterioration of guardrail and its components. Includes repair, realignment, removal or replacement of guardrail sections, posts and hardware.

**Category** Safety Device

- ☐ PM
- ☐ QA
- ☐ Plan Location

**Scheduling & Coordination**

Schedule this work throughout the year.
Damage that is hazardous to traffic should be repaired as soon as possible.

| Reporting | | Asset to Report to | Guardrail | Reporting Units | Linear Feet |
|---|---|---|---|---|---|

Accomplishment is linear feet of guardrail repaired. Breakaway cable terminals or blunt end repair are reported in linear feet to this activity.

Report accomplishment to the guardrail asset. If the asset is not in the WMS inventory, report to Pavement Key.

Damaged buried ends shall be replaced with end treatments.

Repair of energy absorbing guardrail end treatments should be reported to Activity 2550.

Ensure accurate reporting of labor, materials, and equipment for Damage to State Property reimbursement.

If guardrail is being removed only, and not replaced or repaired, report the linear feet removed to Subactivity 531.

For additional work order reporting guidance see the Work Orders section of the Preface

**Crew Size** 4 - 6 Workers

| | QTY |
|---|---|
| Laborer | 4-6 |

*Traffic Control Personnel are NOT shown here

**P.P.E.**

Base PPE

**Materials**

Guardrail Panels - INDOT Spec Section 910
Guardrail Posts/Blocks - INDOT Spec Section 911

**Job Specific Equipment**

Trailer
Post Driver
Backhoe/Loader

*Traffic Control Equipment is NOT shown here

**Other References**

INDOT Spec and Standard Drawings 601
Indiana Design Manual Chapter 49-4.0 and 5.0
Operating Procedure 5

**Sub Activities**

531 - Guardrail Removal Only

| Average Daily Production | 60 Linear Feet | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Guardrail Maintenance | CODE | 2580 |
|---|---|---|---|

**Work Method**

Safety standards as of 12/31/17 require the Midwest Guardrail System (MGS), which is MASH compliant. While the MGS may always be used, often the existing guardrail may be replaced in kind. Below is guidance for determining what must be replaced. More details about MASH Implementation for Guardrail can be viewed at the following link: MASH Implementation Information

When 50% or more of a run is damaged, the entire run should be updated to current standards.

When the length of damage is 200' or more, the repaired section shall be updated to current standards and transitioned to the existing guardrail with an MGS height transition.

When the length of damage is less than 200', the damaged run may be replaced in-kind.

A height transition may still be needed if existing guardrail is updated to current standard and an existing end treatment will remain. The MGS height transition should be used between the new MGS w-beam guardrail and an existing 27 ¾" end treatment.

A MGS height transition is 37'-6"- in length. The rail height is transitioned over 25' and the splice location is transitioned over the remaining 12'-6".

1. Move any debris to the shoulder that may be a hazard to traffic.
2. If repair will not be imminent and there is a safety hazard, place temporary warning devices such as barrels or cones.
3. Assess the damage and the extent of the repair. Determine if damage will require update to MGS.
4. Place signs and safety devices for work crew
5. Remove all debris and damaged parts
6. Reset, or replace any misaligned or damaged posts. Install transitions if switching to MGS.
7. Install new rail
8. Clean up work area
9. Regrade and reseed as necessary
10. Remove signs and safety devices

**Special Considerations**

Guardrail should typically not be removed unless a designer has reviewed the location and determined it is no longer necessary.

Even though MGS specifies 6' posts, the 7' posts from the existing w-beam system may remain or be salvaged and reused.

The MGS w-beam guardrail uses 8" blockouts; however, blockouts up to 16" may be used.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 60 Linear Feet | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Other Safety Device Maintenance | CODE | 2590 |
|---|---|---|---|

**Purpose**

This activity captures work not specific to other activities relating to safety device maintenance and repair. Includes work such as barrier wall repair or other safety devices not covered under another specific activity.

Traffic control for specific activities should be reported to those activities.

Where INDOT provides only traffic control, it should be reported to Activity 2790 or Activity 2791.

**Category** Safety Devices

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule and perform this work throughout the year as needed.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Accomplishment is the total person hours worked.

This activity is NOT for reporting traffic control. Traffic control as part of another maintenance or traffic activity should be reported to that activity. INDOT provided traffic control in support of non-INDOT work should be reported to Activity 2790. INDOT provided traffic control in support of other non-maintenance or traffic INDOT work should be reported to Activity 2791.

Marking of control points or layouts for striping or special markings should be reported to those activities.

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size**

**Workers** **QTY**

Determined by the specific work activity to be performed

**P.P.E.**

Determined by the specific work activity to be performed

**Materials**

Determined by the specific work activity to be performed

**Job Specific Equipment**

Determined by the specific work activity to be performed

**Other References**

**Sub Activities**

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Other Safety Device Maintenance | CODE | 2590 |
|---|---|---|---|

**Work Method**

Determined by the specific work activity to be performed

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Emergency Maintenance | CODE | 2610 |
|---|---|---|---|

**Purpose**

This activity is for the response to any situation to immediately restore safety or clear debris to keep roads traversable.

This activity includes the response to emergency conditions that are a result of damage caused by storms, flooding, slides and fallen rocks, pavement settlements, large objects on the road, damage to structures and safety devices such as guardrail and signs, as well as isolated surface defects.

**Category** Emergency Response

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

This activity is the response to damage that is caused from accidents, storms, or any unexpected mishap that can happen at any time throughout the year.

| Reporting | | Asset to Report to | Various* | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Accomplishment is the number of person hours required to restore temporary safe driving conditions or to place the necessary temporary warning devices.

Work performed on bridges, small culverts, or large culverts should be reported to the asset. All other work performed on the mainline or right of way should be reported to the pavement key.

This activity is only for recording the initial response-type work only. Permanent repairs should be recorded to the appropriate work activity.

Traffic control for accidents should be charged to Activity 2790 Other Traffic Control Maintenance.

This activity may be used to report initial clearing/plowing of debris from the roadway to keep the road open. Actual removal of debris from the R/W should be reported to Activity 2611. Storm Debris Removal.

Note: Overtime callout for routine maintenance activities such as painting, sign repair, or drainage maintenance should be charged to the repair activity if permanent repairs are made.

For additional work order reporting guidance see the Work Orders section of the Preface.

*Reporting Options:

- Pavement Keys
- Bridge Structures
- Large Culverts
- Small Culverts

**Crew Size** | **Workers**

QTY

Determined by specific work activity to be performed.

Report actual labor usage for damage to state property claims recovery.

**Job Specific Equipment**

Determined by specific work activity to be performed.

Report actual equipment used for damage to state property claims recovery

**P.P.E.**

Base PPE

**Materials**

Determined by specific work activity to be performed.

Report actual materials usage for damage to state property claims recovery.

**Other References**

**Sub Activities**

| | | |
|---|---|---|
| 722 Damage to an INDOT Structure | 723 Isolated Surface Defects | 724 Roadway Debris Clearing |
| 725 Other Emergency Maintenance | 726 Settlements | 727 Slides and Fallen Rocks |
| 728 Washouts and High Water | | |

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Emergency Maintenance | CODE | 2610 |
|---|---|---|---|

**Work Method**

Respond and restore safe driving conditions for emergencies caused by:

**Subactivity 722 - Damage to an INDOT Structure**

1. Investigate and report all damage of INDOT's assets for claims recovery.
2. Place temporary warning devices to warn motorists such as stop barrels, traffic barrels and signage.
3. If a structure is not passable and a closure is necessary then follow the temporary road closure policy.

**Subactivity 723 - Isolated Surface Defects**

1. Investigate the cause of the surface defect.
2. Temporary signs can be placed or holes patched with an aggregate containing lime.

**Subactivity 724 - Roadway Debris Removal**

1. INDOT may use state equipment to move objects to the shoulder of the road to expedite safe driving conditions

**Subactivity 725 - Other Emergency Maintenance**

1. Investigate and place temporary devices or perform temporary repairs not specified above.

**Subactivity 726 - Settlement**

1. Investigate the cause of the settlement.
2. Place warning signs.
3. Aggregate with lime may be used as a temporary means to level the roadway.
4. If the road is not passable and a closure is necessary then follow the temporary road closure policy.

**Subactivity 727 - Slides and Fallen Rocks**

1. Remove debris from roadway and examine the roadside for stability to determine if further action is needed.
2. If a road is not passable and a closure is necessary then follow the temporary road closure policy.

**Subactivity 728 - Washouts and High Water**

1. For minor flash flooding place high water signs to warn motorist to prevent hydroplaning.
2. For roads that are not passable and a closure is necessary then follow the temporary road closure policy.

NOTE: FEMA reporting: All Natural Disasters should be reported to the appropriate work activity; not 2610. This activity is for initial response (within 48 hours) only to keep roads passable.

**Special Considerations**

This activity is designed for only temporary repairs or action. If permanent repairs are made they should be charged to the appropriate activity.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Storm Debris Removal | CODE | 2611 |
|---|---|---|---|

**Purpose**

This activity is the actual removal from the right of way of debris created from a storm or other disaster. This includes bagging, chipping, loading and hauling debris off site.

**Category** Right-of-Way

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

This activity is the response to damage that is caused from storms or any unexpected disaster that can happen at any time throughout the year.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Cubic Yards |
|---|---|---|---|---|---|

Accomplishment is the number of cubic yards of debris removed from the right of way.

Clearing lanes only by plowing pushing debris to the shoulder reported to Activity 2610, Emergency Maintenance.

For FEMA reimbursement, correct documentation is essential. Report the type of debris being removed to the correct sub-activity. If large quantities of debris is mixed type (some woody, some building, some silt), create a new, separate work order when one type exceeds 13 cubic yards (approximately 1 tandem load).

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** 3 Workers

| | QTY |
|---|---|
| Laborer | 3 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

Front End Loader
Skid Steer Loader
Chipper
Chain Saw
*Traffic Control Equipment is NOT shown here

**P.P.E.**

Base PPE

**Materials**

Trash Bags

**Other References**

**Sub Activities**

3001 – Trees and Woody Debris
3002 – Sand, Mud, Silt and Gravel
3003 – Building Components and Contents

| Average Daily Production | 40-50 Cubic Yards | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Storm Debris Removal | CODE | 2611 |
|---|---|---|---|

## Work Method

**Subactivity 3001 – Trees and Woody Debris**

See Activity 2220 for details on proper procedures for chainsaws and brush chippers.

1. Saw debris into manageable pieces
2. Smaller debris (such as limbs) may be chipped
3. Load and haul to an approved disposal site

**Subactivity 3002 – Sand, Mud, Silt and Gravel**

1. Excavate debris with loader or other equipment
2. Load and haul to an approved disposal site

**Subactivity 3003 – Building Components and Contents**

1. Saw or break debris into manageable pieces
2. Bag or load directly into trucks
3. Load and haul to an approved disposal site

## Special Considerations

Estimated volumes. Note that "vehicle capacities" is only the volume to the level of the bed. Material stacked above this would be additional.

| Vehicle Capacities (to top of bed) | Est. CYS |
|---|---|
| Pickup Bed | 1.3 |
| Crew Cab Bed | 2.4 |
| Tandem Axle Bed | 13.2 |
| Single Axle Bed | 4.1 |
| Trash Bag - 30 Gallon | 0.5 |

APPROVED BY

Director, Highway Maintenance

| Average Daily Production | 40-50 Cubic Yards | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Snow and Ice Removal | CODE | 2630 |
|---|---|---|---|

**Purpose**

To remove snow and ice from the roadway during and after a storm. Includes loading operations of snow required to support snow and ice removal operations, removal of ice caused by flooding, water leaks or other sources of water on the roadway that can become frozen.

This activity includes the application of brine and or other approved de-icers prior to the forecast of inclement weather and/or icing from frost.

This activity includes the use of a designated loader operator for loading trucks.

**Category** Snow & Ice

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Work is performed and scheduled typically between October and April. The scheduling of any snow and ice strategy will require the use of sound judgment, interpretation of available weather data, and prompt action. If an event is expected to have a duration that exceeds 12 hours then the scheduling of shift work for drivers and staff is recommended.

| Reporting | | Asset to Report to | Snow Routes | Reporting Units | Miles |
|---|---|---|---|---|---|

Report Work to the appropriate sub-activity.

Report one work order per driver, per shift. For example, if a shift spans two days (ex. 7 pm to 7 am the following day), one work order should be created. If a driver works two separate shifts on the same calendar day, create one work order for each shift. **TWO DRIVERS CAN BE ON ONE WORK ORDER DURING A SNOW AND ICE EVENT IF ONE OF THE DRIVERS IS BEING TRAINED. A NOTE SHOULD BE ADDED TO THE COMMENTS ON THE WORK ORDER INDICATING THAT A DRIVER WAS BEING TRAINED AND THE NAME OF THE TRAINEE.**

If a driver plows two or more snow routes, all snow routes can be added to the same work order; however, when completing the Accomplishment (Portion) field the correct number of miles have to be shown for each snow route.

**Avoid simply splitting the total number of miles driven among the snow routes.**

If providing traffic control for a driver servicing ramps, include Labor, Equipment, and Miles on the same work order, adding notes in the Comments to justify additional resources.

Reporting units are total miles driven. Loading only has no accomplishment reported.

For this activity, Comments on the work order are not required **unless special or unusual circumstances are encountered,** such as plow or winter materials not used when reporting to Subactivity 42 – Plowing and Spreading Chemicals, accidents, downed mailboxes, equipment breakdowns, providing traffic control for other drivers, driver being trained, etc.

Material that is left on the truck must be subtracted and not reported on the work order.

The plow must be reported on the work order. If no plow is used, then a note is required to be entered into the Comments indicating why the plow was not needed.

Winter materials are expected on the work order. If no materials are used, a note must be entered into the comments indicating why materials were not needed.

Note: For the removal of ice and debris that are frozen on curb drains, inlets, and bridge drains use Activity 2350.

For additional work order reporting guidance see the Work Orders section of the Preface

| Crew Size | 1- 2 Workers | P.P.E. |
|---|---|---|
| | QTY | Base PPE |
| Determined by specific work activity to be performed. | | |

**Job Specific Equipment**

Semi Tractor - Trailer Sprayer
Tandem Snow Plow Truck
Single Axle Snow Plow Truck
Crew Cab Ton Snow Plow Truck
Spreader (Do not show a spreader for a Do-All truck)
Tank/Applicator
Snow Plow
Front End Loader
Tow Plow
Wing Plow

**Materials**

Sodium Chloride (granular)
Sodium Chloride (liquid brine)
Calcium Chloride (liquid)
Calcium Chloride bag pellets or flakes (granular)
Magnesium Chloride (liquid)
Agricultural Based Chlorides (liquid)

**Other References**

OM 08-01 Snow and Ice Policy and the Snow and Ice Control Operating Memorandums

**Sub Activities**

41- Anti-icing
42- Plowing & Spreading Chemicals
43 - Designated Loader Operator

| Average Daily Production | 200 Miles | EFFECTIVE DATE | 2/12/2024 |
|---|---|---|---|

| ACTIVITY | Snow and Ice Removal | CODE | 2630 |
|---|---|---|---|

**Work Method**

Sub Activity 41 - Anti-Icing:

1. To anti-ice you will select the available equipment needed to apply liquid deicers.
2. Load the tank with salt brine. A product used to enhance the brine may also be used as a blend.
3. Specific loading instructions for available materials are required.
4. Chemicals are applied at a rate of 20 to 150 gallons per lane mile at normal posted driving speeds.
5. Specific application rates for forecasted conditions are required as to spot treat or to treat all lanes.

Sub Activity 42 - Plowing & Spreading:

Deicing Work Method

1. To de-ice you will select the available equipment needed to apply liquid or solid deicers.
2. Load the tank, pre-wet tank and or spreader bed with the desired product available.
3. Only one truck is allowed in the loading/unloading area at any one time.
4. No one is permitted in the staging area.
5. Drivers not loading/unloading their own trucks must stay inside the cab until they are no longer in the staging area.
6. Trucks and loaders are to be kept on a level surface.
7. Do not overload trucks.
8. Distribute the loads evenly.
9. Avoid movements that result in striking the truck and or spreader with the loader bucket.
10. Do not get out of the loader with the loader bucket in an elevated position.
11. Never leave a vehicle running unattended.
12. Keep the loader bucket as low as possible at all times.
13. Avoid and cleanup spillage regularly.

14. Specific product instructions are required. Material selection is based on the goal of the intended application, current road conditions, temperatures, and forecasts.
15. Application rates will range from 100 lbs to 500 lbs per lane miles for granular products and 20 gallons to 150 gallons per lane mile for liquid products. Specific application instructions are required.

Plowing Work Method

1. Plowing is intended to remove as much snow and loose ice as possible before applying chemicals.
2. Plowing is the only method that is needed if the pavement is both and cold and dry and the snow is not adhering to the pavement. Specific plowing instructions are required.

Snow Hauling Work Method

1. This is the process of using mechanical equipment to load snow onto trucks to be hauled to a stockpile area to melt. This is done when additional space is required to plow new forecasted snowfall and to prevent refreeze from melted stockpiled snow.
2. Load snow onto trucks.
3. Do not overload.
4. Distribute load evenly.
5. Dump snow at designated site.
6. Only one truck allowed to unload at a time.

| ACTIVITY | Snow and Ice Removal | CODE | 2630 |
|---|---|---|---|

Sub Activity 43 - Designated Loader Operators

Loader Operations Work Method

1. Loader operators will only allow one truck in the staging area at a time.
2. Drivers are required to stay in the vehicle and not allowed on foot in the staging area.
3. Loaders are to be kept on a level surface.
4. Do not overload trucks.
5. Distribute the loads evenly.
6. Avoid movements that involve striking the truck or spreader with the loader bucket.
7. Do not get out of the loader with the bucket in an elevated position.
8. Do not leave the loader running unattended.
9. Keep the loader bucket as low as possible at all times.
10. Avoid and cleanup spillage regularly.

**Special Considerations**

This activity should be performed in an effort to maintain or return roadways to a safe driving condition. This is achieved by snow & ice strategies such as anti-icing, de-icing, plowing, spreading, or spraying. The appropriate timing of any strategy will require the use of sound judgement, interpretation of available weather data, and prompt action. Anti-icing is the process to prevent bonding of snow and ice from the pavement by placing chemical prior to the storm or frost condition. De-icing is the process of breaking the bond of snow and ice from the pavement after it has formed.

Plowing is the process of removing as much snow or loose ice prior to applying chemicals in anti-icing and de-icing operations or to remove a dry snow that is not adhering to the pavement. Spreading is the mechanical process of applying dry or pre-wet deicing chemicals to the roadway to melt or break the bond. Spraying is the mechanical process of applying liquid deicers to the roadway to melt or break the bond.

Designated loader operator is the manpower assigned to operate the loader for the purpose of mixing and loading materials.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 200 Miles | EFFECTIVE DATE | 2/12/2024 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Brine Mixing | CODE | 2640 |
|---|---|---|---|

**Purpose**

The creation of brine to be used in anti-icing and de-icing operations, prior to and during storm events to prevent snow/ice from bonding to the pavement.

**Category** Snow & Ice

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

This activity is typically scheduled between October and April to maintain an adequate supply of brine. A review of weather forecast is required to determine material needs to schedule within a normal working hour shift.

| Reporting | | Asset to Report to | Unit Code* | Reporting Units | Gallons |
|---|---|---|---|---|---|

Accomplishment is the number of gallons that are produced and stored.

For additional work order reporting guidance see the Work Orders section of the Preface.

*Report activity using the four-digit unit code for the unit at which the activity was performed.

Example: 3101 - Brookville Unit

**Crew Size** 1- 2 Workers

| | QTY |
|---|---|
| Laborer | 1-2 |

**P.P.E.**

Base PPE

**Materials**

Sodium Chloride - Salt

**Job Specific Equipment**

Loader
Brine Maker
Hydrometer

**Other References**

OM 08-01 Snow and Ice Policy and the Snow and Ice Control Operating Memorandums

**Sub Activities**

| Average Daily Production | 4,000 – 8,000 gallons | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Brine Mixing | CODE | 2640 |
|---|---|---|---|

## Work Method

INDOT has a variety of brine makers from in-house home-made to state-of-the-art computer controlled models. Regardless of the type they all require that salt be added to a hopper and then filled with water to dissolve the salt into a liquid solution known as brine. The solution is then monitored to ensure that it has reached the desired concentration. A Hydrometer is a tool that is used to measure the concentration percentage of salt ions in the water. The correct specific gravity for the brine solution is 23.3 percent. Manual machines will require the use of a Hydrometer. The newer computer automated systems have this ability built into the brine maker. Once the solution is at the desired concentration it is then pumped into storage tanks for operational use.

1. Load salt into your brine maker hopper.
2. Fill your hopper with water to dissolve the salt into a brine solution.
3. Test your dissolved brine solution with a hydrometer unless your system is automated and has this feature built in.
4. The brine solution level is to read a specific gravity of 23.3 percent.
5. The brine is then pumped into storage holding tanks.

## Special Considerations

Perform this activity prior to the winter months and throughout the winter as needed, to maintain an adequate supply of brine.

Review weather to determine material need and try to schedule within a normal working hour shift.

Salt needs to be clean.

Periodic flushing and cleaning of the brine maker is required.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 4,000 – 8,000 gallons | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Stockpiling Winter Materials | CODE | 2650 |
|---|---|---|---|

**Purpose**

This Activity is used for the stockpiling and transferring of winter abrasives, de-icing chemicals, and anti-icing chemicals that are used in the performance before and during the winter season. This includes the transfer of salt brine to unit and storage tank locations that do not have brine makers. This activity also includes the hauling and transferring of granular winter materials to unit and storage locations.

**Category** Snow & Ice

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Perform this activity prior to the winter months and throughout the winter as needed to maintain an adequate supply of winter materials.

| Reporting | | Asset to Report to | Unit Code* | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Accomplishment is the number of person hours and equipment used that is required to safely stockpile winter materials under roof in accordance with INDOT policy and procedures.

Note: Material stockpiled is not reported as an accomplishment.

If a winter abrasive stockpile is treated with a deicer to freeze-proof that stockpile. Only the de-icier material that is used to freeze proof is recorded as an accomplishment. Not the entire winter abrasive stockpiled material.

For additional work order reporting guidance see the Work Orders section of the Preface

*Report activity using the four-digit unit code for the unit at which the activity was performed.
Example: 3101 – Brookville Unit

**Crew Size** | **Workers** | **QTY**

Determined by specific work activity to be performed.

**Job Specific Equipment**

Loader
Dump Truck
Forklift
Conveyor

**P.P.E.**

Base PPE

**Materials**

*Sodium Chloride (only used when freeze-proofing winter abrasives)

**Other References**

OM 08-01 Snow and Ice Policy and the Snow and Ice Control Operating Memorandums

**Sub Activities**

| Average Daily Production | Person hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Stockpiling Winter Materials | CODE | 2650 |
|---|---|---|---|

**Work Method**

INDOT's practice and policy is to keep all deicing materials and mixes under roof and on a impermeable surface.

Material is to be handled as little as possible in an effort to decrease or eliminate spillage, material degradation, and unwanted moisture.

A. Stockpiling/Transferring:

1. Only one truck is allowed in the loading/unloading area at any one time.
2. No one is permitted in the staging area.
3. Drivers not loading/unloading their own trucks must stay inside the cab until they are no longer in the staging area.
4. Trucks and loaders are to be kept on a level surface.
5. Do not overload trucks.
6. Distribute the loads evenly.
7. Avoid movements that result in striking the truck and or spreader with the loader bucket.
8. Do not get out of the loader with the loader bucket in an elevated position.
9. Never leave a vehicle running unattended.
10. Keep the loader bucket as low as possible at all times.
11. Avoid and cleanup spillage regularly.

B. Deliveries:

Delivered materials require that the load is visually inspected for contamination before and after dumping.

Material tickets must visually be inspected to ensure proper delivery location and material type.

No liquid material may be placed in a tank that is not properly marked and identified. Not all liquids are compatible.

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person hour | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Patrolling | CODE | 2660 |
|---|---|---|---|

**Purpose**

A patrol is necessary when adverse conditions develop that could cause unsafe conditions on roadway surfaces. Patrol roads to determine the development of hazardous conditions that could require the attention of maintenance forces that are a result of storms such as icing, debris, downed trees and limbs, and flooding.

**Category**: Snow & Ice or Right-of-Way

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule is year around as required. Try to schedule work so that overtime work is not required. Technologies that are available such as MDSS and Scan Web for RWIS can reduce the time that is needed for patrol by monitoring the bridge deck and pavement temperatures and looking at the storm's movement from radar images.

| Reporting | | Asset to Report to | Various* | Reporting Units | Miles |
|---|---|---|---|---|---|

Accomplishment is the number of miles patrolled.

Material that is left on the truck must be subtracted and not reported on the work order.

The plow must be reported on the work order. If no plow is used, then a note is required to be entered into the Comments indicating why the plow was not needed.

Winter materials are expected on the work order. If no materials are used, a note must be entered into the comments indicating why materials were not needed.

For additional work order reporting guidance see the Work Orders section of the Preface.

*Report to Snow Route and assign to the Snow and Ice category for snow and ice patrolling; for all other patrolling work, assign to the Right-of-Way category and report to the Pavement Key.

**Crew Size** 1- 2 Workers

| | QTY |
|---|---|
| Driver/Laborer | 1-2 |

**Job Specific Equipment**

- Pickup
- Crewcab
- Dump Truck
- Spreader
- Plow

**P.P.E.**

Base PPE

**Materials**

- Sodium Chloride (granular)
- Sodium Chloride (liquid brine)
- Calcium Chloride (liquid)
- Calcium Chloride bag pellets or flakes (granular)
- Magnesium Chloride (liquid)
- Agricultural Based Chlorides (liquid)

**Other References**

**Sub Activities**

| Average Daily Production | 300 – 400 Miles | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Patrolling | CODE | 2660 |
|---|---|---|---|

**Work Method**

1. Patrol when a storm has been forecasted that has the potential for hazardous conditions to develop affecting the safe conditions on the roadway surface.
2. Communicate that a patrol has been deployed to the appropriate personnel.
3. Use technologies to determine the patrol parameters and the appropriate timing for the patrol.
4. Spot treatment or action by the patrol should be done if it can be done safely.

**Special Considerations**

Technologies that are available should be utilized such as the Weather Service, radar, forecast, and pavement forecast in conjunction with Scan Web for the RWIS network to reduce the time that is needed for patrol.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 300 – 400 Miles | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Natural Snow Fence | CODE | 2670 |
|---|---|---|---|

**Purpose**

To plant by seeds or plants, native vegetation, and trees to reduce the effects of blowing or drifting snow. These plantings may be completed by seed, plant plugs, tree seedling, potted, or balled & burlap trees.

**Category** Snow & Ice

- ☐ PM
- ☐ QA
- ☒ Plan Location

**Scheduling & Coordination**

Schedule work when ground conditions have adequate moisture in the Spring.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Acres |
|---|---|---|---|---|---|

Accomplishment is the total acres of natural snow fence that is planted.

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** 1- 4 Workers

| | QTY |
|---|---|
| Crew Leader | 1 |
| Truck Driver/Laborer | 2 |
| Tractor/Loader Operator | 1 |

**P.P.E.**

Base PPE

**Materials**

Warm-season grass /Forbs seed

Tree Seedlings or Plant plugs

Trees, Balled& Burlap or Potted

Steel fence post

“Do not Mow or Spray” signs

**Job Specific Equipment**

| | |
|---|---|
| Tractor | 1 |
| No-till drill | 1 |
| Tree seedling Planter | 1 |
| Plug/ seedling hollow dibble | 3-5 |
| Post driver | 1 |

**Other References**

**Sub Activities**

| Average Daily Production | 4 – 8 Acres | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Natural Snow Fence | CODE | 2670 |
|---|---|---|---|

**Work Method**

1. Insert dibble blade 1-2” deeper than the length of the seedling’s roots at angle shown and push straight up.
2. Remove dibble and place seedling at correct depth (same as or ½” deeper than at nursery). Make sure there is no dry grass sticking in the hole with the tree that could act like a wick and dry out the soil around the tree.
3. Insert the dibble 2 inches toward you from seedling and pull the handle toward you, firming the soil at the bottom of the roots. This is to prevent an air pocket at the bottom of that will dry out the roots and kill the tree
4. Push the handle away from you, firming soil at top of roots.
5. Repeat steps 3 and 4 about 2 inches on the other side of the tree to firm the soil evenly.
6. Fill in the hole by stamping with heel. Heel in all around the tree to make sure there are no air pockets.

Establishing Native Warm-Season Grasses (NWSG)

1. NWSG grow during the summer months, thus are usually planted in late spring or early summer. Dormant plantings may be made after Dec. 1, if the soil has thoroughly cooled. Increase the seeding rate 25 to 50 percent for dormant seeding to compensate for seed that will be eaten by rodents or rot before spring.
2. NWSG may be planted into clean-tilled seedbeds or killed sods. Clean-tilled seedbeds should be fine textured and firm, preferably rolled. Several methods work well.
3. NWSG may be planted on killed cool-season grass sods using a rangeland or no-till drill capable of handling chaffy or de-bearded seed.
4. Seed depth should be no more than 1/4 inch to 1/2 inch for all NWSG. Weeds, especially grassy weeds such as giant foxtail, should not be allowed to grow more than 18 inches tall before mowing.
5. Mow to a height of 6 to 8 inches the first season. Cease mowing after early August to avoid disrupting root carbohydrate storage of the native grasses.

**Special Considerations**

The area should be free of noxious weeds prior to seeding or planting. Adjacent property owners shall be contacted prior to work to explain purpose of planting. Type of material to be planted will affect crew size and equipment.

Common Mistakes That Will Kill Seedling/Plant Plugs

1. Storing seedlings/plants in a bucket of water for more than 1-2 hours.
2. Planting too deep or too shallow.
3. Allowing roots to curl back toward the top of the hole.
4. Not allowing proper root spread.
5. Planting in sod without good site preparation.
6. Leaving in boxes exposed to the sun.
7. Planting in dry soil.
8. Planting a species not adaptable to the site.
9. Keeping trees in boxes more than a few days without cold storage.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 4 – 8 Acres | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Man-made Snow Fence | CODE | 2680 |
|---|---|---|---|

**Purpose**

This activity is used when erecting or repairing snow fence on INDOT Right of Way or attaching snow fence to existing INDOT owned farm fence as a permanent fence to reduce blowing and drifting snow.

This activity is also used when placing and removing temporary snow fence on privately owned land.

**Category** Snow & Ice

- ☐ PM
- ☐ QA
- ☒ Plan Location

**Scheduling & Coordination**

If on private land schedule work after the crops are out and when ground conditions will not rut or compact soils. Remove before soil conditions are ready to plant and ground will support equipment without rutting. Keep in contact with the property owner during the season to maintain a positive relationship and to resolve/correct any problems that may develop.

Schedule work on INDOT's Right of Way prior to winter when soil conditions will not damage turf.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Linear Feet |
|---|---|---|---|---|---|

Accomplishment is the number of linear feet of snow fence that is erected, repaired or removed.

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** 1- 2 Workers

| | QTY |
|---|---|
| Laborers | 1-2 |

**Job Specific Equipment**

| | |
|---|---|
| Crew Cab or Dump Truck | 1 |
| Tractor /Loader | 1 |
| Post driver | 1 |

**P.P.E.**

Base PPE

**Materials**

Snow Fence
Plastic Tie Straps
Steel fence post
Salvaged Fencing

**Other References**

**Sub Activities**

200 - Fence Removal Only

| Average Daily Production | 1000 Linear Feet | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Man-made Snow Fence | CODE | 2680 |
|---|---|---|---|

**Work Method**

1. Obtain Right of Entry Agreement before placing on Private Property.
2. Place post at 8 foot intervals a minimum of 24 inches deep along snow fence line
3. Secure Snow fence a minimum of every 6 inches along the length of each post.
4. Do not leave gaps under fence or between sections.
5. When using 48 inch high snow fence, it should be placed 25 to 40 feet from the edge of pavement.

NOTE: Have underground utilities marked prior to placing post in ground.

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 1000 Linear Feet | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Other Winter Maintenance | CODE | 2690 |
|---|---|---|---|

**Purpose**

To install snowplows and spreader beds on trucks for winter operations when not done in conjunction with preparation for fall fleet inspections.

To calibrate equipment for winter operations, and other winter maintenance not specified.

**Category** Snow & Ice

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

This activity is scheduled when inclement weather forecasts are given typically October 15th thru April 1st.

This activity is scheduled to calibrate and recalibrate spreader and application equipment prior to winter operations in the fall and during the winter season as needed.

| Reporting | | Asset to Report to | Unit Code* | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Accomplishment is in person hours determined by specific work activity to be performed.

Note: Hauling or stockpiling any winter materials including the transfer of brine is reported to Activity - 2650 Stockpiling Winter Materials.

All cleaning and painting of equipment should be reported to Activity 2811 - Fleet Cleaning, Maintenance & Inspection Preparation.
All servicing including checking fluids, repairs, and adjustments should be reported to Activity 2810 - Equipment Servicing. Changing plow blades should be reported to Activity 2810, Subactivity 163: Snow Equipment Service

All snow fence maintenance should be reported to Activity 2670 - Man-made Snow Fence.

The transfer of equipment to the shop or from one unit to another should be reported to Activity 2890 - Other Support Activities.

All cleanup around the salt buildings and unit grounds should be reported to Activity 2830 - Building & Grounds Maintenance.

Clearing Snow and ice from drains is reported to Activity 2350 - Manual Drain Cleaning

For additional work order reporting guidance see the Work Orders section of the Preface.

*Report activity using the four-digit unit code for the unit at which the activity was performed.
Example: 3101 – Brookville Unit

**Crew Size** | **Workers**

QTY

Determined by specific work activity to be performed.
Specific assignment instructions are required.

**P.P.E.**

Base PPE

**Materials**

Determined by specific work activity to be performed.
Job specific instructions are required for any materials used on this activity.

**Job Specific Equipment**

Determined by specific work activity to be performed.
Specific assignment instructions are required for equipment.

**Sub Activities**

**Other References**

OM 08-01 Snow and Ice Policy and the Snow and Ice Control Operating Memorandums

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Other Winter Maintenance | CODE | 2690 |
|---|---|---|---|

**Work Method**

**A. Winter Operations**

1. Attach plows and spreaders on the trucks.
2. Check to ensure that the safety pins and straps are locked securely holding the plow and spreader in place.
3. All hydraulic hoses are to be attached ad then operated to check for leaks and to ensure equipment is properly performing.

**B. Calibrating Equipment:** Equipment shall be calibrated each year and any time during the season if the hydraulic pump or control box has been changed. Equipment should be re-calibrated to ensure the proper amount of material is being dispersed.

1. Warm truck's hydraulic oil to normal operating temperature with spreader system running.
2. Put partial load of salt on truck
3. Mark shaft end of auger or conveyor
4. Dump salt on auger or conveyor
5. Rev the truck engine to operating RPM (at least 2000 RPM)
6. Count number of shaft revolutions per minute at each spreader control setting, and record.
7. Collect salt for one revolution and weigh, deducting weight of container. (For greater accuracy, collect salt for several revolutions and divide by this number of turns to get the weight for one revolution)

<u>When to recalibrate:</u>

- When the spreader/controller unit is first put into service.
- Annually, before snow and ice control operations begin
- After major maintenance of the spreader truck is performed and/or after the truck hydraulic fluid and filters are replaced.
- After the controller unit is repaired or when the speed (truck or belt/auger) sensors are replaced
- After new snow and ice control material is delivered to the maintenance garage.

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Lift Bridge Attendant | CODE | 2710 |
|---|---|---|---|

**Purpose**

This activity is the full time operation of lift bridges.

This activity only includes operation of the lift bridge. Report specific maintenance work to the appropriate activity.

**Category** Facilities

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule and perform work at each lift bridge to ensure required coverage.

| Reporting | | Asset to Report to | Bridge Structures | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Accomplishment is the total person hours worked.

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** 1 Workers

| | QTY |
|---|---|
| Lift Bridge Attendant | 1 |

**P.P.E.**

1. Base PPE

**Materials**

**Job Specific Equipment**

**Other References**

**Sub Activities**

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Lift Bridge Attendant | CODE | 2710 |
|---|---|---|---|

**Work Method**

1. Barge captain notifies attendant of approach
2. Attendant notifies adjacent lift bridges to ensure alternate routes are not simultaneously blocked
3. Attendant notifies 911 center bridge will be lifted
4. Attendant activates road barricades and safety devices, ensuring all are operational
5. Attendant lifts bridge, ensuring barge is safely through before lowering
6. Attendant lowers bridge and deactivates barricades and safety devices

**Special Considerations**

Operator should have access to a 2 way marine radio in order to communicate with the Coast Guard, barge operators, and other lift bridges.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Rest Park and Weigh Station Maintenance | CODE | 2720 |
|---|---|---|---|

**Purpose**

General housekeeping, mowing and minor maintenance of state-maintained rest areas, roadside parks and weigh stations performed by INDOT forces.

This activity does not include work at DNR facilities or other state institutions.

**Category** Facilities

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

**Scheduling & Coordination**

Schedule and perform this activity as required to maintain each facility in a clean and neat condition.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Accomplishment is total person hours worked.

Rest parks and weigh stations are inventoried in the WMS system in the PK's (Section Inventory) list. Report to the specific entry for the rest park or weigh station at which the activity is performed.

Examples: RA - LEBANON - SB: SB Lebanon Rest Area
WS - WEST HARRISON - WB: Weigh station I-74 WB

This activity only includes minor maintenance typically taking less than 1 hour, and general housekeeping. Report any pavement, shoulder, sweeping, or tree trimming activities to the specific activity being performed. Any major improvements, repairs or modifications should be conducted under the supervision of the Facilities Manager and reported to the appropriate facility management activity. When loaned out to the Facilities Manager, report time to Activity 1010.

Maintenance of other INDOT facilities, such as Units or Subdistricts, is reported to Activity 2830.

Maintenance of DNR facilities or other state institutions should be reported to the activity for the specific work being performed.

For additional work order reporting guidance see the Work Orders section of the Preface

**Crew Size** — **Workers** — QTY

Determined by the specific work to be performed

**P.P.E.**

Determined by the specific work to be performed

**Materials**

Determined by the specific work to be performed

**Job Specific Equipment**

Determined by the specific work to be performed

**Other References**

**Sub Activities**

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Rest Park and Weigh Station Maintenance | CODE | 2720 |
|---|---|---|---|

**Work Method**

Activities may include:

1. Lawn care
2. Minor repairs to tables and other facilities
3. Litter barrel service
4. Clean out scale pits at weigh stations
5. Minor plumbing or electrical repairs
6. Mowing grounds
7. Minor sewage/water treatment plant maintenance
8. Minor Sidewalk or curb work

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Full Width Litter Pickup | CODE | 2750 |
|---|---|---|---|

**Purpose**

To remove litter along continuous sections of highway for the entire right of way width by walking. This activity includes pickup, bagging, loading, hauling and disposing of removed litter.

**Category** Right-of-Way

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule and perform work prior to the start of the first mowing cycle, for special occasions, such as Trash Bash, or as needed throughout the year.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Cubic Yards |
|---|---|---|---|---|---|

Accomplishment is the total cubic yards of litter removed. See the "Special Considerations" section for estimated volumes of common items.

Isolated areas of litter or debris removal should be reported to Activity 2760.

Full width litter removal performed by DOC crews under INDOT supervision should be reported to subactivity 01.

Materials should be reported to the Cost portion of the Cost and Accomplishment tab; under the drop down for M-Materials. Small and large animals, trash bags, and cubic yards of debris are reported to the cost day card. For further information on how to report this information in the Work Management System (WMS), see Work Order Reporting FAQS.

Full width litter removal performed by DOC crews under INDOT supervision is also reported in the Cost pane of the Cost + Acc + Contracts tab of the Work Order. Select Labor in the Cost Type column, enter $0.00 in the Total Cost ($) field, select L-DOC for cost specific and enter the total hours in the Amount Column (DOC workers x hours worked).

IMPORTANT - Some Districts have agreements with PEN, a division of the Indiana Department of Corrections, that require a small payment for work performed by DOC crews. Please contact your supervisor for details and report the appropriate cost.

## Reporting (continued)

Estimated volumes of common litter items are in the table below. Note that "vehicle capacities" is only the volume to the level of the bed. Material stacked above this would be additional. Note that additional crew members may be required depending on right of way width.

| Large Items | Est. CYS |
|---|---|
| Fridge | 1.4 |
| Twin Mattress | 0.7 |
| Queen Mattress | 1.1 |
| King Mattress | 1.4 |
| Couch | 1.4 |
| Full Semi Tire | 0.7 |
| Trash Bag - 30 Gallon | 0.5 |
| | |
| **Vehicle Capacities (to top of bed)** | **Est. CYS** |
| Pickup Bed | 1.3 |
| Crew Cab Bed | 2.4 |
| Tandem Axle Bed | 13.2 |
| Single Axle Bed | 4.1 |

Link to WMS FAQs site for further information on reporting of litter removal by DOC crews:
https://ingov.sharepoint.com/sites/INDOTIntranet/SitePages/WMS-FAQs.aspx#besides-rented-equipment%2c-what-other-information-should-i-enter-in-the-cost-pane-of-the-cost-%2B-acc-%2B-contracts-tab

For additional work order reporting guidance see the Work Orders section of the Preface

**Crew Size** 2-3 Workers

| | QTY |
|---|---|
| Laborer | 2-3 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

Crew Cab

*Traffic Control Equipment is NOT shown here

**P.P.E.**

Base PPE

**Materials**

Trash Bags

**Other References**

**Sub Activities**

956 - DOC Litter Removal

| Average Daily Production | 6-13 Cubic Yards | EFFECTIVE DATE | 2/12/2024 |
|---|---|---|---|

| ACTIVITY | Full Width Litter Pickup | CODE | 2750 |
|---|---|---|---|

**Work Method**

1. Place required safety devices
2. Crews should only pick up litter in one direction of travel at a time
3. The entire right of way width is walked and all litter greater than the size of a fist is picked up
4. Use leap frog method when possible
   a. First person starts litter pickup and bagging at beginning of assigned area
   b. Second person drives ahead approximately 500 feet, leaves the truck and starts litter pick up
   c. When the first person reaches the truck, he empties his litter into truck, drives ahead another 500 feet, leaves the truck and begins litter pick up
   d. This operation continues until end of the day or until assigned area is covered
5. Remove safety devices
6. Dispose of litter at designated dumping areas

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 6-13 Cubic Yards | EFFECTIVE DATE | 2/12/2024 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Spot Litter Pickup | CODE | 2760 |
|---|---|---|---|

**Purpose**

Remove litter and debris from isolated sections of the right of way, roadway, or shoulder. This activity includes pickup, bagging, loading, hauling, and disposing of removed litter.

**Category** Right-of-Way

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule and perform work prior as needed throughout the year.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Cubic Yards |
|---|---|---|---|---|---|

Accomplishment is the total cubic yards of litter removed. See the "Special Considerations" section for estimated volumes of common items.

Debris or dead animals removed while performing another activity should report such work to that activity.

Picking up trash bags from an Adopt A Highway cleaning event should be reported as Subactivity 240.

Clearing storm debris from the right of way should be reported to Activity 2611, Storm Debris Removal.

Materials should be reported to the Cost portion of the Cost and Accomplishment tab; under the drop down for M-Materials. Small and large animals, trash bags, and cubic yards of debris are reported to the cost day card. For further information on how to report this information in the Work Management System (WMS), see Work Order Reporting FAQS.

All work orders, other than Leave Time, are required to have comments and assets

If picking up bags from the Adopt-A-Highway Program, report it in the Cost pane of the Cost + Acc + Contracts tab of the Work Order. Select Materials in the drop down for Cost Type, enter $0.00 in the Total Cost ($) column, select M-8900 – 55 GAL TRASH BAG for the Cost Specific and enter the amount of bags picked up.

## Reporting (continued)

Estimated volumes of common litter items are in the table below. Note that "vehicle capacities" is only the volume to the level of the bed. Material stacked above this would be additional. Note that additional crew members may be required depending on right of way width.

| Large Items | Est. CYS |
|---|---|
| Fridge | 1.4 |
| Twin Mattress | 0.7 |
| Queen Mattress | 1.1 |
| King Mattress | 1.4 |
| Couch | 1.4 |
| Full Semi Tire | 0.7 |
| Trash Bag - 30 Gallon | 0.5 |
| | |
| **Vehicle Capacities (to top of bed)** | **Est. CYS** |
| Pickup Bed | 1.3 |
| Crew Cab Bed | 2.4 |
| Tandem Axle Bed | 13.2 |
| Single Axle Bed | 4.1 |

Link to WMS FAQs site for more information on reporting pick up of Adopt-A-Highway Program bags: https://ingov.sharepoint.com/sites/INDOTIntranet/SitePages/WMS-FAQs.aspx#besides-rented-equipment%2c-what-other-information-should-i-enter-in-the-cost-pane-of-the-cost-%2B-acc-%2B-contracts-tab

For additional work order reporting guidance see the Work Orders section of the Preface

## Crew Size

**2 Workers**

| | QTY |
|---|---|
| Laborer | 2 |

*Traffic Control Personnel are NOT shown here

## Job Specific Equipment

Crew Cab

*Traffic Control Equipment is NOT shown here

## P.P.E.

Base PPE

## Materials

Trash Bags

## Other References

## Sub Activities

240 - Adopt A Highway bag pickup

| Average Daily Production | 6-8 Cubic Yards | EFFECTIVE DATE | 2/12/2024 |
|---|---|---|---|

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Spot Litter Pickup | CODE | 2760 |
|---|---|---|---|

## Work Method

1. Pull vehicle off of the roadway
2. Collect litter or debris, taking care when loading large or heavy items
3. Dispose of litter at designated dumping areas

## Special Considerations

APPROVED BY

Director, Highway Maintenance

| Average Daily Production | 6-8 Cubic Yards | EFFECTIVE DATE | 2/12/2024 |
|---|---|---|---|

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Roadway Sweeping | CODE | 2770 |
|---|---|---|---|

**Purpose**

To remove excess loose sand, chemicals, and debris from roadway, intersections, curbs, and gutters. To perform mechanical or manual continuous sweeping.

**Category**: Pavement & Shoulders

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule sweeping of curb and gutter sections throughout the year as required. Special effort should be directed to spring cleanup of accumulated sand and chemicals from winter snow and ice control operations.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Linear Miles |
|---|---|---|---|---|---|

Accomplishment is continuous linear miles swept, whether by mechanical or manual means

Cleaning bridges should be reported to 2410, Cleaning Bridge Decks. Litter, trash bag, or other debris removal should be reported to 2760, Spot Litter Pickup.

Report manual sweeping to Subactivity 49. Accomplishment is still in continuous linear miles swept.
All work orders, other than Leave Time, are required to have comments and assets

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size**: 2 Workers

| | QTY |
|---|---|
| Sweeper Truck Operator | 1 |
| Laborer | 1 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

Sweeper Truck

*Traffic Control Equipment is NOT shown here

**P.P.E.**

Base PPE

**Materials**

**Other References**

OM 16-04, Curb Sweeping Rates for Contracts

**Sub Activities**

49 - Hand Sweeping

48 – Road Raking

| Average Daily Production | 10 Linear Miles | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Roadway Sweeping | CODE | 2770 |
|---|---|---|---|

**Work Method**

Mechanical

1. Set up appropriate traffic control
2. Sweep lanes, ensuring adjacent to curb and gutter are cleaned
3. Sweepers should dump sweepings at designated locations

Manual

1. Place signs and safety devices
2. Break loose material as required
3. Sweep material
4. Load material into dump trucks
5. Dump at designated locations
6. Remove signs and safety devices

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 10 Linear Miles | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Other Service Activities | CODE | 2790 |
|---|---|---|---|

**Purpose**

Report other service type activities that are not specifically identified as separate activities. This activity includes providing traffic control for non-INDOT work.

**Category** Overhead

- ☐ PM
- ☐ QA
- ☐ Plan Location

**Scheduling & Coordination**

Schedule and perform this work throughout the year as required.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Accomplishment is total person hours.

See the Work Method for example work to report to this activity.

Providing traffic control for other INDOT activities, such as core drilling, FWD, bridge inspection, or QA's, should be reported to activity 2791.

DOC litter removal should be reported to Activity 2750.

Work in DNR or other state facilities should be reported to the work activity being performed.

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** — **Workers** — **QTY**

Determined by specific work activity to be performed.

**P.P.E.**

Determined by specific work activity to be performed.

**Materials**

Determined by specific work activity to be performed.

**Job Specific Equipment**

Determined by specific work activity to be performed.

**Other References**

**Sub Activities**

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Other Service Activities | CODE | 2790 |
|---|---|---|---|

**Work Method**

Work reported to this activity may include:

1. Assisting law enforcement
2. Providing traffic control for accidents
3. Providing traffic control for any non-INDOT work
4. Performing non-traffic control work for other INDOT divisions
5. Performing work for other governmental agencies

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Traffic Control Support | CODE | 2791 |
|---|---|---|---|

**Purpose**

To provide traffic control support to non-maintenance INDOT activities. Such activities may include core drilling, FWD, geotech, QA testing, and evaluations of new products.

**Category** Overhead

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule and perform this work throughout the year as required.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Accomplishment is total person hours.

Providing traffic control for non-INDOT activities, such as accidents or law enforcement, should be reported to activity 2790.

Traffic control as part of another maintenance or traffic activity should be reported to that activity.

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** 3 Workers

| | QTY |
|---|---|
| Laborer | 3 |

**Job Specific Equipment**

| | |
|---|---|
| Arrow Board | 1-2 |
| Attenuator | 1-2 |
| Dump Truck | 1-2 |
| Crew Cab | 1 |

**P.P.E.**

Base PPE

**Materials**

**Other References**

INDOT Workzone Traffic Control Guidelines

**Sub Activities**

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Traffic Control Support | CODE | 2791 |
|---|---|---|---|

**Work Method**

1. Place signs and safety devices
2. Close lane to traffic
3. Activities take place
4. Open lane to traffic once activities are finished
5. Remove signs and other safety devices

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Equipment Servicing | CODE | 2810 |
|---|---|---|---|

**Purpose**

The routine servicing of INDOT equipment.

**Category** Overhead

- ☐ PM
- ☐ QA
- ☐ Plan Location

**Scheduling & Coordination**

Schedule and perform work throughout the year as necessary.

| Reporting | | Asset to Report to | Unit Code* | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Work performed and reported in the activity should only include what is described in the Work Method. **More intensive work, including PM or Work Order repairs such as those involving replacement of non-routine parts should be done by the shop and not reported to this activity.** If maintenance staff member is loaned to a shop the employee's time should be reported to Activity 1000 – LOANED OUT.

Maintenance specific to snow removal equipment when it is in preparation for snow events and spring assessments and fall readiness inspections should be reported to Activity 2811 – Fleet Cleaning, Maintenance & Inspection Preparation. The equipment considered snow removal equipment includes dump trucks, plows, spreaders and loaders regardless of season.

Equipment inventory & 210 effort is to be reported to Activity 7000, Sub Activity 147.

Servicing of equipment includes everything except for items listed for Activities 2690 and Activity 2811.

When servicing equipment, equipment is not reported unless it is operated or driven.

For additional work order reporting guidance see the Work Orders section of the Preface

*Report activity using the four-digit unit code for the unit at which the activity was performed.
Example: 3101 – Brookville Unit
*If activity is performed at an INDOT facility that is in the Pavement Keys inventory in WMS, such as a rest area or weigh station, report activity to the entry for the specific facility at which the work is being performed.
Example: RA - LEBANON - SB: SB Lebanon Rest Area
*For work orders reported in the Roadway Module, under a traffic management unit, report to the District Traffic MU XX80
*For work orders reported in the Signals Module, the Asset to Report to will be "None."

**Crew Size** — **Workers** — **QTY**

Determined by specific work to be performed.

**P.P.E.**

Base PPE

Respiratory protection (1 strap dust mask)

**Materials**

Determined by specific work to be performed.

**Job Specific Equipment**

Determined by specific work to be performed.

**Other References**

**Sub Activities** 162-MISCELLANEOUS EQUIPMENT SERVICE 163-SNOW EQUIPMENT SERVICE

**Work Method**

Examples of work to be reported to this activity:

1. Misc. parts replacement. Wiper blades, light bulbs, mower blades, plow blades, etc.
2. Lubricating grease points
3. Topping off fluids like washer fluid, DEF, engine oil, etc.
4. Airing tires.
5. Contact Shop Foreman to determine any other work that can be completed at the Unit.

**Special Considerations**

If performing any other work for the shop, work accomplished needs to be recorded in M5. PEOPLESOFT will not capture time from M5, so payable time will need to be entered manually.

**APPROVED BY**

Director, Highway Maintenance

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Fleet Cleaning, Maintenance & Inspection Preparation | CODE | 2811 |
|---|---|---|---|
| | | Category | Overhead |

## Purpose

It is imperative that trucks receive maintenance to ensure they are available when needed. Corrosion prevention is a constant battle, which can cause many problems with electrical systems and increase repair times due to rusted fasteners that require extra measures to disconnect.

Efforts to reduce this include post event washing, summer maintenance, preparation for spring assessments and fall readiness inspections.

This activity should include any work done in preparation for the spring and fall inspections of snow removal equipment, dump trucks, plows, spreaders and loaders.

- ☐ PM
- ☐ QA
- ☐ Plan Location

## Scheduling & Coordination

Schedule and perform work throughout the year as necessary to fulfill timelines below:

Winter Snow & Ice Season

Approximately December 1 to April 1 - If no event is expected for a week or more, every attempt should be made to wash trucks thoroughly.

Spring Assessment Preparation

April 15 - Central and southern districts must have preparation completed for Fleet Department inspections.

May 1 - Fleet Department inspections completed in central and southern districts

May 1 - Northern districts must have preparation completed for Fleet Department inspections.

May 15 - Fleet Department inspections completed in northern districts

Summer Maintenance – This should be completed prior to fall inspections.

Fall Readiness and Inspection Preparation

October 1 - Northern districts must be prepared for Fleet Department inspection.

October 15 - Fleet Department inspections completed in northern districts

October 15- Central and southern districts must be prepared for Fleet inspection.

October 31 - Fleet Department inspections completed in central and southern districts

November 15 - Any and all corrective action to be completed in north districts

December 1 - Any and all corrective action to be completed in central and southern districts

| Reporting | | Asset to Report to | Unit Code* | Reporting Units | Person Hours |
|---|---|---|---|---|---|

- Report all work performed in this code to the corresponding sub activity listed below. Examples are listed in the Work Method section on next page.
- Record washing of equipment on "Activity 2811 - Equipment Washing Check List Form".
- All equipment that is used in snow removal activities should always be reported to snow equipment subactivities, regardless of season.
- Report servicing of all equipment to Activity 2810.
- **Note: When reporting to sub activities 171 – CLEANING NON SNOW REMOVAL EQUIPMENT and 173 – CLEAN SNOW EQUIPMENT, report the commission number of the truck and other equipment being washed for tracking purposes.**
- Work performed and reported in the activity should only include what is described in the sub activities. More intensive work, including PM or Work Order repairs such as those involving replacement of non-routine parts should be done by the shop and not reported in this activity. If a maintenance staff member is loaned to a shop the employee's time should be reported to Activity 1000 – LOANED OUT.
- Each work order should record one shift only.

For additional work order reporting guidance see the Work Orders section of the Preface

*Report activity using the four-digit unit code for the unit at which the activity was performed.
Example: 3101 – Brookville Unit

| Crew Size | Workers |
|---|---|
| Determined by specific work to be performed. | |

**P.P.E.**

Base PPE
Respiratory protection (1 strap dust mask)

**Materials**

Determined by specific work to be performed

**Job Specific Equipment**

Determined by specific work to be performed.

**Other References**

| Sub Activities | 171-Cleaning Non Snow Removal Equipment<br>173-Clean SNOW equipment | 172-Brush/Scrape/Paint Equipment<br>175-Snow & Ice Inspection |
|---|---|---|
| Average Daily Production | Person Hours | EFFECTIVE DATE 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Fleet Cleaning, Maintenance & Inspection Preparation | CODE | 2811 |
|---|---|---|---|

## Work Method

Examples of work to be reported to this activity:

1. Wash and clean equipment as needed

2. Scrape and brush paint equipment. This will include removing paint or undercoating that has started to flake due to rust/corrosion. Upon removal, the paint or undercoating must be reapplied to prevent further corrosion.

3. Spring assessment preparation. Snow trucks should be thoroughly cleaned inside and out to remove all salt residue. Brine tanks and pre-wet systems must be drained, flushed and filled with enough RV antifreeze to fill pump and valve system. Ensure filters are fully flushed as well. Problems identified during the preparation process should be communicated to the assigned maintenance location Shop Foreman via Incident Request in M5 Fleet Management System.

4. Fall readiness inspection preparation. Each fall the snow trucks will be equipped with all snow attachments that can or will be used during winter operations. These will be function tested to ensure winter readiness. Problems identified during inspection preparation should be communicated with the assigned maintenance location Shop Foreman via Incident Request in M5 Fleet Management System.

## Special Considerations

If performing any other work for the shop, work accomplished needs to be recorded in M5. People Soft will not capture time from M5, so payable time will need to be entered manually.

| | APPROVED BY |
|---|---|
| | Director, Highway Maintenance |

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# Equipment Washing Checklist

## Activity 2811

**Comm #** _____ **WMS WO#** _____ **Date:** _____

**Operator:** _____ Start Time: _____ Finish Time: _____ **Total Duration:** _____

**Activity Reason:** Post Winter Activity _____ Post Maintenance Activity _____

### *Truck**

- ☐ Cab and Hood *(Inside and Outside)*
- ☐ Engine Compartment
- ☐ Dump body *(Inside, Outside and Underneath)*
- ☐ Frame Rails *(Inside, Outside, Front to Back)*
- ☐ Wheels *(Backing Plates and Axles)*
- ☐ Underside

### *Spreader*

- ☐ Clean any remaining material from the grates
- ☐ Clean Spreader *(Inside and Outside)*
- ☐ Clean area between front of spreader & dump body
- ☐ Clean area between bottom of spreader & dump body
- ☐ Clean Spinner box *(Inside and Outside)*

### *Plow* *(If Applicable)*

- ☐ Clean Plow Face *(Front and Rear)*
- ☐ Clean Trip Cylinder and Turn Table Area
- ☐ Clean Plow Support Frame

### *Additional Checks* *(If Applicable)*

- ☐ Plow Blade Wear
- ☐ Conveyor Chain Adjustment
- ☐ Tire Inflation
- ☐ Any Fluid Leaks
- ☐ Hydaulic Functions
- ☐ All Lights
- ☐ Detectable Maintenance Needs

*Avoid heat when using pressure washer on trucks with undercoating

***Comments:*** _____

NOTE: To be complete whenever washing of the equipment is performed. Report in WMS under Activity 2811 with approriate Sub Activity Report Comm # in the comments section of the WMS Day Card.

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Buildings and Grounds Maintenance | CODE | 2830 |
|---|---|---|---|

**Purpose**

General housekeeping, mowing and minor maintenance of the buildings and grounds at the District, Subdistrict, Unit and other maintenance facility locations.

**Category** Facilities

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule and perform this activity throughout the year as needed.

| Reporting | | Asset to Report to | Unit Code* | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Accomplishment is total person hours worked.

This activity only includes minor maintenance typically taking less than 1 hour, and general housekeeping. Any major improvements, repairs or modifications should be conducted under the supervision of the Facilities Manager and reported to the appropriate facility management activity. When loaned out to the Facilities Manager, report time to Activity 1010.

Report any road material handling to Activity 2840. Report any maintenance work done to a rest park or weigh station to Activity 2720

For additional work order reporting guidance see the Work Orders section of the Preface.

*Reporting Options:

- Unit Code:
  Report activity using the four-digit unit code for the unit at which the activity was performed.
  Example: 3101 – Brookville Unit

  If activity is performed at an INDOT facility such as a rest area or weigh station, report activity to the rest area or weigh station asset. If the asset is not in the inventory, contact the WMS team for assistance.
  Example: RA - LEBANON - SB: SB Lebanon Rest Area

*For work orders reported in the Roadway Module, report to the District Traffic MU XX80
*For work orders reported in the Signals Module, the Asset to Report to will be “None.”

**Crew Size** — **Workers**

| | QTY |
|---|---|
| Determined by the specific work being performed. | |

**Job Specific Equipment**

Determined by the specific work being performed.

**P.P.E.**

Base PPE

**Materials**

Determined by the specific work being performed.

**Other References**

**Sub Activities**

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Buildings and Grounds Maintenance | CODE | 2830 |
|---|---|---|---|

**Work Method**

Determined by the specific work being performed.

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Building and Grounds Air Compressor | CODE | 2831 |
|---|---|---|---|

**Purpose**

The purpose of this activity is to increase the service life of equipment located at INDOT facility properties throughout the state, which include (but are not limited to) Maintenance Units and Subdistricts.

**Category** Facilities

- ☒ PM
- ☐ QA
- ☐ Plan Location

**Scheduling & Coordination**

Schedule and perform the general preventative maintenance inspection once per month

This activity typically takes 1 employee 30 minutes to perform

**Click on the Calendar to see the facilities general preventative maintenance inspection schedule**

| Reporting | | Asset to Report to | Unit Code | Reporting Units | Each |
|---|---|---|---|---|---|

| WMS Module | Roadway |
|---|---|
| **Work Order Reporting** | |
| Project | Facilities |
| Asset Type | PK's (Road Sections) |
| Activity | 2831 - Building and Grounds Air Compressor |
| Subactivity | 1001 - General Preventative Maintenance |
| Plan Amount | The total number of each air compressor planned to inspect |
| **Day Card Reporting** | |
| Inventory Asset | Unit Code *(Example: 3101 - Brookville Unit)* |
| Accomplishments | The total number of each air compressor inspected |

For additional work order reporting guidance see the Work Orders section of the Preface

**Crew Size**

Determined by specific work to be performed.

**Job Specific Equipment**

Determined by specific work to be performed.

**P.P.E.**

Base P.P.E.

**Materials**

Determined by specific work to be performed.

**Other References**

Determined by specific work to be performed.

**Sub Activities** 1001 – General Preventative Maintenance

| Average Daily Production | (see above) | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Building and Grounds Air Compressor | CODE | 2831 |
|---|---|---|---|

**Work Method**

Work reported to this activity includes:

**1001 - General Preventative Maintenance**

**Inspection**

1. Reference the Operation & Maintenance Manual before performing maintenance on an air compressor. *If an Operation & Maintenance Manual is not present, contact the District Facility Manager to request a copy.*
2. Perform Lockout Tagout procedures.
3. Locate the oil sight glass or dipstick.
4. Inspect the oil level.
5. If the oil level is low, unscrew and remove the oil fill plug.
6. Fill the crankcase with oil**,** to the designated fill level, per the Operations & Maintenance Manual.
7. When finished, replace the oil fill plug, and screw it in HAND TIGHT ONLY.
8. Inspect to verify that drive belts, belt guards, and covers are secure.
   - If the drive belts, belt guards, or covers are not secure, submit a Facilities Service Request to have a Facility staff member service the equipment.


1.) Drive Belts

2.) Belt Guard (wire cage)

3.) Oil Sight Glass

4.) Oil Fill Plug

5.) Crankcase

*Note: SAE30 is a (non-detergent) motor oil that is designed for small engines. Other types of motor oil, for example, 5W30 or 10W30, should not be used because damage to the motor could occur. Do not overfill the oil reservoir because that can cause significant damage to the equipment.*

| ACTIVITY | Building and Grounds Air Compressor | CODE | 2831 |
|---|---|---|---|

**Work Method**

10. If the compressor tank does not have an automatic draining device, drain the receiver tank condensation manually.
    - Open the manual drain valve taking care to stand clear of the drain port because air and water may be expelled forcefully.
    - When the liquid stops flowing, close the valve.
    - Clean up any condensation with floor dry.
    - If an issue is discovered during the inspection that compromises the performance of the equipment, submit a Facilities Service Request. The Facilities Service Request form is located on the ERIN page, under Employee Resources.

*Note: If the receiver tank is not drained regularly, rust can develop on the inside and weaken the tank walls.*

**Special Considerations**

| APPROVED BY | |
|---|---|
| Director, Highway Maintenance | |
| **Average Daily Production** (see page 1) | **EFFECTIVE DATE** 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Building and Grounds Brine Maker | CODE | 2832 |
|---|---|---|---|

**Purpose**

The purpose of this activity is to increase the service life of equipment located at INDOT facility properties throughout the state, which include (but are not limited to) Maintenance Units and Subdistricts.

**Category** Facilities

- ☒ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

**Scheduling & Coordination**

Schedule and perform the general preventative maintenance inspection semi-annually in September and March

Schedule and perform the brine tank recirculation as needed during winter operations

This activity typically takes 2 employees 2 hours to perform

**Click on the Calendar to see the facilities general preventative maintenance inspection schedule**

| Reporting | | Asset to Report to | Unit Code | Reporting Units | Each |
|---|---|---|---|---|---|

| WMS Module | Roadway |
|---|---|
| **Work Order Reporting** | |
| Project | Facilities |
| Asset Type | PK's (Road Sections) |
| Activity | 2832 - Building and Grounds Brine Maker |
| Subactivity | 1001 - General Preventative Maintenance 1016 - Brine Tank Recirculation |
| Plan Amount | The total number of each brine maker system planned to inspect |
| **Day Card Reporting** | |
| Inventory Asset | Unit Code (*Example: 3101 - Brookville Unit*) |
| Accomplishments | The total number of each brine maker system inspected |

For additional work order reporting guidance see the Work Orders section of the Preface

**Crew Size**

Determined by specific work to be performed.

**P.P.E.**

Base P.P.E.

**Materials**

Determined by specific work to be performed.

**Job Specific Equipment**

Determined by specific work to be performed.

**Other References**

Determined by specific work to be performed.

| Sub Activities | 1001 – General Preventative Maintenance 1016 – Brine Tank Recirculation |
|---|---|

| Average Daily Production | (see above) | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Building and Grounds Brine Maker | CODE | 2832 |
|---|---|---|---|

**Work Method**

Work reported to this activity include:

## 1001 - General Preventative Maintenance

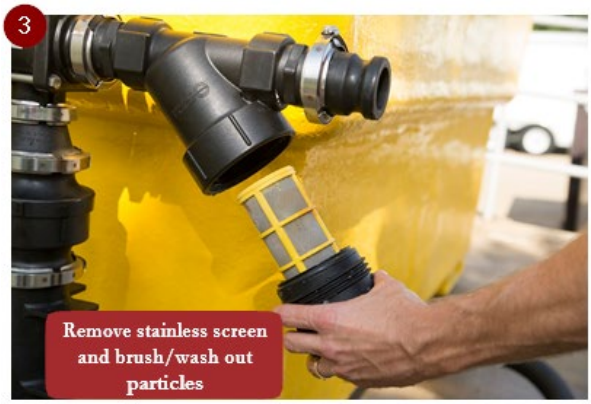
### Inspection

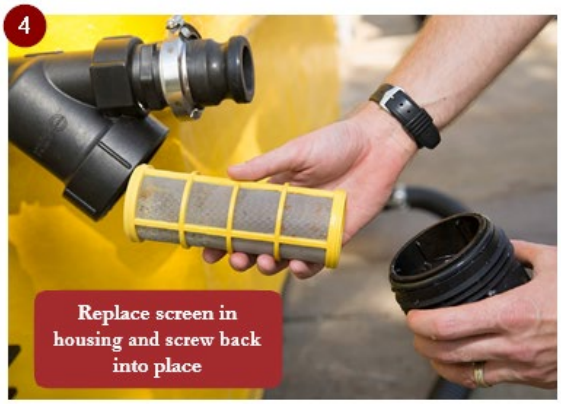
1. If the brine maker is an automatic model such as the AccuBrine System, the system will notify the operator when a cleanout is necessary, the system then rinses itself out, and a sloped floor will direct runoff to a designated area. This process takes approximately 15 minutes to perform.

2. If the brine maker is a manual model such as the AccuBatch System, the Y-strainer, salt hopper, and brine tank will need to be cleaned out semi-annually in September and March.

3. Y-Strainer Cleanout Procedure
   - The Y-strainer is located on the tank storage side (opposite of the salt hopper) of Valve #3.
   - Unscrew the "Y-portion" of the strainer by turning counter-clockwise.
   - Once the housing is unscrewed, remove the stainless screen and either brush or wash out the particles captured in the screen.
   - Dump out any particles remaining in the housing.
   - Replace screen in housing and screw housing back into place.





4. Salt hopper Cleanout Procedure,
   - The salt hopper can be drained of water or completely emptied ofboth rock salt and water depending on how far the butterfly valve canopen. To open the butterfly valve, locate the ratcheted handle on the bottom side of the salt hopper,squeeze the handle and turn counterclockwise.
   - The salt hopper should be at a height to allow positioning of most front-end loader buckets underneath the opening to catch anddispose of the waste.
   - The salt will flow easily out of a fully opened valve if there is enough water to achieve a salt/water slurry. If after fully openingthe valve, there is salt remaining in the hopper one can fill the tank with water by two of the following methods:
   - Shut the butterfly valve by squeezing the handle and turning clockwise. Ensure there is water in the brine tank. If not, open Valve #1 and fill the tank with an adequate amount of water. Turn the system to “Hand” mode and press the Start button. This will send water from the brine tank, through the three nozzles in the salt tank. After an adequateamount of water has been added, press the Stop button. Open the butterfly valve and repeat the process as necessary until the tank is emptied.
   - Use a hose or pressure washer to add water and wash down any residual salt through the open butterfly valve.

| ACTIVITY | Building and Grounds Brine Maker | CODE | 2832 |
|---|---|---|---|

**Work Method (Continued)**

5. Brine Tank Cleanout Procedure,
   - The brine tank can be either drained or cleaned out via the 2” discharge port located on the bottom side of the tank, oppositethe fresh water inlet.
   - Shut off Valve #2
   - After draining the water in the tank, two methods can be followed to clean out the remaining residual solids accumulated on the floor of the brine tank as follows:
   - Open Valve #1 to allow fresh water to flow through the PVC fresh water inlet pipe. Depending on the available pressure and volume of the fresh water source, this may wash the residual material downslope towardthe cleanout sump and out of the discharge port.
   - Use a hose or pressure washer to remove and wash any remaining residual not removed by the fresh water inlet pipe, to the cleanout sump and out of the discharge port.
   - After the cleanout procedure is complete, reconnect the hose connecting the brine tank to the pump inlet.
   - **Note: Keep Valve #2 in the open position during the non-use season**



| ACTIVITY | Building and Grounds Brine Maker | CODE | 2832 |
|---|---|---|---|

**Work Method (Continued)**

6. Visually inspect the plumbing and equipment,
   - Inspect all fittings for broken parts, excessive corrosion, deteriorated surface texture, cracks, wear marks, or other signs that could cause potential leaks
   - Inspect all gaskets for discoloration, deterioration, bulges, checking, or cracking of the gasket material
   - Inspect the tank for obvious cuts, cracks, punctures, or leaks that could contribute to tank failure

7. Exercise all valves from one extent to the other and leave them open during non-use season.
   - If an issue is discovered during the inspection that compromises the performance of the equipment, submit a Facilities Service Request. The Facilities Service Request form is located on the ERIN page, under Employee Resources.

### 1016 – Brine Tank Recirculation

1. Automatic brine tank recirculation should only be performed by a designated Site Admin. Contact the District Facility Manager if you require assistance training designated personnel.
   - **If the brine maker on site is an automated Henderson model, contact the District Facility Manager to coordinate training for the designated Site Admin.**

**Special Considerations**

| | APPROVED BY |
|---|---|
| | Director, Highway Maintenance |

| Average Daily Production | (see page 1) | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Building and Grounds Catwalk | CODE | 2833 |
|---|---|---|---|

**Purpose**

The purpose of this activity is to increase the service life of equipment located at INDOT facility properties throughout the state, which include (but are not limited to) Maintenance Units and Subdistricts.

**Category** Facilities

- ☒ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule and perform the general preventative maintenance inspection once per month

This activity typically takes 1 employee 30 minutes to perform

**Click on the Calendar to see the facilities general preventative maintenance inspection schedule**

| Reporting | | Asset to Report to | Unit Code | Reporting Units | Each |
|---|---|---|---|---|---|

| WMS Module | Roadway |
|---|---|
| **Work Order Reporting** | |
| Project | Facilities |
| Asset Type | PK's (Road Sections) |
| Activity | 2833 - Building and Grounds Catwalk |
| Subactivity | 1001 - General Preventative Maintenance |
| Plan Amount | The total number of each catwalk planned to inspect |
| **Day Card Reporting** | |
| Inventory Asset | Unit Code (*Example: 3101 - Brookville Unit)* |
| Accomplishments | The total number of each catwalk inspected |

For additional work order reporting guidance see the Work Orders section of the Preface

**Crew Size**

Determined by specific work to be performed.

**Job Specific Equipment**

Determined by specific work to be performed.

**P.P.E.**

Base P.P.E.

**Materials**

Determined by specific work to be performed.

**Other References**

Determined by specific work to be performed.

**Sub Activities** 1001 – General Preventative Maintenance

| Average Daily Production | (see above) | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Building and Grounds Catwalk | CODE | 2833 |
|---|---|---|---|

**Work Method**

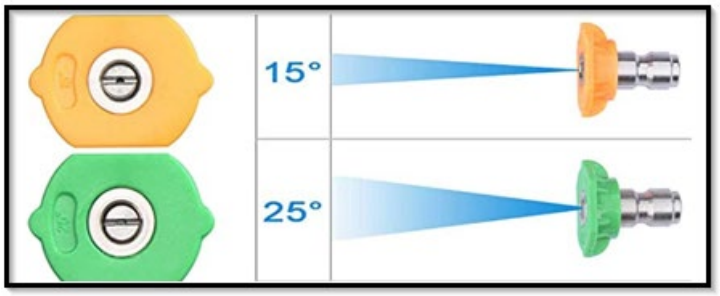
Work reported to this activity include:

**1001 - General Preventative Maintenance**

**Inspection**

1. Complete a thorough visual inspection of the catwalk for any signs of damage or wear.
   - Inspect the anchor points, connection points, support structure, stairs, railings, and grating material.
   - Inspect the overall stability of the structure, stairs, and railings.
   - Inspect nuts to determine if they are securely tightened and if nuts are loose, tighten.
   - Inspect the non-skid grit surface on the edge of the stairs to confirm that it is still present and provides sufficient texture to prevent slipping.

2. After the inspection is complete, clean off any visible dirt, grease, or oil from the catwalk surfaces using a pressure washer hose equipped with a fan tip.
   - If an issue is discovered during the inspection that compromises the performance of the equipment, submit a Facilities Service Request. The Facilities Service Request form is located on the ERIN page, under Employee Resource




*Note: To prevent damage to Fiberglass Reinforced Plastic (FRP), the pressure washer hose should be equipped with a fan tip. Yellow and green fan tips are acceptable. Keep spray tip at least 24 inches away from the FRP surface.*

**Special Considerations**

| | APPROVED BY |
|---|---|
| | Director, Highway Maintenance |

| Average Daily Production | (see page 1) | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Building and Grounds Generator | CODE | 2834 |
|---|---|---|---|

**Purpose**

The purpose of this activity is to increase the service life of equipment located at INDOT facility properties throughout the state, which include (but are not limited to) Maintenance Units and Subdistricts.

**Category** Facilities

- ☒ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

**Scheduling & Coordination**

Schedule and perform the general preventative maintenance inspection once per week
Schedule and perform the generator oil inspection once per month

This activity typically takes 1 employee 30 minutes to perform

**Click on the Calendar to see the facilities general preventative maintenance inspection schedule**

| Reporting | | Asset to Report to | Unit Code | Reporting Units | Each |
|---|---|---|---|---|---|

| WMS Module | Roadway |
|---|---|
| **Work Order Reporting** | |
| Project | Facilities |
| Asset Type | PK's (Road Sections) |
| Activity | 2834 - Building and Grounds Generator |
| Subactivity | 1001 - General Preventative Maintenance 1017 - Generator Oil Inspection |
| Plan Amount | The total number of each generator planned to inspect |
| **Day Card Reporting** | |
| Inventory Asset | Unit Code (*Example: 3101 - Brookville Unit)* |
| Accomplishments | The total number of each generator inspected |

For additional work order reporting guidance see the Work Orders section of the Preface

**Crew Size**

Determined by specific work to be performed.

**P.P.E.**

Base P.P.E.

**Materials**

Determined by specific work to be performed.

**Job Specific Equipment**

Determined by specific work to be performed.

**Other References**

Determined by specific work to be performed.

**Sub Activities** 1001 – General Preventative Maintenance 1017 – Generator Oil Inspection

| Average Daily Production | (see above) | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Building and Grounds Generator | CODE | 2834 |
|---|---|---|---|

**Work Method**

Work reported to this activity include:

**1001 - General Preventative Maintenance**

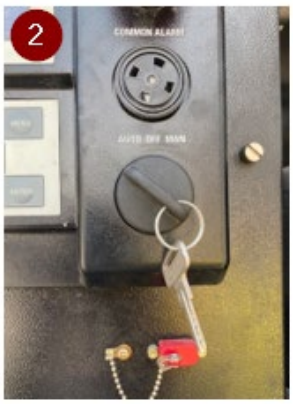
**Inspection**

1. Reference the Operation & Maintenance Manual before performing maintenance on a generator.
   *If an Operation & Maintenance Manual is not present, contact the District Facility Manager to request a copy.*

2. Perform Lockout Tagout procedures before adding fuel to a generator.
   - Before adding fuel to a Generac diesel generator, turn key switch clockwise to the **OFF** position.

**Generac Diesel Generator**


**Key Switch**

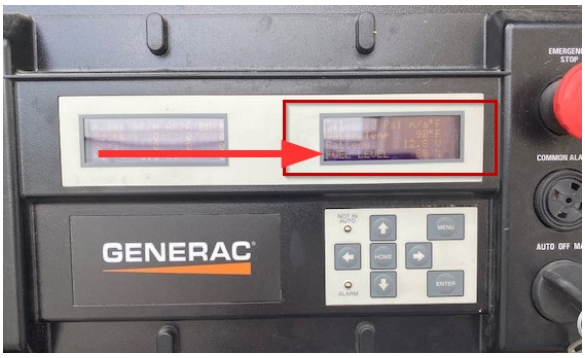




| ACTIVITY | Building and Grounds Generator | CODE | 2834 |
|---|---|---|---|

**Work Method (Continued)**

3. Inspect fuel level
   - Check the fuel level reader located on the control system, if the fuel level is under 50% full, refill the fuel
   - **Do not fill fuel level over 85% full**
   - Statewide **Bulk Fuel QPA** available through vendor Co-Alliance, **QPA - 15672**

**Control System (Fuel Level Reader)**




**Fuel Cap**

4. If applicable, refill fuel
   - Unscrew the fuel cap
   - Poor in additional fuel slowly to ensure that the fuel level is not overfilled

5. Check engine hours
   - Check the engine hours reader located on the control system to verify that the generator is running regular automatic cycles.
   - Record the engine hours in the work order comments
   - If an issue is discovered during the inspection that compromises the performance of the equipment, submit a Facilities Service Request. The Facilities Service Request form is located on the ERIN page, under Employee Resources.

| ACTIVITY | Building and Grounds Generator | CODE | 2834 |
|---|---|---|---|

**Work Method (Continued)**

## 1017 - Generator Oil Inspection

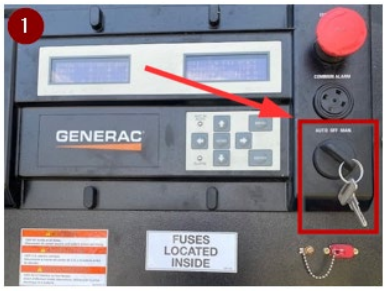
### Inspection

1. Reference the Operation & Maintenance Manual before performing maintenance on a generator.
   *If an Operation & Maintenance Manual is not present, contact the District Facility Manager to request a copy.*

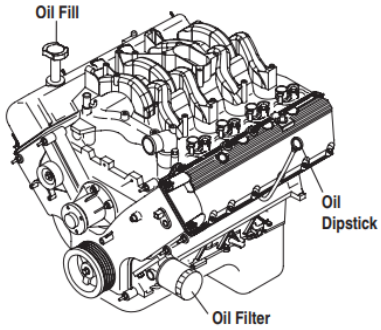
2. Perform Lockout Tagout procedures.
   - Turn key switch clockwise to the OFF position before performing generator oil inspection

3. Inspect the engine oil level.
   - Allow the engine to cool down for 10 minutes
   - Locate the engine oil dipstick
   - Remove oil dipstick and wipe it dry with a clean linen cloth
   - Insert oil dipstick
   - After 10 seconds remove the dipstick
   - Look at the oil on both sides of the dipstick, the lower of the two readings will be the correct oil level
   - The oil level should be between Full and Add marks
   - If the engine oil level is low, submit a **Facilities Service Request** to request an oil service.

4. Inspect the overall condition of the generator.
   - Look for any cracks, leaks, loose or frayed wiring, and loose or frayed hoses.
   - If an issue is discovered during the inspection that compromises the performance of the equipment, submit a Facilities Service Request. The Facilities Service Request form is located on the ERIN page, under Employee Resources.






**Special Considerations**

| | APPROVED BY |
|---|---|
| | Director, Highway Maintenance |

| Average Daily Production | (see page 1) | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Building and Grounds Facility Overhead Doors | CODE | 2835 |
|---|---|---|---|

**Purpose**

The purpose of this activity is to increase the service life of equipment located at INDOT facility properties throughout the state, which include (but are not limited to) Maintenance Units and Subdistricts.

**Category** Facilities

- ☒ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

**Scheduling & Coordination**

Schedule and perform the general preventative maintenance inspection once per month

This activity typically takes 2 employees 30 minutes to perform

**Click on the Calendar to see the facilities general preventative maintenance inspection schedule**

| Reporting | | Asset to Report to | Unit Code | Reporting Units | Each |
|---|---|---|---|---|---|

| WMS Module | Roadway |
|---|---|
| **Work Order Reporting** | |
| Project | Facilities |
| Asset Type | PK's (Road Sections) |
| Activity | 2835 - Building and Grounds Facility Overhead Doors |
| Subactivity | 1001 - General Preventative Maintenance |
| Plan Amount | The total number of each overhead door planned to inspect |
| **Day Card Reporting** | |
| Inventory Asset | Unit Code (*Example: 3101 - Brookville Unit*) |
| Accomplishments | The total number of each overhead door inspected |

For additional work order reporting guidance see the Work Orders section of the Preface

**Crew Size**

Determined by specific work to be performed.

**P.P.E.**

Base P.P.E.

**Materials**

Determined by specific work to be performed.

**Job Specific Equipment**

**Other References**

Determined by specific work to be performed.

**Sub Activities** 1001 – General Preventative Maintenance

| Average Daily Production | (see above) | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Building and Grounds Facility Overhead Doors | CODE | 2835 |
|---|---|---|---|

**Work Method**

Work reported to this activity include:

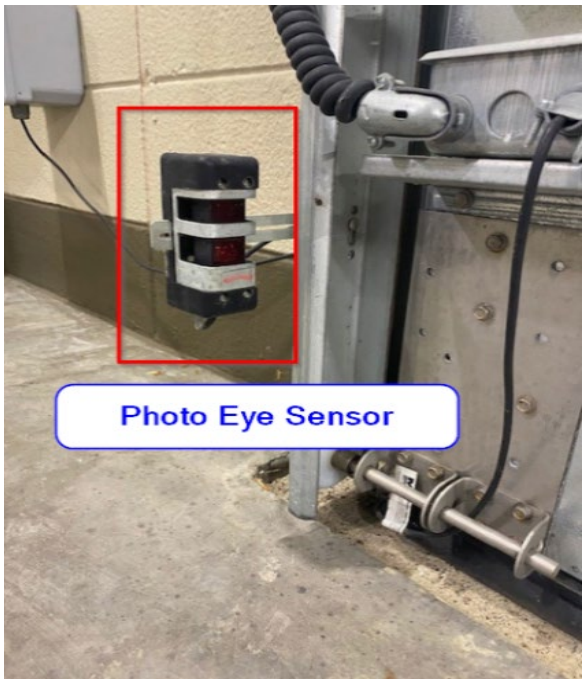
**1001 - General Preventative Maintenance**

**Inspection**

1. Inspect all forms of overhead door safety devices.

2. Verify that the contact stripe responds to pressure.
   - This can be performed safely by using a long tool such as a shovel, placing it under the contact stripe as the overhead door closes.
   - If the safety device works properly, the contact stripe will sense the pressure of the shovel, and the door will not close.


3. Confirm that the photo eye sensor is detecting objects and preventing the door from closing.
   - This can be performed safely by waving an object such as a shovel in front of the sensor as the door is closing.



**Work Method (Continued)**

4. If present, verify that the constant contact switch is functional.
   - This can be performed safely by verifying that the door stops moving when contact is removed from the open and close switches during operation.


5. Visually inspect the weather seal condition.

6. Visually inspect the condition of the door for cracks, dents, or broken sections.

7. After completing the inspection, apply garage door spray lubricant to the overhead door rollers as needed.
   - If an issue is discovered during the inspection that compromises the performance of the equipment, submit a Facilities Service Request. The Facilities Service Request form is located on the ERIN page, under Employee Resources.

Note: *Fastenal offers several overhead door spray lubricants. This lubricant should be kept in the stockroom and requested, as necessary.*

**Special Considerations**

| APPROVED BY |
|---|
| Director, Highway Maintenance |

| Average Daily Production | (see above) | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Building and Grounds Oil Water Separator | CODE | 2836 |
|---|---|---|---|

**Purpose**

The purpose of this activity is to increase the service life of equipment located at INDOT facility properties throughout the state, which include (but are not limited to) Maintenance Units and Subdistricts.

**Category** Facilities

- ☒ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

**Scheduling & Coordination**

Schedule and perform the general preventative maintenance inspection once per week

This activity typically takes 2 employees 1 hour to perform

**Click on the Calendar to see the facilities general preventative maintenance inspection schedule**

| Reporting | | Asset to Report to | Unit Code | Reporting Units | Each |
|---|---|---|---|---|---|

| WMS Module | Roadway |
|---|---|
| **Work Order Reporting** | |
| Project | Facilities |
| Asset Type | PK's (Road Sections) |
| Activity | 2836 - Building and Grounds Oil Water Separator |
| Subactivity | 1001 - General Preventative Maintenance |
| Plan Amount | The total number of each oil water separator system planned to inspect |
| **Day Card Reporting** | |
| Inventory Asset | Unit Code *(Example: 3101 - Brookville Unit)* |
| Accomplishments | The total number of each oil water separator system inspected |

For additional work order reporting guidance see the Work Orders section of the Preface

**Crew Size**

Determined by specific work to be performed.

**P.P.E.**

Base P.P.E.

**Materials**

Determined by specific work to be performed.

**Job Specific Equipment**

Determined by specific work to be performed.

**Other References**

Determined by specific work to be performed.

**Sub Activities** 1001 - General Preventative Maintenance

| Average Daily Production | (see above) | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Building and Grounds Oil Water Separator | CODE | 2836 |
|---|---|---|---|

**Work Method**

Work reported to this activity include:

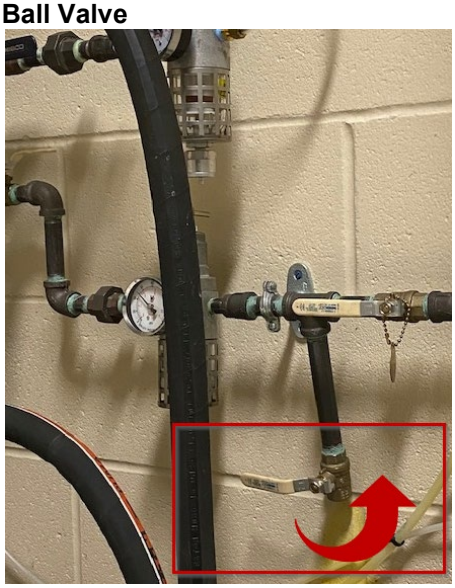
**1001 - General Preventative Maintenance**

**Inspection**

1. Reference the Operation & Maintenance Manual before performing any oil water separator maintenance.
   *If an Operation & Maintenance Manual is not present, contact the District Facility Manager to request a copy.*

2. Drain the excess moisture from the facility airline.
   - Open the ball valve located next to the pressure gauge
   - Drain the excess moisture
   - Close the valve when finished draining

**Ball Valve**

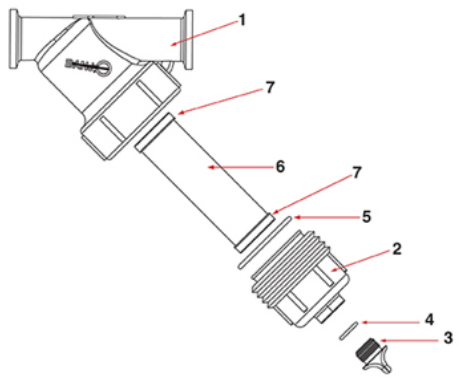


3. Verify that the air regulator is working by inspecting the pressure gauge.
   - The pressure gauge should read between 40 to 60 PSI.
   - If the pressure gauge is not reading between 40 to 60 PSI, submit a Facility Service Request to have a Facility staff member service the equipment

**Pressure Gauge**

4. If a Y-Strainer is present, perform the following,
   - Unscrew the strainer cap
   - Remove the mesh screen
   - Rinse and clean the mesh screen with clean water in a sink
   - Insert the mesh screen back into the Y-Strainer
   - When complete, tighten the cap back in place

**Y-Strainer Components**




1) Body
2) Cap
3) Plug
4) O-Ring
5) EPDM Gasket
6) FKM Gasket
7) Mesh Screen

**Y-Strainer**

**Y-Strainer Location Example**

| ACTIVITY | Building and Grounds Oil Water Separator | CODE | 2836 |
|---|---|---|---|

**Work Method (Continued)**

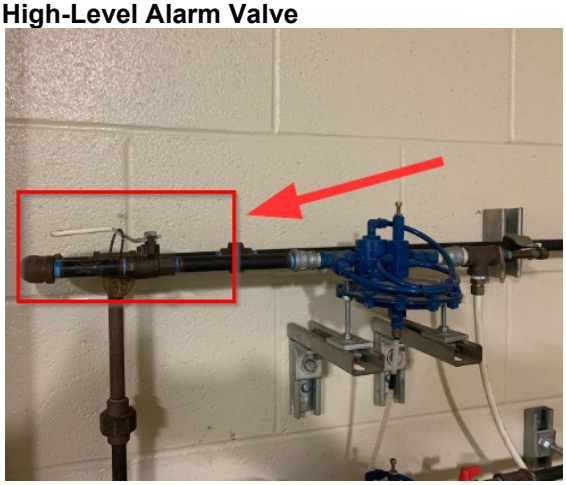
5. Next, verify that the automatic setting is functional.
   - Introduce water into the wash bay pit
   - If the automatic mode is working properly the air compressor should turn on

**Wash Bay**

*Note: Water may need to run for 20 minutes to determine if the automatic mode is functioning properly.*

6. Next, confirm that the high-level alarm air line valve is open.
   - The valve should be flush with the pipes as pictured below
   - If an issue is discovered during the inspection that may compromise the performance of the equipment, submit a Facilities Service Request. The Facilities Service Request form is located on the ERIN page, under Employee Resources.

**High-Level Alarm Valve**



*Note: The high-level alarm serves as a warning device in the event of a wash bay flood.*

**Special Considerations**

| | APPROVED BY |
|---|---|
| | Director, Highway Maintenance |
| Average Daily Production (see page 1) | EFFECTIVE DATE 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Building and Grounds Garage Floor Drain Systems | CODE | 2837 |
|---|---|---|---|

**Purpose**

The purpose of this activity is to increase the service life of equipment located at INDOT facility properties throughout the state, which include (but are not limited to) Maintenance Units and Subdistricts.

**Category** Facilities

- ☒ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

**Scheduling & Coordination**

Schedule and perform the general preventative maintenance inspection quarterly in September, December, March, and June

Schedule and perform the general preventative maintenance inspection as needed during winter operations

This activity typically takes 4 employees 1 hour to perform

**Click on the Calendar to see the facilities general preventative maintenance inspection schedule**

| Reporting | | Asset to Report to | Unit Code | Reporting Units | Each |
|---|---|---|---|---|---|

| WMS Module | Roadway |
|---|---|
| **Work Order Reporting** | |
| Project | Facilities |
| Asset Type | PK's (Road Sections) |
| Activity | 2837 - Building and Grounds Garage Floor Drain Systems |
| Subactivity | 1001 - General Preventative Maintenance |
| Plan Amount | The total number of each drain system planned to inspect |
| **Day Card Reporting** | |
| Inventory Asset | Unit Code (*Example: 3101 - Brookville Unit*) |
| Accomplishments | The total number of each drain system inspected |

For additional work order reporting guidance see the Work Orders section of the Preface

**Crew Size**

Determined by specific work to be performed.

**Job Specific Equipment**

Hand tools (shovel/rake)

**P.P.E.**

Base P.P.E.

**Materials**

Determined by specific work to be performed.

**Other References**

Determined by specific work to be performed.

**Sub Activities** 1001 - General Preventative Maintenance

| Average Daily Production | (see above) | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Building and Grounds Garage Floor Drain Systems | CODE | 2837 |
|---|---|---|---|

**Work Method**

Work reported to this activity include:

**1001 - General Preventative Maintenance**

**Inspection**

1. Remove garage floor drain covers.
2. If drain sediment is dry and greater than 1 inch deep, clean out the sediment with a shovel or appropriately sized hand tool.
3. If applicable, clean out the sediment bucket.
4. When complete, replace the drain covers.
5. Dispose of any dry sediment in a receptacle such as a garbage can or dumpster.
   - If a drain is filled with liquid and no longer draining, submit a Facilities Service Request. The Facilities Service Request form is located on the ERIN page, under Employee Resources.

**Special Considerations**

| | APPROVED BY |
|---|---|
| | Director, Highway Maintenance |
| Average Daily Production | (see page 1) |
| EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Materials Handling and Storage | CODE | 2840 |
|---|---|---|---|

**Purpose**

The handling and storage of materials for routine roadway maintenance activities, excluding snow and ice control materials. Reporting includes the loading, hauling, unloading, mixing, stockpiling and storage of materials. This activity is only to capture handling of roadway repair material. Actual use of those materials are reported to the specific activity.

**Category** Overhead

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule and perform this work throughout the year as needed.

| Reporting | | Asset to Report to | Unit Code* | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Accomplishment is the total person hours worked.

Do not report materials to this activity. Materials are reported to the specific activity when they are used.

Report snow and ice material handling to Activity 2650.

This activity is only to report the handling of maintenance materials, which are directly used on the road. Transport of supplies (such as state maps to rest parks) or transfer of equipment from one INDOT location to another should be reported to Activity 2890.

See the work method for examples of this activity.

For additional work order reporting guidance see the Work Orders section of the Preface.

*Report activity using the four-digit unit code for the unit at which the activity was performed.
Example: 3101 – Brookville Unit
*For Work Orders reported in the Signals Module, the Asset to Report To will be "None."

**Crew Size** — **Workers** — **QTY**

Determined by the specific work being performed.

**Job Specific Equipment**

Determined by the specific work being performed.

**P.P.E.**

Base PPE

**Materials**

Do not report materials to this activity.

**Other References**

**Sub Activities**

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Materials Handling and Storage | CODE | 2840 |
|---|---|---|---|

**Work Method**

Examples of work to report to this activity are:

1. Pipes - hauling pipe from vendor to unit for storage, staging or organizing in yard.
2. Signs and sign posts - staging or organizing in yard, unloading sign order from LSC delivery truck
3. Bituminous material - sending a tanker to emulsion plant, hauling cold mix from vendor
4. Aggregates - hauling from quarry to unit or remote stockpile, staging in yard
5. Guardrail - hauling parts from vendor or District lot to unit
6. Paint - unloading delivery truck.
7. Transporting salvage material from a contract to an INDOT location.

**Special Considerations**

Materials should be handled as little as possible to minimize damage, segregation, spillage, and degradation. Utilize proper loading techniques at all times. Improper material handling can cause issues if INDOT tries to go back on a material supplier for not meeting specifications.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Other Support Activities | CODE | 2890 |
|---|---|---|---|

**Purpose**

Other overhead or support activities that are not specifically identified as separate activities. Includes work such as transferring equipment from one INDOT location to another, transporting equipment to be serviced, or delivering supplies to rest parks.

**Category**: Overhead

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule and perform this work throughout the year as needed.

| Reporting | Asset to Report to | Unit Code* | Reporting Units | Person Hours |
|---|---|---|---|---|

Accomplishment is reported in person hours.

If using this activity for equipment transfer, only report the equipment hours the piece of equipment was actually operated or driven.

Transport of equipment for servicing is reported to Sub Activity 721.

Transport of roadway materials should be reported to Activity 2840.

If supplies are being transported, do not report to the materials section.

For additional work order reporting guidance see the Work Orders section of the Preface.

*Reporting Options:

- Unit Code
  Report activity using the four-digit unit code for the unit at which the activity was performed.
  Example: 3101 – Brookville Unit

*For Work Orders reported in the Signals Module, the Asset to Report To will be "None."

When reporting to Sub Activity 721, the activity should be reported to the unit that the equipment is delivered to.

Facilities employees should report to the structure at which they are performing this activity

| Crew Size | Workers QTY |
|---|---|
| Determined by the specific work activity to be performed | |

| Job Specific Equipment | QTY |
|---|---|
| Determined by the specific work activity to be performed | |

**P.P.E.**

1) Base P.P.E.

**Materials**

Determined by the specific work activity to be performed

**Other References**

**Sub Activities**

721 – Equipment Transport for Servicing

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Other Support Activities | CODE | 2890 |
|---|---|---|---|

**Work Method**

Determined by the specific work being performed.

**Special Considerations**

| | APPROVED BY |
|---|---|
| | Director, Highway Maintenance |
| Average Daily Production: Person Hours | EFFECTIVE DATE: 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Major Surface/Shoulder Improvements | CODE | 2991 |
|---|---|---|---|

**Purpose**

Major, non-routine road or shoulder improvement projects performed by INDOT forces that are not covered under other activities. Any work that is to be reported to under this activity shall be identified and planned and submitted to the District for approval prior to performing the work. Central Office approval may also be required as denoted below.

See the Work Method for examples of work to report to this activity.

**Category**: Pavement & Shoulders

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☒ Plan Location

**Scheduling & Coordination**

Schedule and perform this work throughout the year, as weather conditions permit, depending on specific work being performed.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Accomplishment is total person hours worked. Make sure all equipment and materials used in the project are captured and recorded on the work order.

If paving more than 1/2 mile continuous, constructing a new or extending an existing turn lane, or applying a double or triple seal coat, report to the appropriate sub-activity.

A copy of the District approval must be attached to the work order.

A copy of Central Office approval may also be required, as denoted below, and if required that approval shall also be attached to the work order.

Ensure a detailed description of the work is included in the comments section.

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** — **Workers**

QTY

Determined by the specific work to be performed.

**P.P.E.**

Base PPE

**Materials**

Determined by the specific work to be performed.

**Job Specific Equipment**

Determined by the specific work to be performed.

**Other References**

**Sub Activities**

729 - Major Paving

730 - New Lane Construction

731 - Multiple Application Seal Coat

732 - Major Patching

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Major Surface/Shoulder Improvements | CODE | 2991 |
|---|---|---|---|

**Work Method**

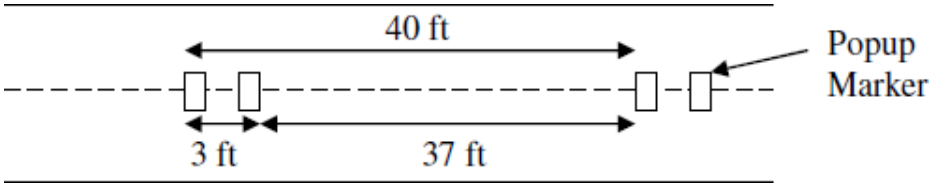
Examples of work to report to this activity:

1. Roadway reconstruction or full depth patching greater than 100' in any single location (Subactivity 732). Any such work less than or equal to 100' in length should be reported to Activity 2020.
2. Roadway paving (Subactivity 729). Any such work up to 1/2 mile in continuous length should be reported to Activity 2030.
3. New Lane construction (Subactivity 730), such as a new turn lane or passing blister where none currently exist. Repaving or patching existing turn lanes should be reported to the appropriate activity.
4. Constructing new shoulders where none currently exist. Reconditioning or patching existing shoulders should be reported to the appropriate activity.
5. Constructing new parking lot or access road on state property.
6. Double or triple application seal coats (mainline or shoulder - Subactivity 731). A written request must be submitted to and approved by the District Technical Services Director, District Highway Maintenance Director, District Deputy Commissioner, and Director of Pavement Asset Management prior to scheduling this type of work.

**Pavement Markings**

- Permanent pavement markings should be re-established within 30 days of completing work. Coordinate with district traffic to inform them of the location of the work and the date that the work is finished so that they can schedule re-striping of the roadway.
- For multiple application chip seal work that covers existing pavement markings, temporary centerline delineation must be provided for roads with an ADT > 3,000 by utilizing one (or a combination) of the following methods. For roads < 3,000 ADT, these methods are encouraged but not required. The requirements in this section will not apply if construction is done under a full road closure, where the road is not open until final pavement markings are installed.

    1. Utilize temporary pop-up chip seal markers. These should be placed on the day of construction. Pop-upmarkers shall be placed in a set of 2, spaced 3 ft longitudinally apart. The spacing between each set shall be 40 ft.




    2. Provide temporary markings with either paint or removable tape. Such markings should be 4 feet long, centered on 40 foot spacing. Temporary markings should be installed within 2 calendar days of construction.

**Special Considerations**

When performing major road work, make sure to consult with the District Pavement Asset Engineer to ensure proper materials, techniques, and specifications are being followed.

| | APPROVED BY |
|---|---|
| | Director, Highway Maintenance |
| Average Daily Production: Person Hours | EFFECTIVE DATE: 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Support Work Assignments | CODE | 7000 |
|---|---|---|---|

**Purpose**

Report person hours of personnel (including winter transfer and summer hire personnel) assigned to perform support work assignments (physicals, drug testing, clerical work, etc.).

Report time on contract inspection and management of maintenance contracts

**Category** Overhead

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

**Scheduling & Coordination**

This activity should not be identified for routine or daily assignment and should be used minimally. The one exception is to cover time for personnel doing construction inspection and management of maintenance contract.

| Reporting | | Asset to Report to | Various* | Reporting Units | Person Hours |
|---|---|---|---|---|---|

1. This activity is typically used for CDL physicals and drug testing.
2. Teambuilding or other functions not specific to training may be reported to this activity.
3. Any work in support of another activity should be reported to that specific activity.
4. Any minor equipment work is reported to Activity 2810.
5. Work on snow fleet washing, maintenance and inspection preparation is reported to Activity 2811.
6. Any minor housekeeping and building/grounds maintenance is reported to Activity 2830.
7. For contract inspection, the Contract Number(s) should be entered in the Comments section of the work order.

NOTE: Any work beyond minor repairs/maintenance should be loaned out and conducted under the supervision of the shop foreman or facilities manager.

*Refer to the Sub Activities section for the Asset to Report To for each Sub Activity

*For Work Orders reported in the Signals Module, the Asset to Report To will be “None (Signals)”

*The Asset to Report To for Facilities Work Orders will be “None (Facilities)”

| Crew Size | Workers | QTY |
|---|---|---|
| | | |

**Job Specific Equipment**

**P.P.E.**

**Materials**

**Other References**

| Sub Activities | (Asset to Report to in Parenthesis) |
|---|---|
| 65 – Administration Service: Administrative/Clerical/Secretarial (Unit Code) | |
| 66 – Drug/CDL Testing, Physical, Labor Relations (Unit Code) | |
| 67 – Hoosier Helper (Unit Code) | |
| 147 – Equipment Inventory & 210 ( Unit Code) | |
| 180 – Contract Inspection (None) | |

**APPROVED BY**

Director, Highway Maintenance

| Average Daily Production | Person Hours | EFFECTIVE DATE | 2/12/2024 |
|---|---|---|---|

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Sheet Sign Modernization | CODE | 8100 |
|---|---|---|---|

**Purpose**

System modernization and upgrade to meet current standards. Systematic replacement of existing sheet signs, directional markers, mileposts, and hazard markers to restore safe control of traffic flow, provide uniform/adequate reflectivity, legibility of all existing traffic signage, and comply with federally proposed minimum sheet sign reflectivity standards. This activity will allow for coordination of sign removal from inventory.

**Category** Signs

- ☒ **PM**
- ☒ **QA**
- ☒ **Unit Cost**
- ☒ **Plan Location**

**Scheduling & Coordination**

This activity can be scheduled year-round, and shall be based on a 20 year sign replacement schedule

Entire roads should be scheduled as corridor resign to ensure uniformity of signs. Signs 6 years old or newer do not need to be replaced during the corridor resign

Technical Services provides the resigning plan for the district

Overhead signage should be scheduled separately to best utilize equipment and labor

Coordinate with other units to facilitate traffic control as needed

Work that changes the features inventory (removing, moving, or new signs) should be reported to activity 8200

| Reporting | Asset to Report to | Sign* | Reporting Units | Signs |
|---|---|---|---|---|

Accomplishment equals each new attached sign. There can be multiple new signs (accomplishments) on one post. There is zero accomplishment for sign removals.

If work includes putting up re-used signs in the same workday as installing new signs, the re-used signs must be reported under Activity 8110. To report the re-used signs, subtract 1-2 hours from the total hours worked and report that amount as the hours worked under Activity 8100, then create a second work order for the 1-2 hours subtracted under Activity 8110.

For additional work order reporting guidance see the Work Orders section of the Preface.

* Report to the sign asset. If asset is not in sign inventory, report to Pavement Key.

**Crew Size** 2 Workers

| | QTY |
|---|---|
| Laborer | 1 |
| Crew Leader | 1 |

**Job Specific Equipment**

| | |
|---|---|
| Aerial Bucket Truck as needed | 1 |
| Pickup truck as needed | 1 |

**P.P.E.**

1) Base PPE

2) Safety Harness / Fall Protection if using lift

**Materials**

Sign Materials – INDOT Spec Section 802.02

Posts, Anchors, Brackets, Aluminum Bars, Stiffeners, Sheet Signs

**Other References**

Activity 8100 QA Form

IMUTCD Chapter 2A

INDOT Standard Specification / Drawings section 802

Sheet Sign Replacement Cycle OM 11-01

**Sub Activities**

| Average Daily Production | 16-24 Signs | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Sheet Sign Modernization | CODE | 8100 |
|---|---|---|---|

**Work Method**

1. Review sign log
2. Call in locates 48 hours before re-signing work will be performed. Any anchor or post that will be driven **or removed** from the ground requires a locate. (This does not include removing post from anchor)
3. Ensure all signs for the day are loaded on the vehicle as well as any posts and hardware that may possibly be needed.
4. Place work area safety devices.
5. Refer to Standard Drawings to determine proper height and offset from roadway or walkway, and sign size.
6. Measure offsets and heights of current sign. Laser or line level may be required to determine height above roadway.
7. Determine if current post and anchor can be reused or if sign needs to be moved to meet current standards. If new post is required, refer to Sign Post Selection Guide. Signs shall not be placed on utility posts unless a separate agreement with the utility exists.
8. If the sign is leaning, the post and anchor need to be removed and re-driven. No more than 2” of the anchor shall remain above the ground.
9. Remove existing sheet sign. May use ladder/lift to remove sign from post or remove post and sign from anchor, then remove the sign while on the ground.
10. If a new post is required, cut the post to correct length to achieve proper height of the sign. Secure in anchor with corner bolts.
11. Install date sticker on what will be the lower back corner of the sign that will be closest to the roadway.
12. Attach sign to post with new hardware. Lock washer and nut or lock nut shall be on the back of the sign, nylon then metal washer on the sign face. Holding bolt head against sign face, tighten nut from the back of the sign. Nuts shall be tightened sufficiently to hold sign firmly to post, but caution should be used not to twist sign sheeting.
13. Step back and review installation. Ensure no obstructions are present, and that the sign is correctly installed.
14. Collect tools and all materials. Ensure the worksite is free of debris.
15. Remove work area safety devices and move to next location.

**Special Considerations**

Crews should be provided with a packet of Standard Drawings applicable to sign operations

If drilling holes in the sign, drill from the front of sign to reduce sheeting tear.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 16-24 Signs | EFFECTIVE DATE | 7/12/2023 |

# Indiana Department of Transportation

## Activity 8100 QA Form - Sheet Sign Modernization

Asset Inventory #:_____ District/Sub/Unit:_____
Work Order #:_____ Route:_____
Date completed:_____ Intersections:_____
Date inspected:_____ RP Start/End:_____
Inspector:_____
QA Window: 0-6 months

**Sign information:**
Message:_____ Rural/Urban:_____
Type (R/W/G):_____ Year of sign:_____
Type of post (S/G):_____

**Observations:**

1. Is sign at correct height?
   0 No
   11 Yes

2. Correct application of post?
   0 No
   11 Yes

3. Sign at correct angle?
   0 No
   11 Yes

4. Date sticker or other method visible?
   0 No
   11 Yes

5. Bolts and washers correct?
   0 No
   11 Yes

6. Is sign visible to motorists?
   0 No
   11 Yes

7. Is sign correct size for conditions?
   0 No
   11 Yes

8. Is sign plumb?

| | |
|---|---|
| 0 | No |
| 11 | Yes |

9. Is there a Serious Deficiency? (if Serious Deficiency exists QA is automatic failure scored at 0)

| | |
|---|---|
| 11 | No |
| Fail | Yes |

**Inspector Comments:**

**Score:**

| | Possible | Actual |
|---|---|---|
| **1** | 11 | |
| **2** | 11 | |
| **3** | 11 | |
| **4** | 11 | |
| **5** | 11 | |
| **6** | 11 | |
| **7** | 11 | |
| **8** | 11 | |
| **9** | 11 *or* Fail | |
| **Total:** | | |

**Serious Deficiencies include:**

- Back to back channel posts unprotected by a guardrail
- Sign face blocked by brush
- Sign defaced and difficult to read
- Sign structure damaged by vehicle or vandalism
- Post(s) with no sign/button on it, unable to show post-only for seasonal sign
- No known age available
- Incorrect channel post splices
- Primary sign height < 4'6"
- Any square post base > 4" above the ground

**Final % score (divide Actual by Possible):_____**

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Sheet Sign Maintenance | CODE | 8110 |
|---|---|---|---|

**Purpose**

To restore and maintain adequate control and guidance of traffic; repair, reset, and replace existing sheet signs, directional markers, mileposts, and hazard markers.

**Category** Signs

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

**Scheduling & Coordination**

Repair or replace stop, yield, and other priority signs without waiting for routine scheduling. Other deficiencies should be scheduled. Signs that are leaning more than 5 degrees, have damage, or have poor legibility should be scheduled to for maintenance. New sign replacements should be made with installations which comply with current standards. Be specific when scheduling signs for repair; exact locations and necessary material should be with crew to eliminate comebacks whenever possible. Signs with blinking LED lights installed on them should be visually inspected twice yearly to check the functionality of the LED lights. Any lights that are not functioning properly should be repaired or replaced promptly after the inspection is performed.

| Reporting | Asset to Report to | Sign* | Reporting Units | Signs |
|---|---|---|---|---|

The following are considered one accomplishment: attaching a new sign to a post; replacing a damaged post; re-installing anchor or installing a flange on an anchor to repair or maintain integrity of the sign installation. The maximum accomplishment per structure is equal to the number of signs on the structure.

Straightening a post in place is not an accomplishment and should not be done. Instead, the post/anchor should be removed and reinstalled close to the current location, or an anchor with flanges should be used.

A new sign at a new location is reported to Activity 8200

For additional work order reporting guidance see the Work Orders section of the Preface.

* Report to the sign asset. If asset is not in sign inventory, report to Pavement Key.

**Crew Size** 2 Workers

| | QTY |
|---|---|
| Laborer | 1 |
| Crew Leader | 1 |

**Job Specific Equipment**

| | |
|---|---|
| Aerial Bucket Truck as needed | 1 |
| Pickup truck as needed | 1 |

**P.P.E.**

1) Base PPE

2) Safety Harness / Fall Protection if using lift

**Materials**

Sign Materials - INDOT Spec Section 802.02

Posts, Anchors, Brackets, Aluminum Bars, Stiffeners, Sheet Signs

**Other References**

Activity 8100 QA Form

IMUTCD Chapter 2A

INDOT Standard Specification / Drawings section 802

**Sub Activities**

| Average Daily Production | 9 – 15 Signs | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Sheet Sign Maintenance | CODE | 8110 |
|---|---|---|---|

**Work Method**

1. Review sign log and locations that need maintenance
2. Call in locates 48 hours before sheet sign maintenance work will be performed. Any anchor or post that will be driven **or removed** from the ground requires a locate. (This does not include removing post from anchor)
3. If a priority sign needs repaired before a locate can be performed use a temporary sign mounted on temporary supports.
4. Ensure all signs for the day are loaded on the vehicle as well as any posts and hardware that may possibly be needed.
5. Place work area safety devices.
6. Refer to Standard Drawings to determine proper height and offset from roadway or walkway, and sign size.
7. Measure offsets and heights of current sign. Laser or line level may be required to determine height above roadway.
8. Determine if current post and anchor can be reused or if sign needs to be moved to meet current standards. If new post is required, refer to Sign Post Selection Guide. Signs shall not be placed on utility posts unless a separate agreement with the utility exists.
9. If the sign is leaning, the post and anchor need to be removed and re-driven. No more than 2” of the anchor shall remain above the ground.
10. Remove existing sheet sign. May use ladder/lift to remove sign from post in the air or remove post from anchor, then remove the sign while on the ground.
11. If a new post is required, cut the post to correct length to achieve proper height of the sign. Secure in anchor with corner bolts.
12. Install date sticker on what will be the lower back corner of the sign that will be closest to the roadway.
13. Attach sign to post with new hardware. Lock washer and nut or lock nut shall be on the back of the sign, nylon then metal washer on the sign face. Holding bolt head against sign face, tighten nut from the back of the sign. Nuts shall be tightened sufficiently to hold sign firmly to post, but caution should be used not to twist sign sheeting.
14. Check the installation work to make sure that all steps above were followed correctly. Check the sign for sight distance obstructions using the instructions in the “Maintaining Vegetation for Sight Distance” document attached at the end of this activity entry. If the sight distance of the sign is obstructed by vegetation, report as a deficiency using the Deficiency Application.
15. Collect tools and all materials. Ensure the worksite is free of debris.
16. Remove work area safety devices and move to next location.

**Special Considerations**

Crews should be provided with a packet of Standard Drawings applicable to sign operations

If drilling holes in the sign, drill from the front of sign to reduce sheeting tear.

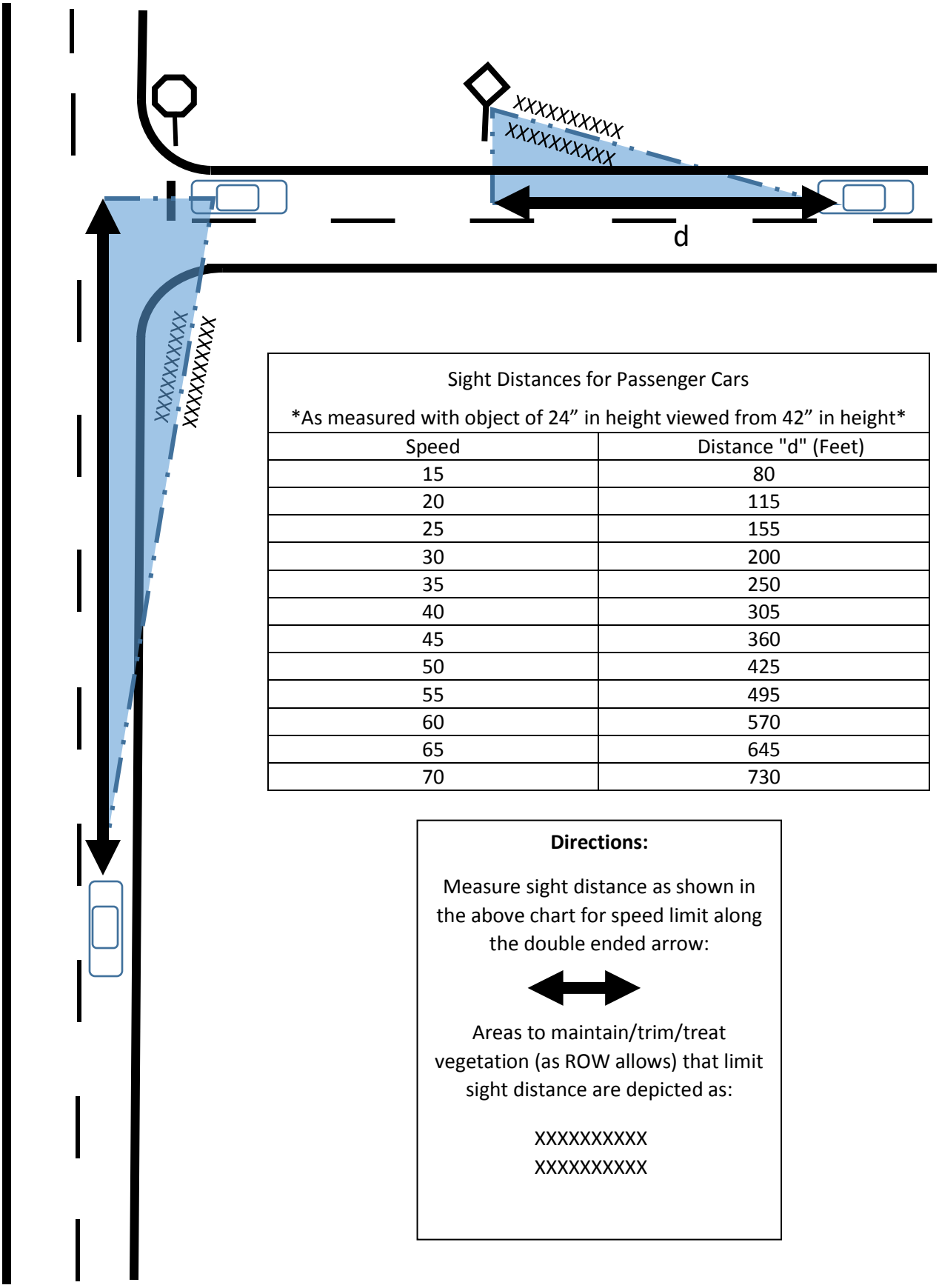
| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 9 - 15 Signs | EFFECTIVE DATE | 7/12/2023 |

# Maintaining Vegetation for Sight Distance

1. Determine the passenger car sight distance “d” in feet for the speed limit of the road section on which the sign is installed using the table on the next page.
2. Position your vehicle in a safe location on the shoulder of the roadway a distance equal to “d” feet away from the sign. The distance “d” should be measured along the line of the roadway as shown in the diagram on the next page.
3. From this position, observe the sign and its visibility. Look for any vegetation that is obstructing the view of the sign, as well as any vegetation that looks like it has the potential to grow and obstruct the view of the sign.
4. If there is any vegetation obstructing view of the sign, a work request should be created for the clearing of the vegetation. The request should include the following in the description field:

   “Sight distance to sign has obstructions. Vegetation starting (number of feet from face of sign to obstructing vegetation) feet from the sign needs to be cleared so that the sign can be viewed from (sight distance value “d”) feet. The obstructing vegetation includes (description of vegetation, ex. “hanging tree branches” or “woody vegetation on ground”).”

# Maintaining Vegetation for Sight Distance




| Sight Distances for Passenger Cars<br>*As measured with object of 24” in height viewed from 42” in height* | |
|---|---|
| Speed | Distance "d" (Feet) |
| 15 | 80 |
| 20 | 115 |
| 25 | 155 |
| 30 | 200 |
| 35 | 250 |
| 40 | 305 |
| 45 | 360 |
| 50 | 425 |
| 55 | 495 |
| 60 | 570 |
| 65 | 645 |
| 70 | 730 |

**Directions:**

Measure sight distance as shown in the above chart for speed limit along the double ended arrow:

Areas to maintain/trim/treat vegetation (as ROW allows) that limit sight distance are depicted as:

XXXXXXXXXX
XXXXXXXXXX

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Panel Sign Maintenance | CODE | 8120 |
|---|---|---|---|

**Purpose**

Repair, reset, or replace panel traffic signs to restore and maintain adequate control and guidance of traffic, lost due to accident or storm damage or vandalism. This activity does not include installation of new signs at new locations or new signs required as a result of change in sign standards.

**Category** Signs

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Perform this activity as required throughout the year. Signs should be repaired as soon as possible after damage.

| Reporting | | Asset to Report to | Sign* | Reporting Units | Signs |
|---|---|---|---|---|---|

Accomplishment is;

- Repair sign on site; replace demountable copy, shields, re-attach I-beam to footer
- Remove sign, return to shop for repairs to sign, make repairs to footer if necessary, re-install on site (all 1 accomplishment)

Only 1 accomplishment per panel sign repair

For additional work order reporting guidance see the Work Orders section of the Preface.

* Report to the sign asset. If asset is not in sign inventory, report to Pavement Key.

**Crew Size** 3-4 Workers

| | QTY |
|---|---|
| Crew Leader | 1 |
| Laborer | 2-3 |

*Traffic Control Personnel are NOT shown here

**P.P.E.**

1) Base P.P.E.
2) Safety Harness/Fall Protection when using aerial lift

**Materials**

| | |
|---|---|
| Panel Sign | Edge Molding |
| I Beams | Demountable Copy |
| Overlay | (All INDOT Spec Section 919.01) |
| Shields | |

**Job Specific Equipment**

65' Platform Truck
Auger/Crane
2 ton Stakebed
Trailer

*Traffic Control Equipment is NOT shown here

**Other References**

IMUTCD Chapter 2
INDOT Standard Specification section 802
INDOT Standard Drawings section 802
Wind Load Selection Guide (for I-Beams)
OM 11 - 01

**Sub Activities**

| Average Daily Production | 2 Signs | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Panel Sign Maintenance | CODE | 8120 |
|---|---|---|---|

**Work Method**

Schedule required traffic control

1. Place work zone safety devices

2. Inspect structure, sign, footers to determine which materials are needed to effect repairs.

3. If possible, make repair at this time to ensure safety of structure and motoring public (i.e.: lay sign down, bring sign/structure to shop).

On site repairs.

4. Reset I-beam, replace keeper plates and nuts bolts and washers as needed. See standard drawing E 802-SNGP-05 for torque values

5. Replace demountable copy, shields, panel bolts, etc. if necessary

6. If replacing demountable copy, install date sticker on what will be the lower back corner of the sign that will be closest to the roadway. If there is already a previous date sticker on the sign, install the new date sticker directly on top of the old sticker, with the new sticker completely covering the old sticker.

7. If repairs cannot be made in the field, remove sign and or structure and transport to shop for repairs

8. Clean area of debris

9. Remove traffic control devices

10. Order materials for sign repair from LSC, panels, I-beams, fuse plates etc.

11. Effect repairs on sign or structure and transport to site and re-install

12. Schedule traffic control if necessary

13. Transport to site and re-install panel sign

14. Clean area of debris

15. Remove traffic control

Mobilize to next assignment

**Special Considerations**

When new footers are required, the installation shall meet current design standards as specified in the Manual on Uniform Traffic Control Devices and Wide Flange Post Selection Table from the Standard Drawings.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 2 Signs | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Panel Sign Overlay | CODE | 8121 |
|---|---|---|---|

**Purpose**

Panel Sign modernization and upgrade to current panel sign standards using panel overlays. Overlay existing panel signs, with panel overlay to restore and maintain adequate control and guidance of traffic and comply with federal minimum panel sign reflectivity standards. This activity does not include installation of new panel signs at new locations, which would add to the feature inventory

**Category** Signs

- ☒ **PM**
- ☐ **QA**
- ☒ **Plan Location**

**Scheduling & Coordination**

Corridor replacement plan based upon a 20 year panel sign age replacement.

Panel overlays shall be ordered twice yearly to meet work plan requirements.

| Reporting | | Asset to Report to | Sign* | Reporting Units | Square Feet |
|---|---|---|---|---|---|

Accomplishment is reported in square footage of overlay installed

All work including pre-drilling, overlay installation, etc shall be reported to one Work Order

This activity does not include installation of new panel signs at new locations; this activity is reported to 8200

For additional work order reporting guidance see the Work Orders section of the Preface.

* Report to the sign asset. If asset is not in sign inventory, report to Pavement Key.

**Crew Size** 3 Workers

| | QTY |
|---|---|
| Crew Leader | 1 |
| Laborer | 2 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

65' Platform Truck

*Traffic Control Equipment is NOT shown here

**P.P.E.**

1) Base P.P.E.
2) Safety Harness/Fall Protection when using aerial lift

**Materials**

Edge Molding – INDOT Spec Section 919.01

Overlay – INDOT Spec Section 919.01

**Other References**

IMUTCD Chapter 2

INDOT Standard Specification section 802

INDOT Standard Drawings section 802

**Sub Activities**

| Average Daily Production | 200 - 300 Square Feet | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Panel Sign Overlay | CODE | 8121 |
|---|---|---|---|

## Work Method

1. Pre-drill panel overlays around outer edges at approximately 16" intervals and approximately 16" intervals throughout the overlay section. This will prevent screw breaking and panel overlay buckling
2. Schedule required traffic control if necessary
3. Place work area safety devices
4. Remove any existing demountable copy and shields; flat edge floor scraper or flat shovel works well for this.
5. Ensure surface of panels is smooth. Use grinder or spade to remove all rivets.
6. Install Overlay
   a. Attach straight edge to bottom of panel sign using clamps
   b. Start at lower left next to edge molding and move across row by row
   c. Attach overlays with #8 3/4" stainless steel, self-tapping screws around each piece with 16" spacing both horizontal and vertical, ensure screws do not break during installation process. If it does break, tap another screw next to it.
7. Install date sticker on what will be the lower back corner of the sign that will be closest to the roadway. If there is already a previous date sticker on the sign, install the new date sticker directly on top of the old sticker, with the new sticker completely covering the old sticker
8. Step back from site and review installation
9. Collect tools and clean up all materials and debris from work site
10. Remove safety devices

## Special Considerations

Overlay should be fabricated to utilize the existing panel sign's current structure. The overlay can extend 6" on all size panels to facilitate larger font messages if necessary.

Consider purchasing drywall drill to help prevent screws from breaking.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 200 - 300 Square Feet | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Panel Sign Inspection/Minor Maintenance | CODE | 8125 |
|---|---|---|---|

**Purpose**

Conduct inspections of panel sign installations to ensure structure is sound and message is intact; this includes fasteners, nuts, bolts, keeper plates, footers, and overall appearance of the sign. This activity also includes minor repairs that can be made from the ground. Example: all footer bolts torqued and burred to specifications, keeper plates are positioned correctly, foundations are clear of soil buildup, etc.

**Category** Signs

- ☒ **PM**
- ☒ **QA**
- ☐ **Unit Cost**
- ☒ **Plan Location**

**Scheduling & Coordination**

Inspect approximately 1/5 of feature inventory each year. This activity can be scheduled in any weather.

| Reporting | | Asset to Report to | Sign* | Reporting Units | Structures |
|---|---|---|---|---|---|

Accomplishment is per structure inspected

Inspection form to be completed and attached to work order

Create work request for signs requiring maintenance that was unable to be performed during inspection

For additional work order reporting guidance see the Work Orders section of the Preface.

* Report to the sign asset. If asset is not in sign inventory, report to Pavement Key.

**Crew Size** 2 Workers

| | QTY |
|---|---|
| Crew Leader | 1 |
| Laborer | 1 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

Pick-up truck
Torque Wrench
Shovel
Chisel

*Traffic Control Equipment is NOT shown here

**P.P.E.**

Base PPE

**Materials**

**Other References**

IMUTCD Chapter 2
INDOT Standard Specification section 802
INDOT Standard Drawings section 802

**Sub Activities**

| Average Daily Production | 15 – 20 Structures | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Panel Sign Inspection/Minor Maintenance | CODE | 8125 |
|---|---|---|---|

**Work Method**

1. Place traffic control devices if needed
2. Inspect structure using panel sign inspection form.
   - Ensure message is clearly legible from road
   - Ensure fuse plate is proper location, panel clips installed correctly, and the proper size and number of I-beams
   - Clean soil and debris around footer breakaway system
   - Ensure base height meets standards
   - Check that proper size keeper plates are used
   - Test torque values of all base bolts to ensure they are not too loose or tight

     If necessary, correct the torque or bolts
   - Ensure all base bolts are properly burred. If necessary, burr the base bolts.
   - Check for date sticker on back of sign.
3. Check the installation work to make sure that all steps above were followed correctly. Check the sign for sight distance obstructions using the instructions in the “Maintaining Vegetation for Sight Distance” document attached at the end of this activity entry. If the sight distance of the sign is obstructed by vegetation, report as a deficiency using the Deficiency Application.
4. Collect tools and materials. Ensure area is clear of debris.
5. Remove traffic control devices.
6. Move to next locations.
7. Create work requests for any sign that requires maintenance that was not able to be performed during the inspection.
8. Attach inspection forms to work orders.

**Special Considerations**

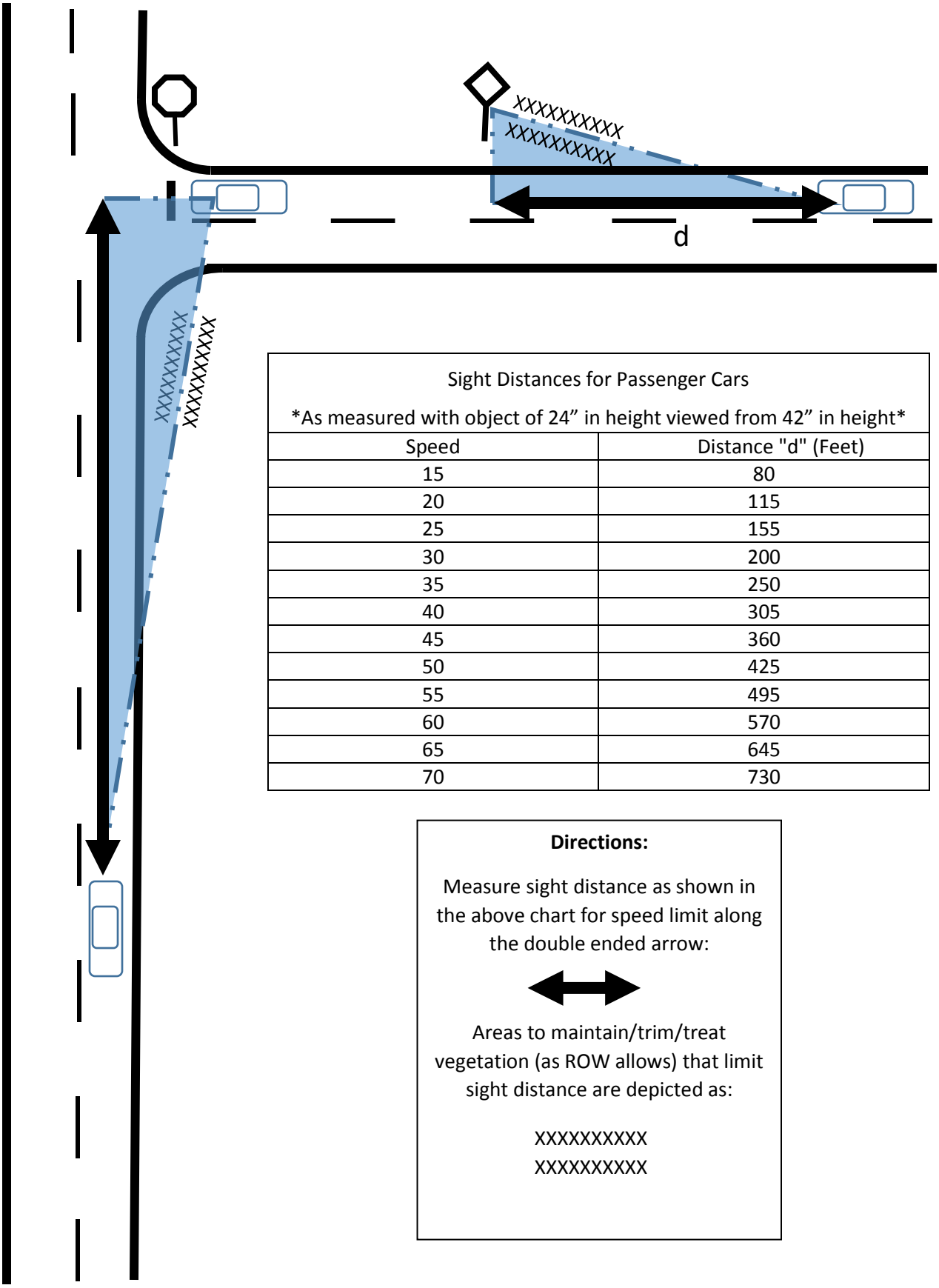
| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 15 – 20 Structures | EFFECTIVE DATE | 7/12/2023 |

# Maintaining Vegetation for Sight Distance

1. Determine the passenger car sight distance “d” in feet for the speed limit of the road section on which the sign is installed using the table on the next page.
2. Position your vehicle in a safe location on the shoulder of the roadway a distance equal to “d” feet away from the sign. The distance “d” should be measured along the line of the roadway as shown in the diagram on the next page.
3. From this position, observe the sign and its visibility. Look for any vegetation that is obstructing the view of the sign, as well as any vegetation that looks like it has the potential to grow and obstruct the view of the sign.
4. If there is any vegetation obstructing view of the sign, a work request should be created for the clearing of the vegetation. The request should include the following in the description field:

   “Sight distance to sign has obstructions. Vegetation starting (number of feet from face of sign to obstructing vegetation) feet from the sign needs to be cleared so that the sign can be viewed from (sight distance value “d”) feet. The obstructing vegetation includes (description of vegetation, ex. “hanging tree branches” or “woody vegetation on ground”).”

# Maintaining Vegetation for Sight Distance




| Sight Distances for Passenger Cars<br>*As measured with object of 24” in height viewed from 42” in height* | |
|---|---|
| Speed | Distance "d" (Feet) |
| 15 | 80 |
| 20 | 115 |
| 25 | 155 |
| 30 | 200 |
| 35 | 250 |
| 40 | 305 |
| 45 | 360 |
| 50 | 425 |
| 55 | 495 |
| 60 | 570 |
| 65 | 645 |
| 70 | 730 |

**Directions:**

Measure sight distance as shown in the above chart for speed limit along the double ended arrow:

Areas to maintain/trim/treat vegetation (as ROW allows) that limit sight distance are depicted as:

XXXXXXXXXX
XXXXXXXXXX

# INDOT – Panel Sign Inspection Form

Inspection Date: _____ Inspectors: _____

Route: _____ RP: _____ Direction: _____

Location Description: _____

Latitude: _____ Longitude: _____ Position (RT,LT, Median) _____

Type of Sign: Overlay: ☐ Demountable Copy: ☐

## Work Request Required For Sign ☐ Yes ☐ No

Message legible/reflective ☐ Yes ☐ No

Sign is at correct height ☐ Yes ☐ No

Sign has proper mounting *(Fuse Plates, panel clips, correct number, size, and location of I Beams)* ☐ Yes ☐ No

All Footer break away system clear of soil and debris ☐ Yes ☐ No

All base heights ≤ 4" ☐ Yes ☐ No

Proper size keep plates installed ☐ Yes ☐ No

Base Bolts torqued to specs ☐ Yes ☐ No

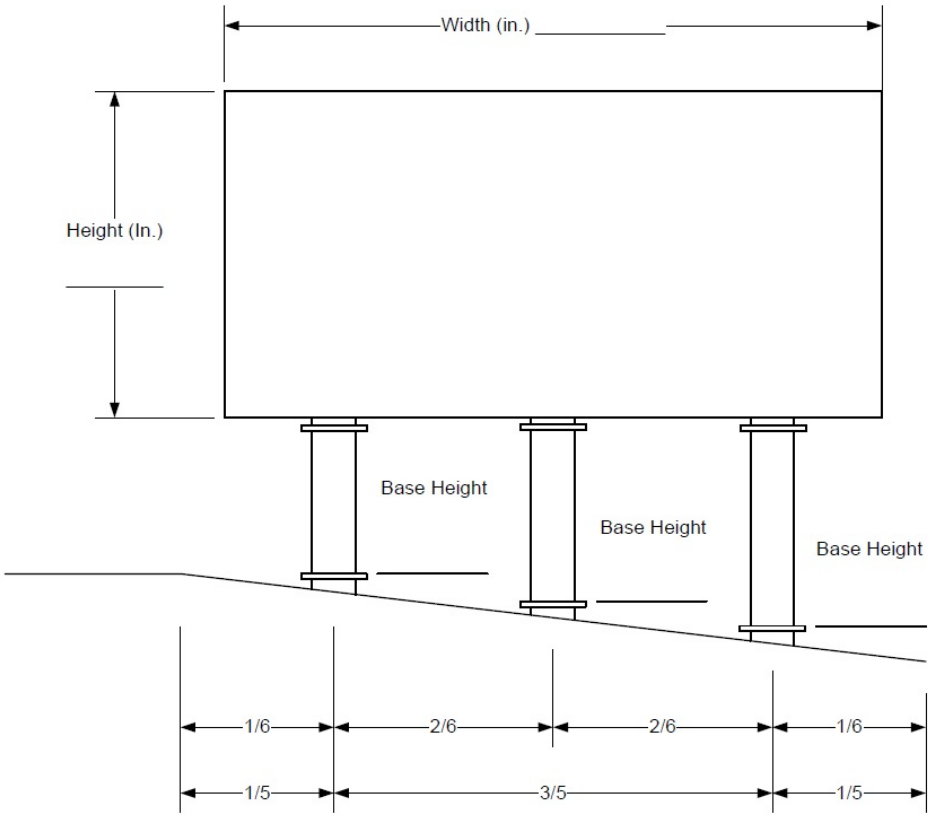
Base bolts burred ☐ Yes ☐ No

Top of fuse plate 1"-5" from bottom of sign (*Should all be about same value)* ☐ Yes ☐ No

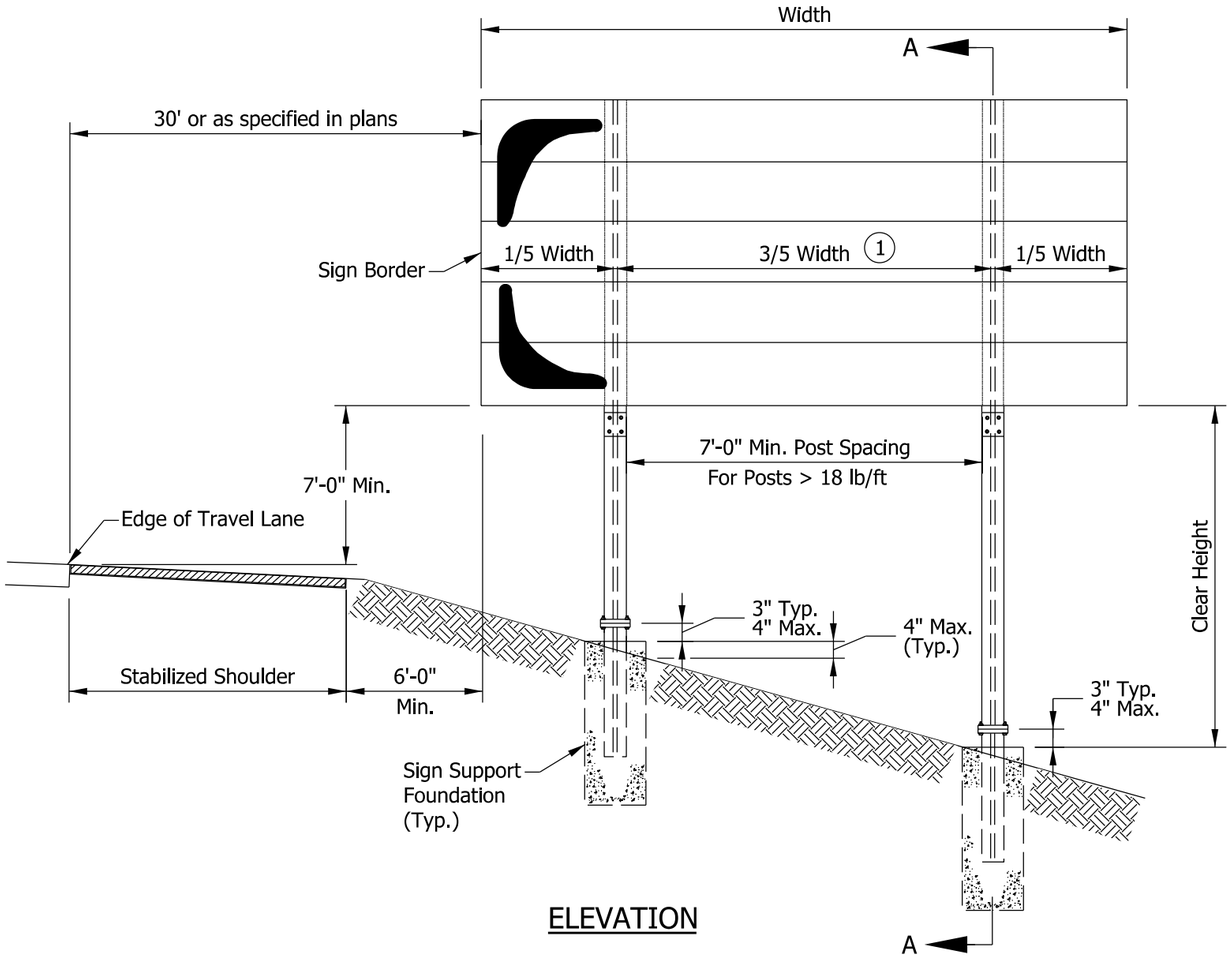
Date sticker placed *(Located lower roadside corner)* ☐ Yes ☐ No

Date of Sticker _____

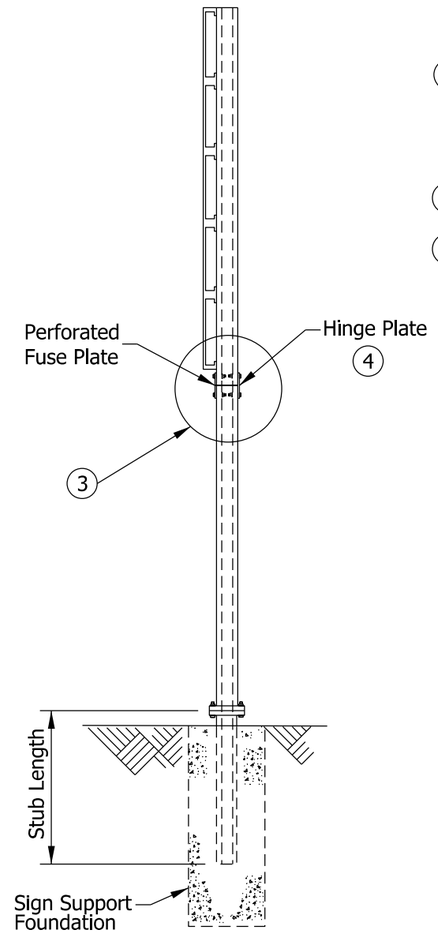
***Fill in Drawing below with all the information including message of the sign***




**Comments:**



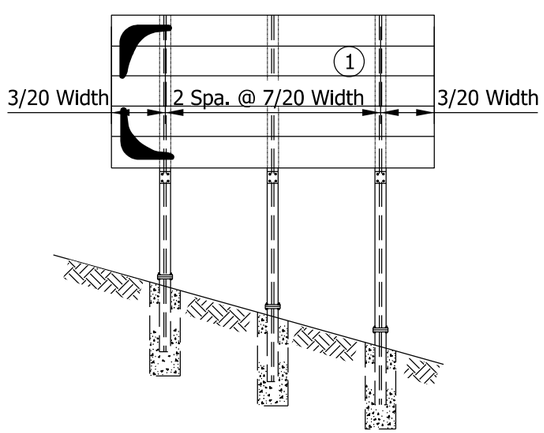

ELEVATION



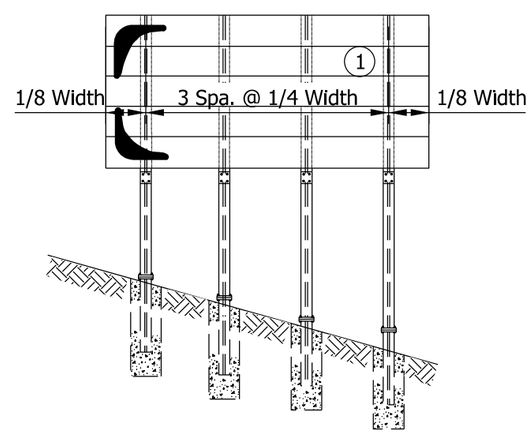

SECTION A-A

## NOTES:

1. For beams that have a unit weight greater than 18 lbs per foot the minimum beam spacing shall be 7 ft.
2. For sign post clip details see Standard Drawing E 802-SNGP-07.
3. See Detail A on Standard Drawing E 802-SNGP-05.
4. See keynote 3 on Standard Drawing E 802-SNGP-05.
5. Clear height is based on the longest post.




3 BEAM SPACING




4 BEAM SPACING

INDIANA DEPARTMENT OF TRANSPORTATION

WIDE FLANGE SIGN SUPPORT
PLACEMENT AND POST SPACING

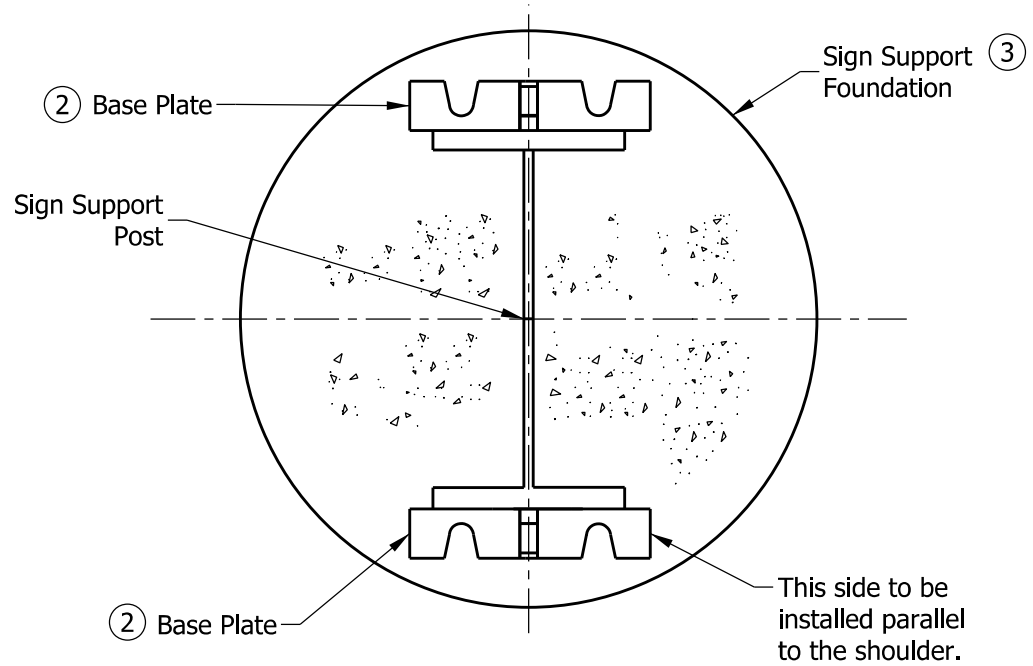
SEPTEMBER 2017

STANDARD DRAWING NO. E 802-SNGP-02

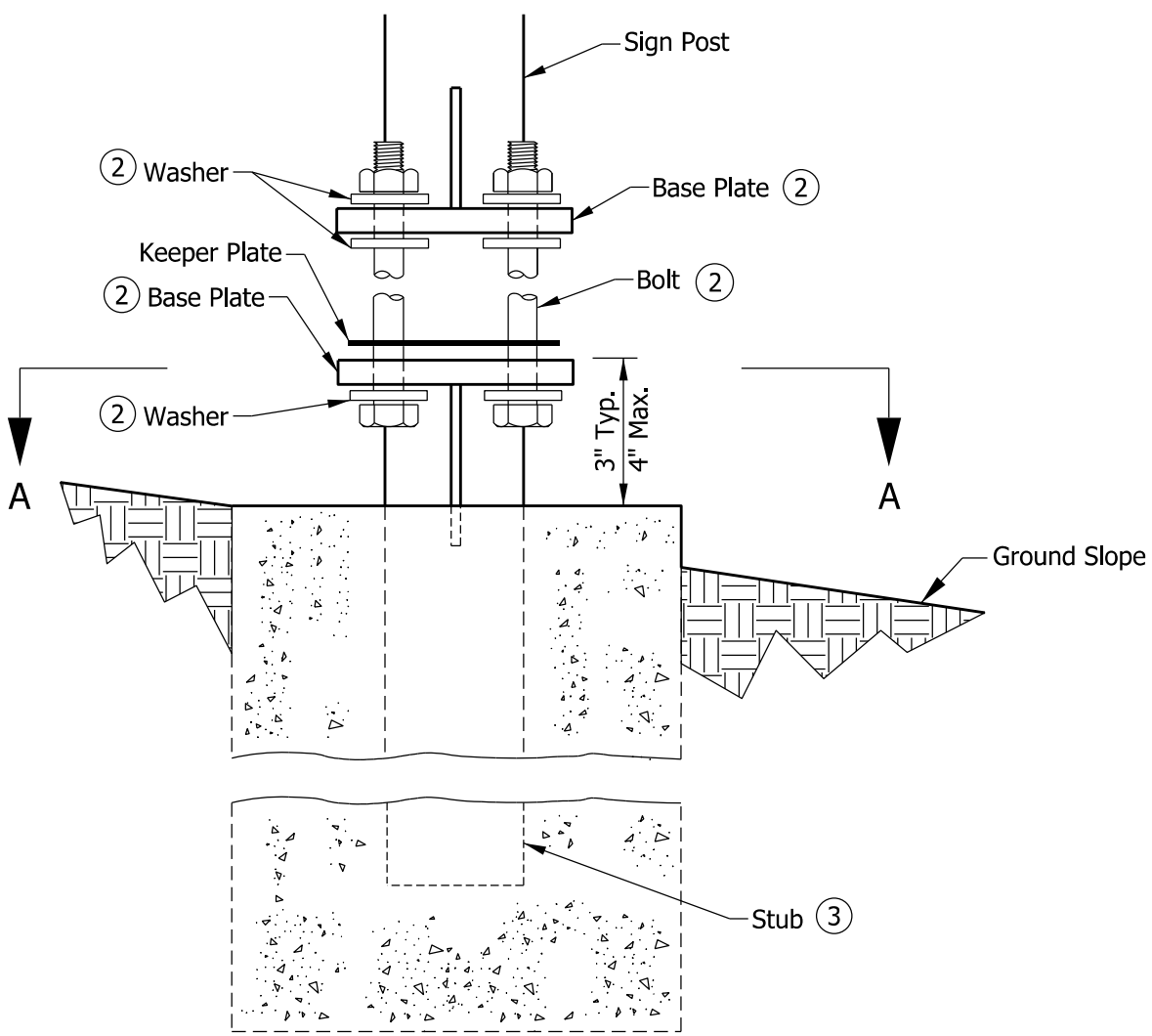
DAVID H. BORUFF
REGISTERED
No.
60900348
STATE OF
INDIANA
PROFESSIONAL ENGINEER

/s/ David H. Boruff 03/17/17
DESIGN STANDARDS ENGINEER DATE

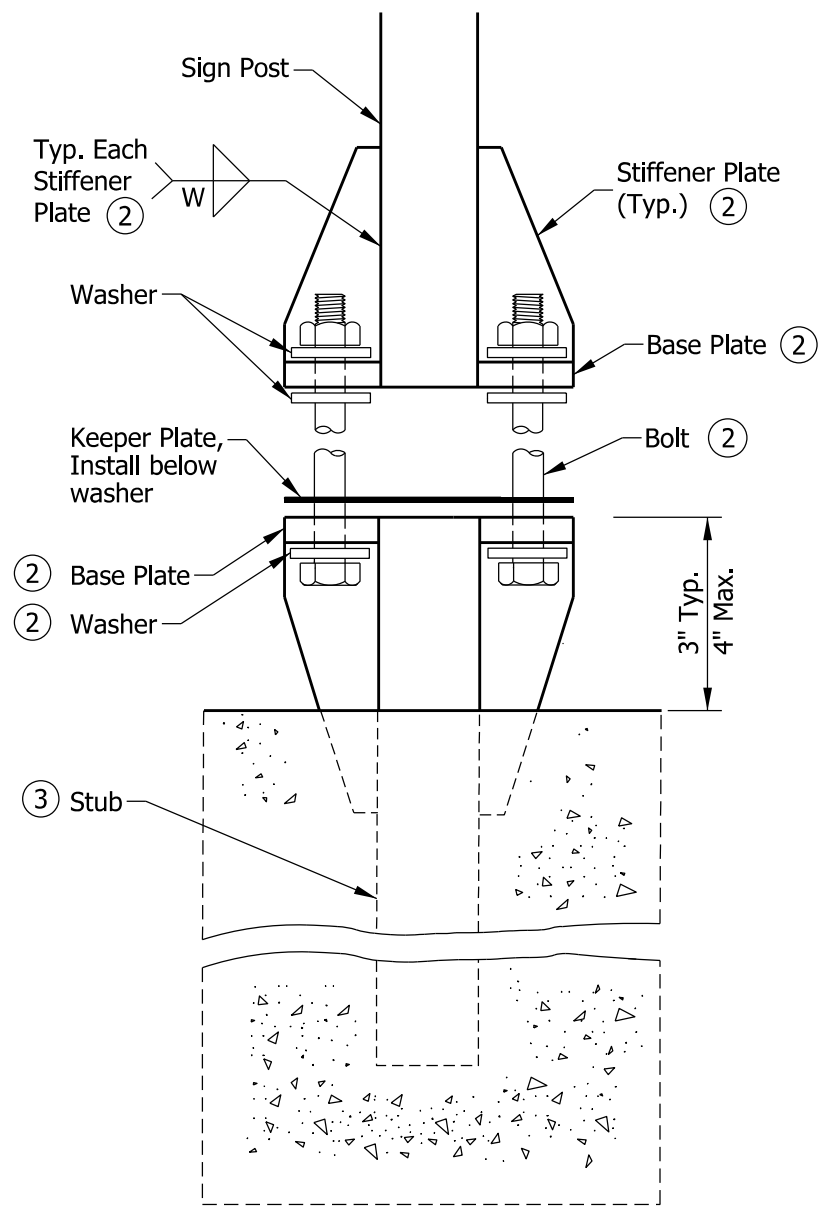
/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE




SECTION A-A




FRONT ELEVATION




SIDE ELEVATION

## NOTES:

1. Stubs shall be plumb and base plate shall be leveled and physically held level until the concrete sets.

(2) See Standard Drawing E 802-SNGP-04 for base plate and stiffener plate details, including weld thickness and bolt diameter.

(3) See Foundation Data table on Standard Drawing E 802-SNGP-16 for stub length and foundation dimensions.

## PROCEDURE FOR ASSEMBLY OF BASE CONNECTION:

A. The contractor shall bolt post to stub. One flat washer on each bolt shall be placed between the top of the keeper plate and bottom of the top base plate. Shim as required to plumb post.

B. All bolts shall be tightened in accordance to 711.65(d).

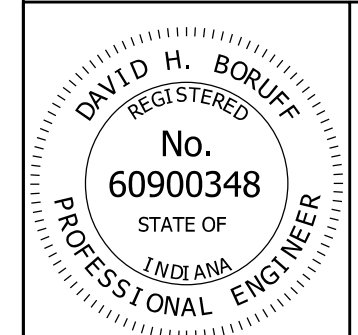
C. Threads at junction with nuts shall be burred using a center punch to prevent nut loosening.

INDIANA DEPARTMENT OF TRANSPORTATION

WIDE-FLANGE SIGN SUPPORT
BASE CONNECTION

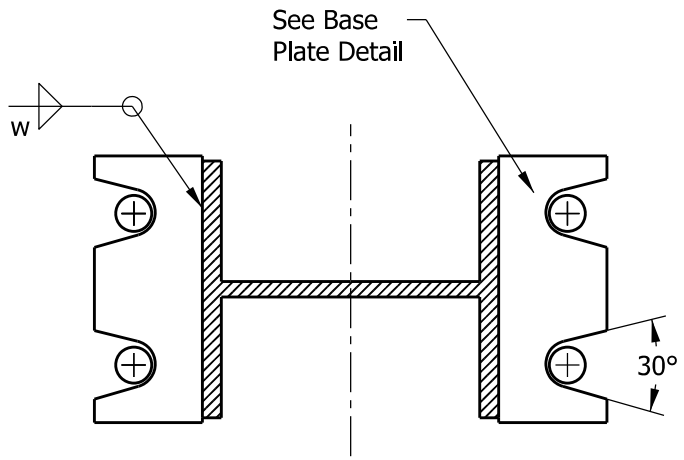
SEPTEMBER 2017

STANDARD DRAWING NO. E 802-SNGP-03

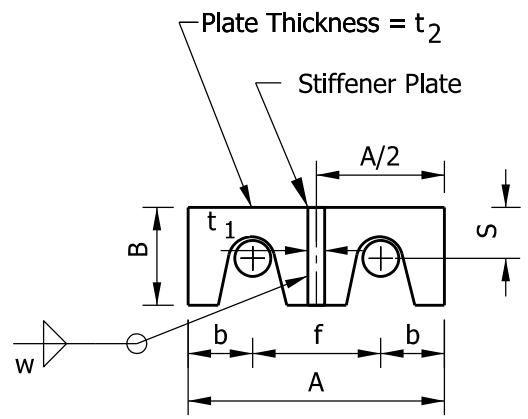



/s/ David H. Boruff 03/17/17
DESIGN STANDARDS ENGINEER DATE

/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE




SECTION AT BASE PLATE




BASE PLATE

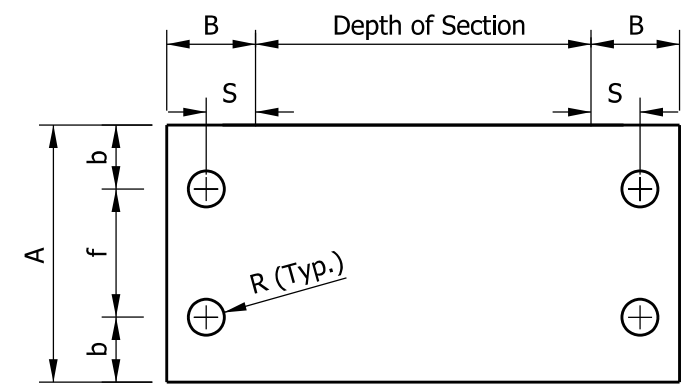
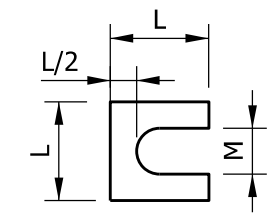


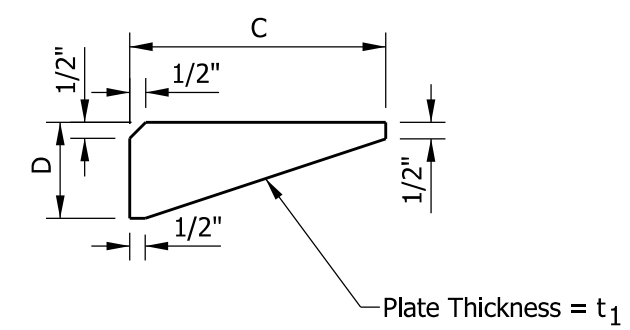

Plate Thickness = 0.0149"
(28 Gauge)

BOLT KEEPER PLATE




Provide 2 - 0.0149" Thick (28 Gauge)
and 2 - 0.0329" Thick (21 Gauge)
Shims per Post.

SHIM DETAIL




STIFFENER PLATE

| BASE CONNECTION DATA | | | | | | | | | | | | | | SHIM | | Wt. of Base Plate, Stiffener, & Misc. Hardware Per Post (lb) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Post Size | A | B | C | D | Bolt Dia. | Torque (lbf*in) | R | b | f | S | $t_1$ | $t_2$ | w | L | M | |
| W 6x9 | 4-1/2" | 2" | 4-1/2" | 2" | 1/2" | 140 ±20 | 9/32" | 1" | 2-1/2" | 1-3/8" | 1/2" | 1/2" | 3/16" | 1-3/4" | 13/16" | 8.43 |
| W 6x12 | 4-3/4" | 2" | 5-1/8" | 2" | 5/8" | 270 ± 45 | 3/8" | 1-1/8" | 2-1/2" | 1-3/16" | 1/2" | 1/2" | 1/4" | 1-3/8" | 11/16" | 9.02 |
| W 8x18 | 5-3/4" | 2-3/16" | 6-1/4" | 2-3/16" | 3/4" | 445 ± 75 | 7/16" | 1-1/2" | 2-3/4" | 1-3/8" | 1/2" | 5/8" | 1/4" | 1-3/4" | 13/16" | 13.71 |
| W 8x24 | 7" | 2-3/8" | 8" | 2-3/8" | 3/4" | 445 ± 75 | 7/16" | 1-3/4" | 3-1/2" | 1-3/8" | 1/2" | 3/4" | 5/16" | 2-1/8" | 13/16" | 20.70 |
| W 10x33 | 8" | 2-3/4" | 8" | 2-3/4" | 1" | 580 ± 90 | 9/16" | 2" | 4" | 1-9/16" | 1/2" | 3/4" | 5/16" | 2-3/8" | 1-1/16" | 26.08 |
| W 12x45 | 8" | 3" | 8" | 3" | 1" | 580 ± 90 | 9/16" | 2" | 4" | 1-9/16" | 1/2" | 3/4" | 5/16" | 2-3/4" | 1-1/16" | 28.35 |

INDIANA DEPARTMENT OF TRANSPORTATION

WIDE-FLANGE SIGN SUPPORT
BASE CONNECTION DIMENSIONS

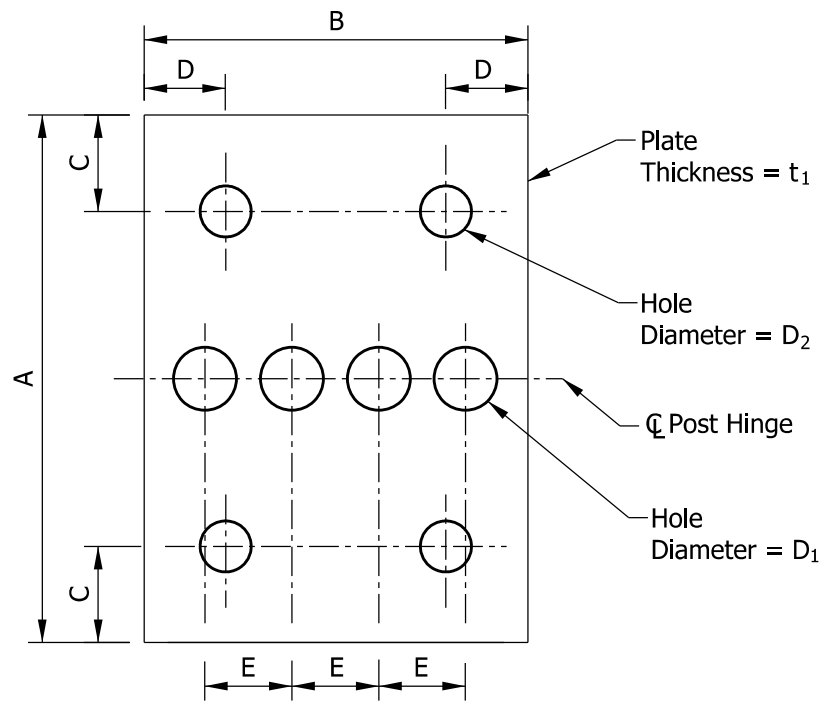
SEPTEMBER 2017

STANDARD DRAWING NO. E 802-SNGP-04

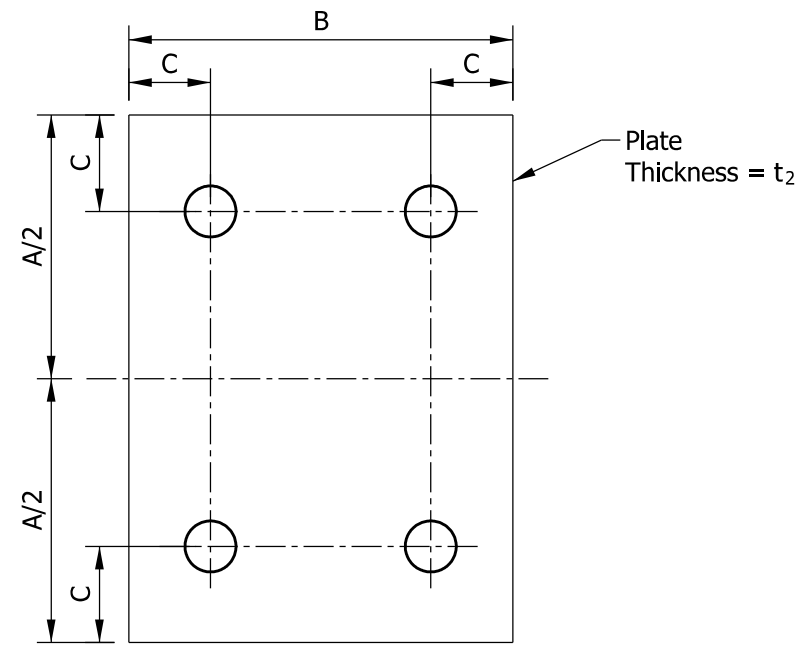
DAVID H. BORUFF
REGISTERED
No.
60900348
STATE OF
INDIANA
PROFESSIONAL ENGINEER

/s/ David H. Boruff 03/17/17
DESIGN STANDARDS ENGINEER DATE

/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE



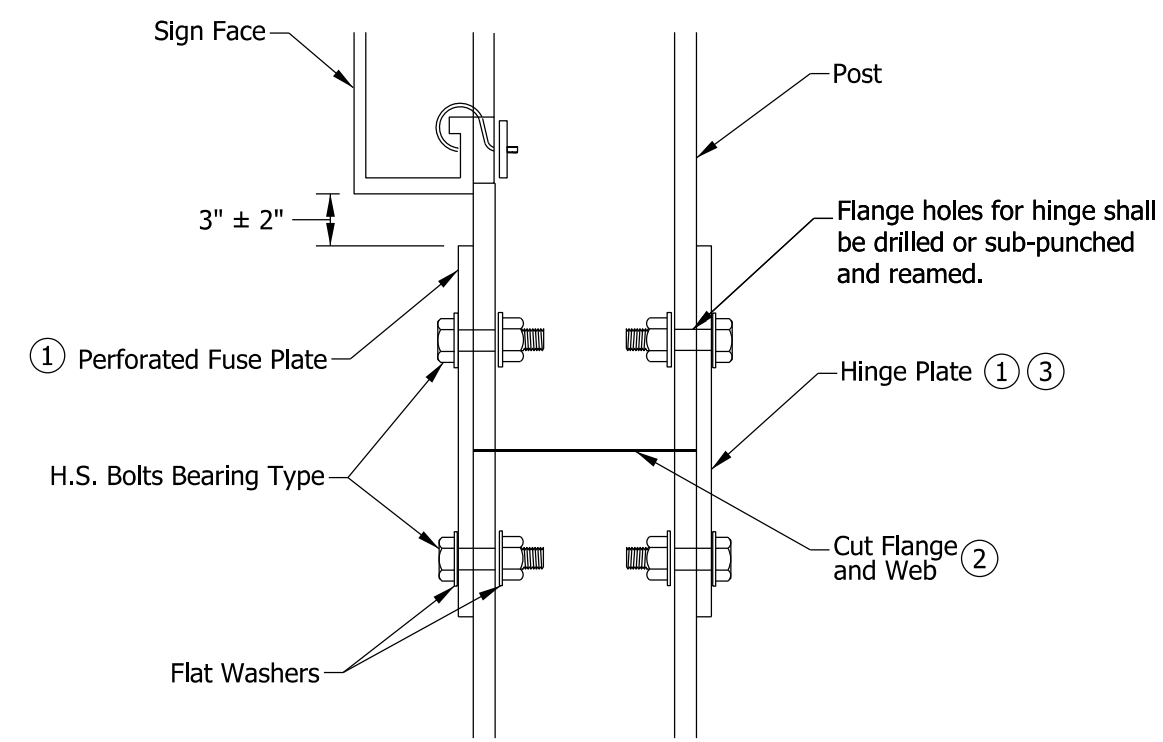

FUSE PLATE




HINGE PLATE

## NOTES:

1. The distance from the top of the fuse plate and the hinge plate to the bottom of the sign shall be the same for all posts.
2. The upper and middle W-Beam sections at the fuse plate/hinge plate connection shall fit flush. Any variation shall not exceed 0.0625 in.
3. For assemblies in medians or along undivided highways, perforated fuse plates shall be used on the front and back sides of the upper joint.




DETAIL A

FUSE AND HINGE PLATE DATA

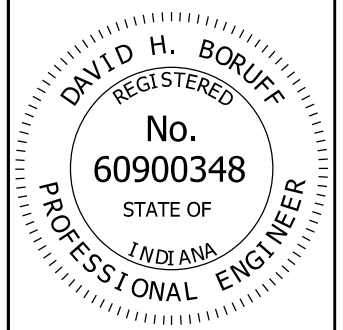
| Post Size | A | B | C | D | E | $t_1$ fuse plate | $t_2$ hinge plate | $D_1$ | $D_2$ | Bolt Diameter | Wt. of Fuse Plate & Hinge Plate Per Post (lb) | Bolt Tension (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W 6x9 | 4-1/4" | 4" | 1-1/8" | 7/8" | 1" | 1/4" | 1/4" | 3/4" | 9/16" | 1/2" | 4.80 | 12,050 |
| W 6x12 | 7-1/4" | 4" | 1-1/4" | 7/8" | 15/16" | 3/8" | 3/8" | 13/16" | 11/16" | 5/8" | 6.16 | 19,200 |
| W 8x18 | 8-1/4" | 5-1/4" | 1-3/8" | 1-1/8" | 1-1/4" | 3/8" | 3/8"" | 1" | 13/16" | 3/4" | 9.20 | 28,400 |
| W 8x24 | 8-1/4" | 6-1/2" | 1-3/8" | 1-1/2" | 1-1/2" | 1/2" | 1/2" | 1" | 13/16" | 3/4" | 15.20 | 28,400 |
| W 10x33 | 9-1/4" | 8" | 2" | 1-3/4" | 1-3/4" | 5/8" | 5/8" | 1-1/8" | 1-1/16" | 1" | 26.20 | 39,250 |
| W 12x45 | 11" | 8" | 2" | 1-3/4" | 1-3/4" | 3/4" | 3/4" | 1-5/16" | 1-1/16" | 1" | 37.40 | 51,500 |

INDIANA DEPARTMENT OF TRANSPORTATION

WIDE-FLANGE SIGN SUPPORT
FUSE/HINGE PLATE CONNECTION

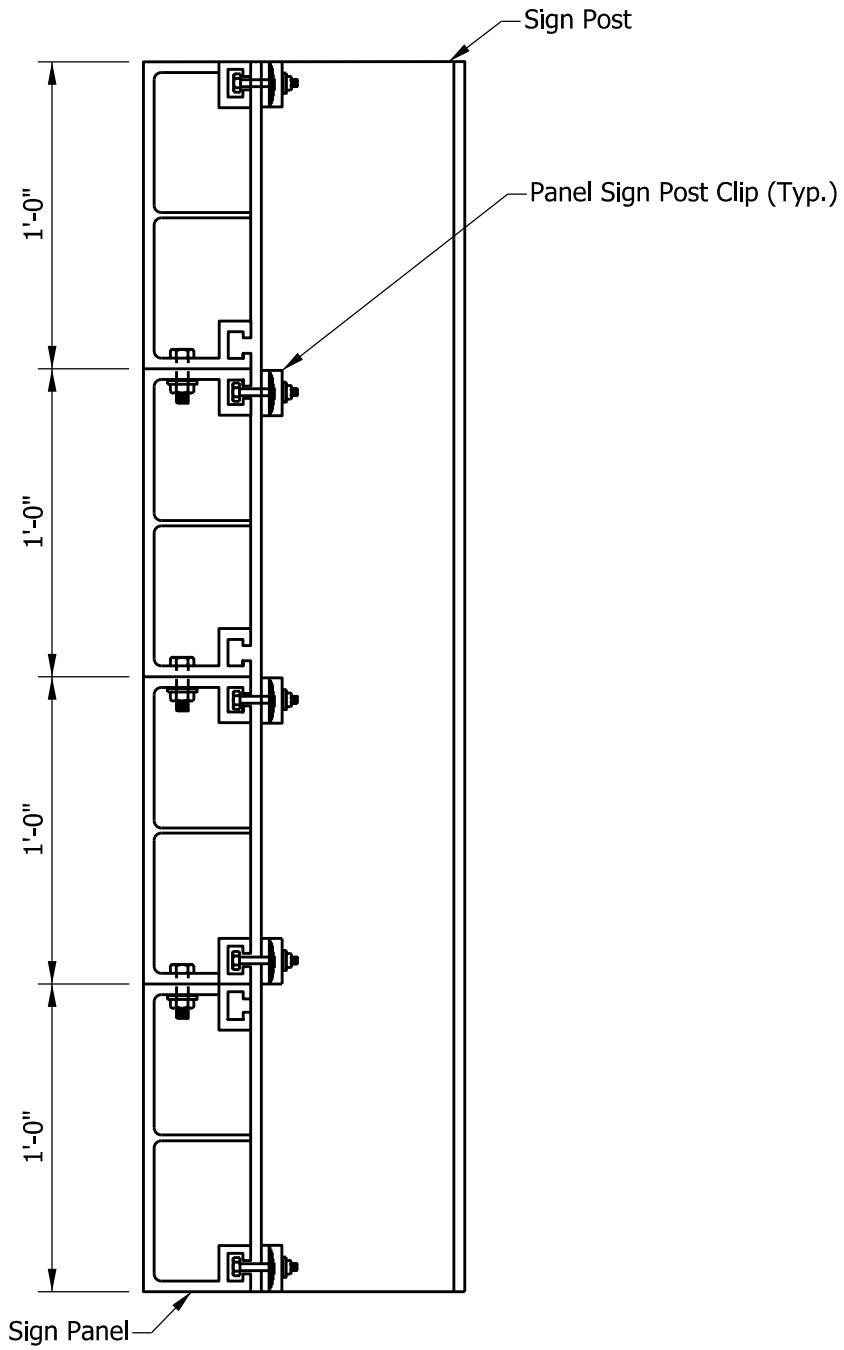
SEPTEMBER 2017

STANDARD DRAWING NO. E 802-SNGP-05

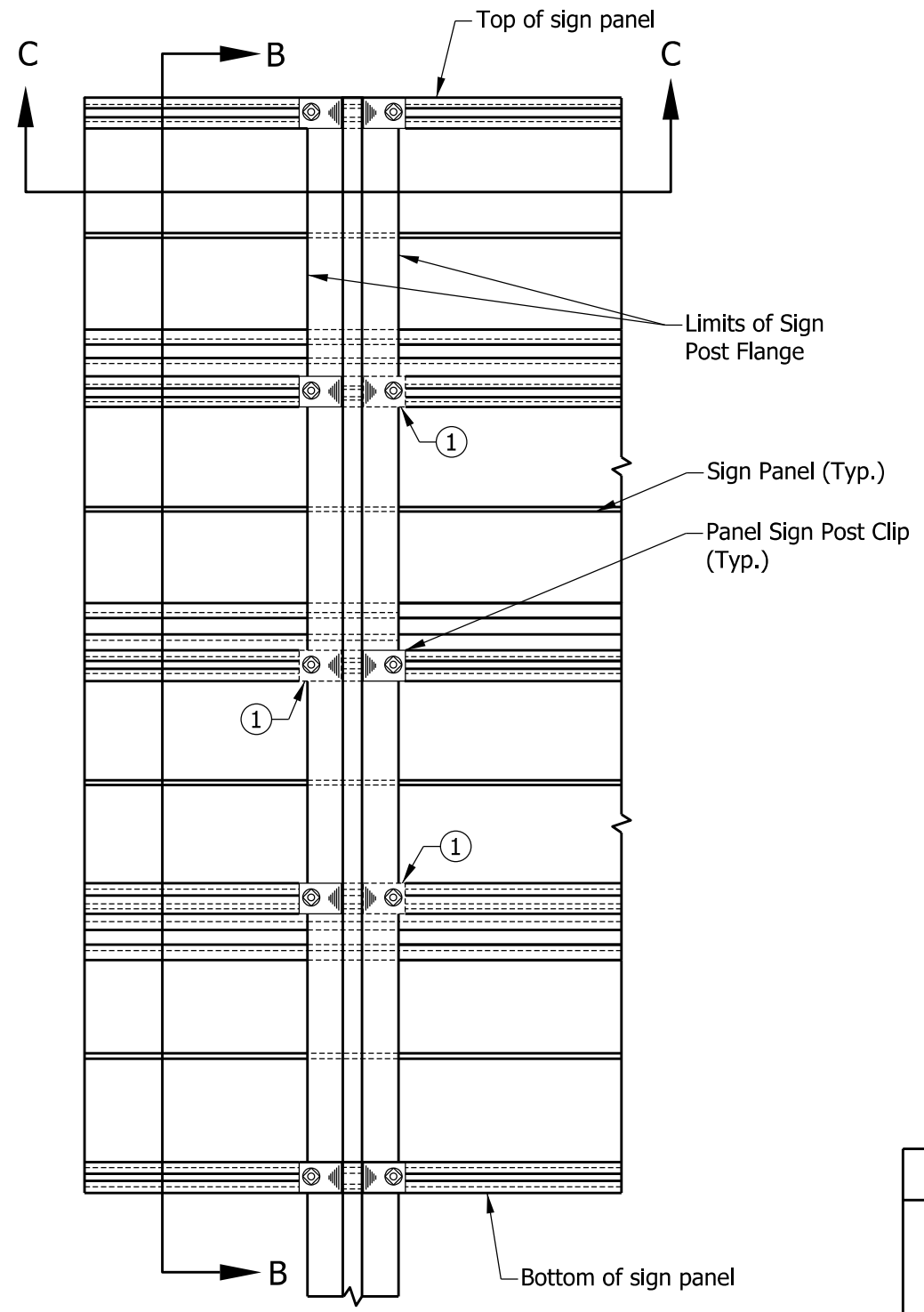



/s/ David H. Boruff 03/17/17
DESIGN STANDARDS ENGINEER DATE

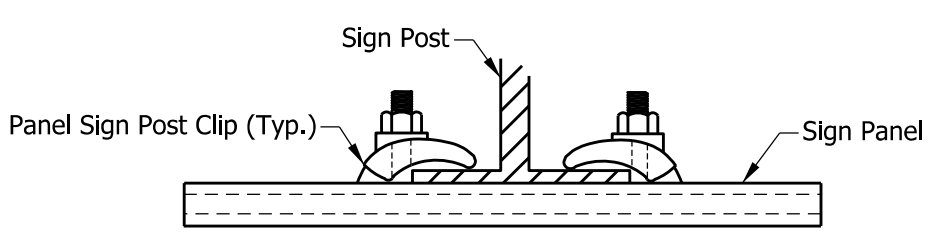
/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE



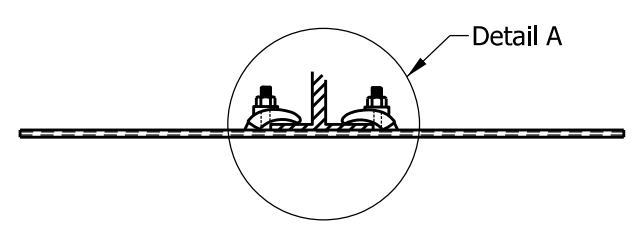

SECTION B-B




ELEVATION
(View from Back of Sign)




DETAIL A




SECTION C-C

## NOTES:

1. These clips are not required for signs less than 24 ft. in width. See Standard Drawing E 802-SNGP-07 for Post Clip details.

INDIANA DEPARTMENT OF TRANSPORTATION

PANEL SIGN CONNECTION DETAILS

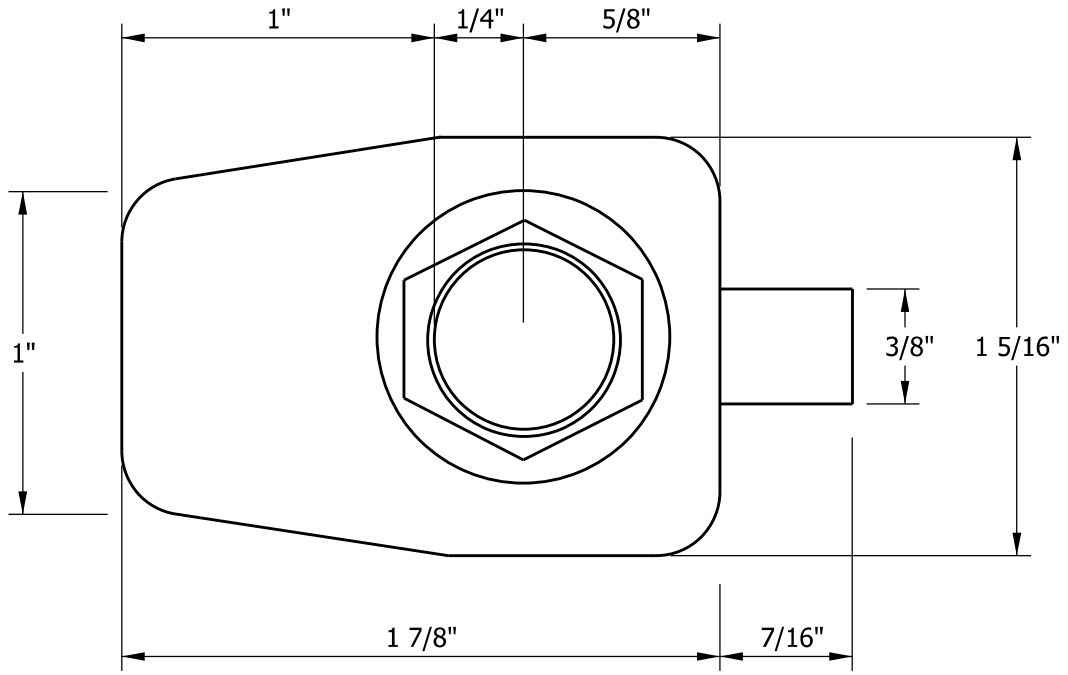
SEPTEMBER 2017

STANDARD DRAWING NO. E 802-SNGP-06

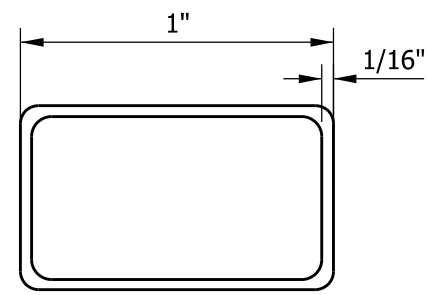
DAVID H. BORUFF REGISTERED No. 60900348 STATE OF INDIANA PROFESSIONAL ENGINEER

/s/ David H. Boruff 03/17/17
DESIGN STANDARDS ENGINEER DATE

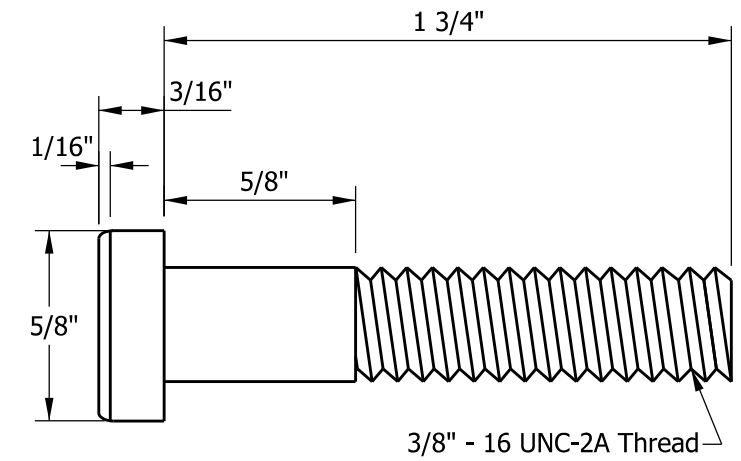
/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE




PLAN VIEW

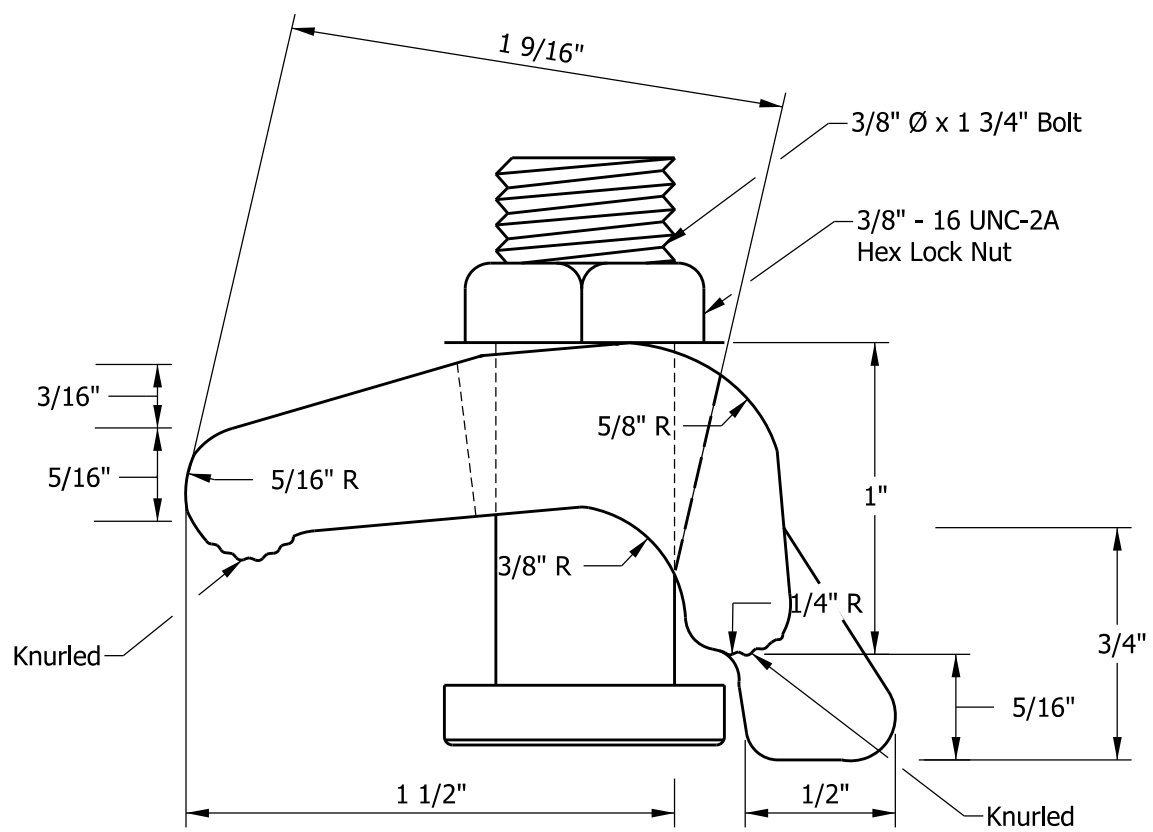



TOP VIEW




SIDE VIEW

POST CLIP BOLT




ELEVATION

| INDIANA DEPARTMENT OF TRANSPORTATION | |
|---|---|
| PANEL SIGN POST CLIP<br>SEPTEMBER 2017 | |
| STANDARD DRAWING NO. E 802-SNGP-07 | |
| DAVID H. BORUFF REGISTERED No. 60900348 STATE OF INDIANA PROFESSIONAL ENGINEER | /s/ David H. Boruff — DESIGN STANDARDS ENGINEER — 03/17/17 DATE<br>/s/ John Leckie — CHIEF ENGINEER — 04/10/17 DATE |

Sign Width (ft)

| Sign Height (ft) | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 |
| 6 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x12 | 2- W6x12 | 2- W6x12 | 2- W6x12 |
| 8 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 |
| 10 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 |
| 12 | 2- W6x9 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W10x33 | 2- W10x33 |
| 14 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 |
| 16 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 |
| 18 | 2- W8x18 | 2- W8x18 | 2- W8x24* | 2- W8x24 | 2- W8x24 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 |
| 20 | 2- W8x18 | | 2- W8x24* | 2- W8x24 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W12x45 | 2- W12x45 |
| 22 | | | 2- W8x24* | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W12x45 | 2- W12x45 | 3- W10x33 | 3- W10x33 |
| 24 | | | 2- W10x33* | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W12x45 | 2- W12x45 | 3- W10x33 | 3- W10x33 | 4- W10x33 |
| 26 | | | 2- W10x33* | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W12x45 | 2- W12x45 | 3- W10x33 | 3- W10x33 | 4- W10x33* | 4- W10x33 | 4- W10x33 |
| 28 | | | 2- W10x33* | 2- W10x33 | 2- W10x33 | 2- W12x45 | 2- W12x45 | 3- W10x33 | | | 4- W10x33* | 4- W10x33* | |
| 30 | | | 2- W10x33* | 2- W10x33 | 2- W12x45 | 2- W12x45 | | | | | | | |

Standard size not available

* Post spacing shall be 7'-0"

## NOTES:

1. Clear height is the distance from the top of foundation to bottom of sign.
2. Table entries are number of posts- post size.
3. Sign dimensions and clear height should be rounded up to the nearest even number.

INDIANA DEPARTMENT OF TRANSPORTATION

WIDE-FLANGE SIGN SUPPORT
POST SELECTION TABLE
CLEAR HEIGHT = 8 FT

SEPTEMBER 2017

STANDARD DRAWING NO. E 802-SNGP-08

DAVID H. BORUFF
REGISTERED
No.
60900348
STATE OF
INDIANA
PROFESSIONAL ENGINEER

/s/ David H. Boruff 03/17/17
DESIGN STANDARDS ENGINEER DATE

/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE

Sign Width (ft)

| Sign Height (ft) | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x12 | 2- W6x12 |
| 6 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x12 | 2- W6x12 | 2- W6x12 | 2- W6x12 | 2- W8x18 | 2- W8x18 | 2- W8x18 |
| 8 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x12 | 2- W6x12 | 2- W6x12 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 |
| 10 | 2- W6x9 | 2- W6x12 | 2- W6x12 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 |
| 12 | 2- W6x12 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x24 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 |
| 14 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x24 | 2- W8x24 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 |
| 16 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 |
| 18 | 2- W8x18 | 2- W8x18 | 2- W8x24* | 2- W8x24 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W12x45 |
| 20 | 2- W8x18 | | 2- W8x24* | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W12x45 | 2- W12x45 | 3- W10x33 |
| 22 | | | 2- W10x33* | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W12x45 | 3- W10x33 | 3- W10x33 | 3- W10x33 |
| 24 | | | 2- W10x33* | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W12x45 | 3- W10x33 | 3- W10x33 | 3- W10x33 | 4- W10x33 | 4- W10x33 |
| 26 | | | 2- W10x33* | 2- W10x33 | 2- W10x33 | 2- W12x45 | 2- W12x45 | 3- W10x33 | 3- W10x33 | | 4- W10x33* | 4- W10x33 | 4- W10x33 |
| 28 | | | 2- W10x33* | 2- W10x33 | 2- W12x45 | 2- W12x45 | 3- W10x33* | 3- W10x33 | | | 4- W10x33* | 4- W10x33 | |
| 30 | | | 2- W10x33* | 2- W10x33 | 2- W12x45 | | | | | | | | |

Standard size not available

* Post spacing shall be 7'-0"

## NOTES:

1. Clear height is the distance from the top of foundation to bottom of sign.
2. Table entries are number of posts- post size.
3. Sign dimensions and clear height should be rounded up to the nearest even number.

INDIANA DEPARTMENT OF TRANSPORTATION

WIDE-FLANGE SIGN SUPPORT
POST SELECTION TABLE
CLEAR HEIGHT = 10 FT
SEPTEMBER 2017

STANDARD DRAWING NO. E 802-SNGP-09

DAVID H. BORUFF
REGISTERED
No.
60900348
STATE OF
INDIANA
PROFESSIONAL ENGINEER

/s/ David H. Boruff 03/17/17
DESIGN STANDARDS ENGINEER DATE

/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE

Sign Width (ft)

| Sign Height (ft) | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x12 | 2- W6x12 | 2- W6x12 | 2- W6x12 | 2- W6x12 | 2- W8x18 |
| 6 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x12 | 2- W6x12 | 2- W6x12 | 2- W6x12 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 |
| 8 | 2- W6x9 | 2- W6x12 | 2- W6x12 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 |
| 10 | 2- W6x12 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x24 | 2- W8x24 | 2- W10x33 | 2- W10x33 |
| 12 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x24 | 2- W8x24 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 |
| 14 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x24 | 2- W8x24 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 |
| 16 | 2- W8x18 | 2- W8x18 | 2- W8x24* | 2- W8x24 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 |
| 18 | 2- W8x18 | | 2- W8x24* | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W12x45 | 2- W12x45 | 3- W10x33 |
| 20 | | | 2- W8x33* | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W12x45 | 2- W12x45 | 3- W10x33 | 3- W10x33 | 3- W10x33 |
| 22 | | | 2- W10x33* | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W12x45 | 2- W12x45 | 3- W10x33 | 3- W10x33 | 3- W12x45 | 3- W12x45 |
| 24 | | | 2- W10x33* | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W12x45 | 3- W10x33 | 3- W10x33 | 3- W10x33 | 4- W10x33* | 4- W10x33 | 4- W10x33 |
| 26 | | | 2- W10x33* | 2- W10x33 | 2- W10x33 | 2- W12x45 | 3 W10x33* | 3- W10x33 | | | 4- W10x33* | 4- W10x33 | 4- W12x45 |
| 28 | | | 2- W10x33* | 2- W10x33 | 2- W12x45 | | | | | | | | |
| 30 | | | 2- W10x33* | 2- W12x45 | | | | | | | | | |

Standard size not available

* Post spacing shall be 7'-0"

## NOTES:

1. Clear height is the distance from the top of foundation to bottom of sign.
2. Table entries are number of posts- post size.
3. Sign dimensions and clear height should be rounded up to the nearest even number.

INDIANA DEPARTMENT OF TRANSPORTATION

WIDE-FLANGE SIGN SUPPORT
POST SELECTION TABLE
CLEAR HEIGHT = 12 FT
SEPTEMBER 2017

STANDARD DRAWING NO. E 802-SNGP-10

DAVID H. BORUFF
REGISTERED
No.
60900348
STATE OF
INDIANA
PROFESSIONAL ENGINEER

/s/ David H. Boruff 03/17/17
DESIGN STANDARDS ENGINEER DATE

/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE

Sign Width (ft)

| Sign Height (ft) | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 2- W6x9 | 2- W6x9 | 2- W6x9 | 2- W6x12 | 2- W6x12 | 2- W6x12 | 2- W6x12 | 2- W6x12 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 |
| 6 | 2- W6x9 | 2- W6x12 | 2- W6x12 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 |
| 8 | 2- W6x12 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 |
| 10 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 |
| 12 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 |
| 14 | 2- W8x18 | 2- W8x18 | 2- W8x24* | 2- W8x24 | 2- W8x24 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 |
| 16 | 2- W8x18 | | 2- W8x24* | 2- W8x24* | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 3- W10x33 | 3- W10x33 |
| 18 | | | 2- W8x24* | 2- W10x33 | 2- 10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 3- W10x33 | 3- W10x33 | 3- W10x33 | 3- W10x33 |
| 20 | | | 2- W10x33* | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 3- W10x33 | 3- W10x33 | 3- W10x33 | 3- W10x33 | 4- W10x33 |
| 22 | | | 2- W10x33* | 2- W10x33 | 2- W10x33 | 2- W10x33 | 3- W10x33* | 2- W10x33 | 3- W10x33 | 3- W10x33 | 4- W10x33* | 4- W10x33 | 4- W10x33 |
| 24 | | | 2- W10x33* | 2- W10x33 | 2- W10x33 | | 3- W10x33* | 3- W10x33 | | | 4- W10x33* | 4- W10x33 | |
| 26 | | | 2- W10x33* | 2- W10x33 | | | | | | | | | |
| 28 | | | 2- W10x33* | | | | | | | | | | |

Standard size not available

* Post spacing shall be 7'-0"

## NOTES:

1. Clear height is the distance from the top of foundation to bottom of sign.
2. Table entries are number of posts- post size.
3. Sign dimensions and clear height should be rounded up to the nearest even number.

INDIANA DEPARTMENT OF TRANSPORTATION

WIDE-FLANGE SIGN SUPPORT
POST SELECTION TABLE
CLEAR HEIGHT = 14 FT
SEPTEMBER 2017

STANDARD DRAWING NO. E 802-SNGP-11

DAVID H. BORUFF
REGISTERED
No.
60900348
STATE OF
INDIANA
PROFESSIONAL ENGINEER

/s/ David H. Boruff 03/17/17
DESIGN STANDARDS ENGINEER DATE

/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE

Sign Width (ft)

Sign Height (ft)

| | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 2- W6x12 | 2- W6x12 | 2- W6x12 | 2- W6x12 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 |
| 6 | 2- W6x12 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x24 | 2- W8x24 | 2- W8x24 |
| 8 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W10x33 | 2- W10x33 |
| 10 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 |
| 12 | 2- W8x18 | | 2- W8x24* | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 |
| 14 | | | 2- W8x24* | 2- W8x24 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 3- W10x33 |
| 16 | | | 2- W8x24* | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 3- W10x33 | 3- W10x33 | 3- W10x33 |
| 18 | | | 2- W10x33* | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 3- W10x33 | 3- W10x33 | 3- W10x33 | 3- W10x33 | 4- W10x33 |
| 20 | | | 2- W10x33* | 2- W10x33 | 2- W10x33 | 2- W10x33 | 3- W10x33* | 3- W10x33 | 3- W10x33 | | 4- W10x33* | 4- W10x33 | 4- W10x33 |
| 22 | | | 2- W10x33* | 2- W10x33 | 2- W10x33 | | | | | | | | |
| 24 | | | 2- W10x33* | | | | | | | | | | |

Standard size not available

* Post spacing shall be 7'-0"

## NOTES:

1. Clear height is the distance from the top of foundation to bottom of sign.
2. Table entries are number of posts- post size.
3. Sign dimensions and clear height should be rounded up to the nearest even number.

INDIANA DEPARTMENT OF TRANSPORTATION

WIDE-FLANGE SIGN SUPPORT
POST SELECTION TABLE
CLEAR HEIGHT = 16 FT

SEPTEMBER 2017

STANDARD DRAWING NO. E 802-SNGP-12

DAVID H. BORUFF
REGISTERED
No.
60900348
STATE OF
INDIANA
PROFESSIONAL ENGINEER

/s/ David H. Boruff 03/17/17
DESIGN STANDARDS ENGINEER DATE

/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE

Sign Width (ft)

| Sign Height (ft) | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 2- W6x12 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x24 |
| 6 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 |
| 8 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 |
| 10 | 2- W8x18 | | 2- W8x24* | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 |
| 12 | | | 2- W8x24* | 2- W8x24 | 2- W8x24 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 |
| 14 | | | 2- W8x24* | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 3- W10x33 | 3- W10x33 | 3- W10x33 |
| 16 | | | 2- W10x33* | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 2- W10x33 | 3- W10x33 | 3- W10x33 | 4- W10x33 |
| 18 | | | 2- W10x33* | 2- W10x33 | 2- W10x33 | 2- W10x33 | 3- W10x33* | 3- W10x33 | 3- W10x33 | | 4- W10x33* | 4- W10x33 | 4- W10x33 |
| 20 | | | 2- W10x33* | 2- W10x33 | 2- W10x33 | | | | | | | | |
| 22 | | | 2- W10x33* | | | | | | | | | | |

Standard size not available

* Post spacing shall be 7'-0"

## NOTES:

1. Clear height is the distance from the top of foundation to bottom of sign.
2. Table entries are number of posts- post size.
3. Sign dimensions and clear height should be rounded up to the nearest even number.

INDIANA DEPARTMENT OF TRANSPORTATION

WIDE-FLANGE SIGN SUPPORT
POST SELECTION TABLE
CLEAR HEIGHT = 18 FT

SEPTEMBER 2017

STANDARD DRAWING NO. E 802-SNGP-13

DAVID H. BORUFF
REGISTERED
No.
60900348
STATE OF
INDIANA
PROFESSIONAL ENGINEER

/s/ David H. Boruff 03/17/17
DESIGN STANDARDS ENGINEER DATE

/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE

Sign Width (ft)

| Sign Height (ft) | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 |
| 6 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 3- W8x24 |
| 8 | 2- W8x18 | | 2- W8x24* | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 3- W8x24 | 3- W8x24 | 3- W8x24 | 3- W8x24 | 4- W8x24 |
| 10 | | | 2- W8x24* | 2- W8x24 | 2- W8x24 | 3- W8x24* | 3- W8x24* | 3- W8x24 | | | | | |
| 12 | | | 2- W8x24* | 2- W8x24 | | | | | | | | | |

X Standard size not available
* Post spacing shall be 7'-0"

## NOTES:

1. Clear height is the distance from the top of foundation to bottom of sign.
2. Table entries are number of posts- post size.
3. Sign dimensions and clear height should be rounded up to the nearest even number.

INDIANA DEPARTMENT OF TRANSPORTATION

WIDE-FLANGE SIGN SUPPORT
POST SELECTION TABLE
CLEAR HEIGHT = 20 FT
SEPTEMBER 2017

STANDARD DRAWING NO. E 802-SNGP-14

DAVID H. BORUFF
REGISTERED
No.
60900348
STATE OF
INDIANA
PROFESSIONAL ENGINEER

/s/ David H. Boruff 03/17/17
DESIGN STANDARDS ENGINEER DATE

/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE

Sign Width (ft)

| Sign Height (ft) | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 2- W8x18 | 2- W8x18 | 2- W8x18 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 |
| 6 | | | 2- W8x24* | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 2- W8x24 | 3- W8x24 | 3- W8x24 | 3- W8x24 |
| 8 | | | 2- W8x24* | 2- W8x24 | 2- W8x24 | 2- W8x24 | 3- W8x24* | 3- W8x24 | | | | | |
| 10 | | | 2- W8x24* | | | | | | | | | | |

Standard size not available

* Post spacing shall be 7'-0"

## NOTES:

1. Clear height is the distance from the top of foundation to bottom of sign.
2. Table entries are number of posts- post size.
3. Sign dimensions and clear height should be rounded up to the nearest even number.

INDIANA DEPARTMENT OF TRANSPORTATION

WIDE-FLANGE SIGN SUPPORT
POST SELECTION TABLE
CLEAR HEIGHT = 22 FT

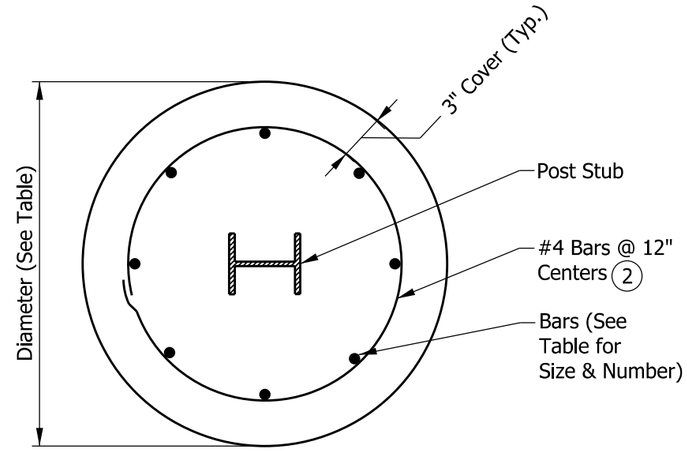
SEPTEMBER 2017

STANDARD DRAWING NO. E 802-SNGP-15

DAVID H. BORUFF
REGISTERED
No.
60900348
STATE OF
INDIANA
PROFESSIONAL ENGINEER

/s/ David H. Boruff 03/17/17
DESIGN STANDARDS ENGINEER DATE

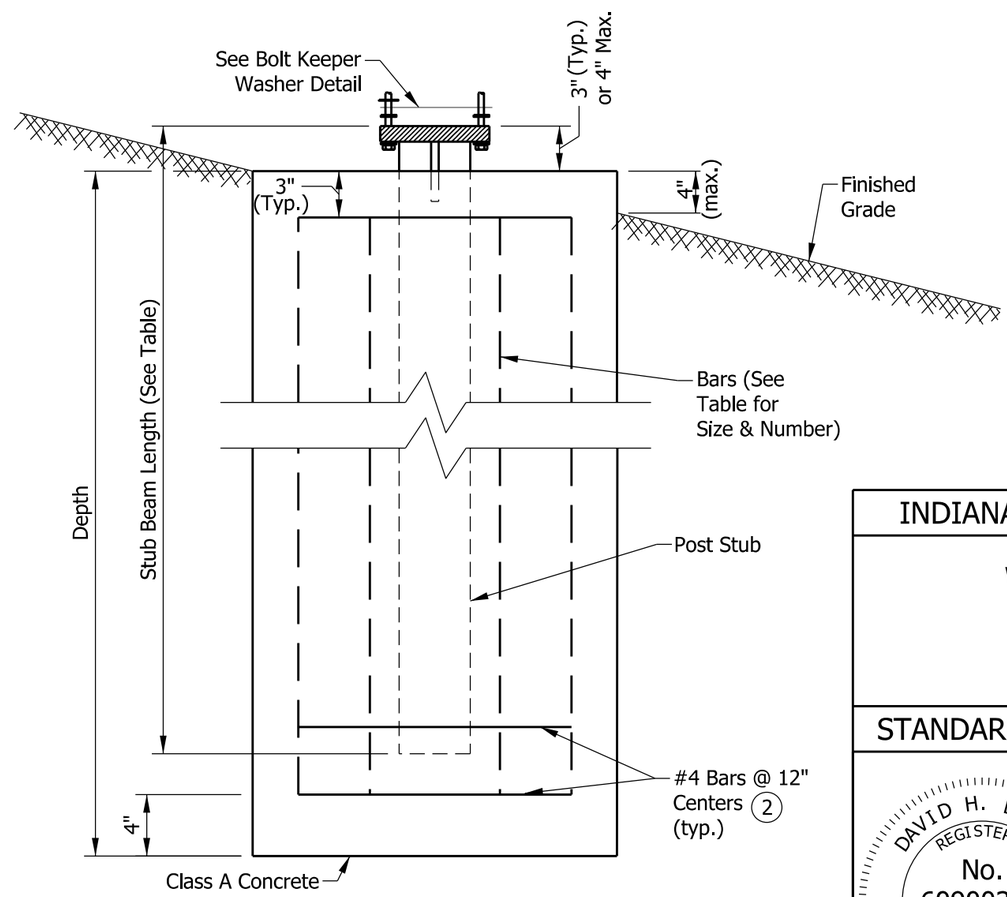
/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE




## NOTES:

1. All reinforcing shall be grade 60.
2. At the option of the contractor, D10 spiral wire @ 6" pitch, three flat turns top and one flat turn bottom may be utilized in lieu of #4 bars.
3. Where shop-welded assemblies of foundation stirrup reinforcing bars are used, reinforcing bars shall be in accordance with ASTM Specification A706/706M and holding wires shall be in accordance with ASTM Specification A1064.

| FOUNDATION DATA | | | | | |
|---|---|---|---|---|---|
| Type | Post Size | Diameter | Depth | Stub Length | Reinforcement Bars |
| A | W6x9 | 2' | 7' | 4' | 8 - #8 |
| A | W6x12 | 2' | 7' | 4' | 8 - #8 |
| B | W8x18 | 2' | 10' | 4' | 8 - #8 |
| B | W8x24 | 2' | 10' | 4' | 8 - #8 |
| C | W10x33 | 2'-6" | 12' | 5' | 10 - #8 |
| C | W12x45 | 2'-6" | 12' | 5' | 10 - #8 |




INDIANA DEPARTMENT OF TRANSPORTATION

WIDE-FLANGE SIGN SUPPORT FOUNDATION

SEPTEMBER 2017

STANDARD DRAWING NO. E 802-SNGP-16

DAVID H. BORUFF REGISTERED No. 60900348 STATE OF INDIANA PROFESSIONAL ENGINEER

/s/ David H. Boruff 03/17/17
DESIGN STANDARDS ENGINEER DATE

/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE

# Indiana Department of Transportation

## Activity 8125 QA Form - Panel Sign Inspection/Minor Maintenance

Asset Inventory #:_____ District/Sub/Unit:_____
Work Order #:_____ Route:_____
Date completed:_____ Intersections:_____
Date inspected:_____ RP Start/End:_____
Inspector:_____
QA Window: 0-6 months

**Sign information:**
Message:_____ Year of sign:_____

**Observations:**

1. Keeper plate?
   - 0 No
   - 10 Yes

2. Base bolts torqued and burred/chiseled?
   - 0 Not properly torqued or bolts burred/chiseled
   - 25 All torqued properly

3. Base height is < 4" above ground level and not buried.
   - 0 No
   - 25 Yes

4. Sign is correct height?
   - 0 No
   - 10 Yes

5. Proper mounting (fuse plate location, panel clips, correct I-beam size, number, & location).
   - 0 No
   - 25 Yes

6. Date sticker?
   - 0 No
   - 5 Yes

**Inspector Comments:**

**Score:**

| | Possible | Actual |
|---|---|---|
| **1** | 10 | |
| **2** | 25 | |
| **3** | 25 | |
| **4** | 10 | |
| **5** | 25 | |
| **6** | 5 | |
| **Total:** | 100 | |

**Final % score (divide Actual by Possible):_____**

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Delineator Maintenance | CODE | 8140 |
|---|---|---|---|

**Purpose**

The periodic replacement and repair or new installation of delineators on the highway system to provide adequate safety for the motorists. Delineators are installed in a series to indicate the alignment of the roadway. in accordance with the standards specified in the Manual on Uniform Traffic Control Devices

**Category** Safety Devices

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Perform this activity as required throughout the year.

This activity can be performed in most weather conditions and is an ideal activity when crews are unable to complete their scheduled activity. (Example: Paint crew cannot paint due to rain or equipment failure)

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Delineators |
|---|---|---|---|---|---|

Each repair or installation of a delineator assembly is one accomplishment.

Posts used to mark assets (drains, culverts, etc) should not be reported to this activity. Reflective delineators should not be used to mark these assets.

Roadway crews that are primarily performing a different activity for the day, but repair one or two delineators during the course of the day may report the time and materials under the primary activity. However, there will be no accomplishment reported for the delineators repaired.

Reflectors repaired or installed on barrier wall or guardrail shall be reported to activity 8390

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** 2 Workers

| | QTY |
|---|---|
| Laborer | 2 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | |
|---|---|
| Pick-up truck | 1 |

*Traffic Control Equipment is NOT shown here

**P.P.E.**

Base PPE

**Materials**

Delineator – INDOT Spec Section 910.15

Anchor – INDOT Spec Section 910.15

Buttons – INDOT Spec Section 926.02

**Other References**

IMUTCD Chapter 3F

Table 3F-1 MUTCD

Standard Drawing 802-SNGS-07

Standards and Specs Section 804

**Sub Activities**

| Average Daily Production | 45 - 70 Delineators | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Delineator Maintenance | CODE | 8140 |
|---|---|---|---|

**Work Method**

If anything is removed from the ground without a sleeve / anchor remaining or if delineator posts will be driven into the ground, call in for locates at least 48 hours before work.

Management or supervisors should review routes for damaged delineation.

1. Place Traffic Control devices if needed.
2. Install, replace, or repair delineators on assigned routes and at specific locations. Delineators should be spaced 200 to 530 ft, on mainline tangent sections and 20 to 90 ft on horizontal curves or ramps; Refer to table 3F-1 in the MUTCD.
3. Install delineators 2 ft to 8 ft outside the outer edge of the shoulder; remain consistent with offset whenever possible; the color of the retroreflector device shall match the edgeline paint. Delineators should be mounted on suitable supports at a mounting height, measured vertically from the bottom of the lowest retroreflective device to the elevation of the near edge of the roadway; approximately 4 feet.
4. Remove work area safety signs and devices if they were placed.

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 45 - 70 Delineators | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Detour Work | CODE | 8150 |
|---|---|---|---|

**Purpose**

Setting up, maintenance, and removal of detours to direct traffic through and around road closers due to activities such as railroad crossing work and bridge restrictions.

**Category** Overhead

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Detours / road closures lasting 24 hours or less should be handled by sub district maintenance operations or local law enforcement.

Coordinate and plan this activity with all district departments prior to yearly work plan development

Schedule this work throughout the year when necessary due to unforeseen circumstances.

If routes not owned by the state will be used, there must be signed agreements with the owners prior to placement of detour.

Coordinate with communications office for public notifications, local and county officials, police and fire depts.

Notify vendor of all needed rental materials.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Accomplishment is in Person Hours

This activity is only to be used for non-INDOT activity detours. Setting up and removing detours from other INDOT maintenance work, such as chip seals or pipe replacements, should be reported to the specific activity.

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** 2-3 Workers

| | QTY |
|---|---|
| Crew Leader | 1 |
| Laborer | 1-2 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

Stake bed truck

Bucket truck

*Traffic Control Equipment is NOT shown here

**P.P.E.**

1) Base PPE

2) Safety Harness/Fall Protection when using aerial lift

**Materials**

**Other References**

Detour Plan

IMUTCD section 6A-01

**Sub Activities**

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Detour Work | CODE | 8150 |
|---|---|---|---|

## Work Method

1. Review detour plan.
2. Ensure all materials are available at job site.
3. Placement of detour shall start opposite to the flow of traffic.

   Place all signs on detour route before closure site. Closure site is at the start and finish point of detour

   Place road closed signs at starting point of detour and install barricades to begin traffic detour

   Place road closed signs and barricades at opposite closure site of detour (complete this simultaneously if possible)

   Last signs to be placed are the road closed signs and barricades at closure point if this point is different than the start of the detour. Closure site is when detour begins and ends; Closure point is actual work site.
4. Place appropriate lighting as necessary. Must be placed before sunset.
5. Drive through to ensure detour is performing as planned.
6. Perform any maintenance or changes to the detour as required throughout detour period.
7. Remove detour starting at closure point and work backward through the detour in both directions at the same time if possible. If not possible, remove signs and barricades at closure point and work back to closure site, remove signs and barricades at this location; return to closure point and remove signs and barricades in opposite direction from closure point to closure site; the road is now open; remove signage from detour route.

Notify vendor the same day of opening to pick up rented materials.

## Special Considerations

Special signs may be needed to notify motorist of businesses that are still open if closure site is different than closure point.

Pre-detour signs can be placed up to two weeks in advance of closure to communicate the coming event

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Traffic Sign Work Orders | CODE | 8200 |
|---|---|---|---|

**Purpose**

Install a new sign at a new location, permanently remove a sign, move a sign to a new location, or replace a sign with a different sign in order to respond to a need identified by Traffic Engineering. This activity should require changing the feature inventory.

This activity should not be used in conjunction with activity 8100

**Category** Signs

- ☐ PM
- ☐ QA
- ☐ Plan Location

**Scheduling & Coordination**

Perform this work throughout the year as directed.

| Reporting | | Asset to Report to | Sign* | Reporting Units | Signs |
|---|---|---|---|---|---|

Accomplishment: New sign installed at new location; sign permanently removed from inventory, move existing sign to new location or replace existing sign with a different sign. (not sign modernization activity).

For additional work order reporting guidance see the Work Orders section of the Preface.

* Report to the sign asset. If asset is not in sign inventory, report to Pavement Key.

**Crew Size** 2 Workers

| | QTY |
|---|---|
| Crew Leader | 1 |
| Laborer | 1 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | |
|---|---|
| Pick-up Truck | 1 |
| Bucket Truck if needed | 1 |

*Traffic Control Equipment is NOT shown here

**P.P.E.**

1) Base PPE
2) Safety Harness/Fall Protection when using aerial lift

**Materials**

Post – INDOT Spec Section 802.02
Anchor – INDOT Spec Section 802.02
Sheet Sign – INDOT Spec Section 802.02

**Other References**

IMUTCD Chapter 2
INDOT Standard Specification section 802
INDOT Standard Drawings section 802
Post Selection Guide

**Sub Activities**

| Average Daily Production | 7 - 11 Signs | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Traffic Sign Work Orders | CODE | 8200 |
|---|---|---|---|

**Work Method**

1. Review work order
2. Call in locates 48 hours before work will be performed
3. Place safety devices as necessary
4. Remove signs, posts, and anchors according to work order.
5. Refer to Standard Drawings for proper offset, height, and sign size
6. At work site, check offsets of posts and get grades using laser or line level
7. If new post is required refer to Sign Post Selection Guide
8. Install new post anchor if needed; refer to sign post selection guide; measure offset from roadway or shoulder; install anchor, only 2" of anchor above grade; use laser or line level to determine length of post required
9. Cut post to proper length determined by road class and sign location; ensure ditch or back slope are considered when measurements are calculated.
10. Bolt sign to post; ensure proper hardware is utilized, lock washer and nut or lock nut on back side of sign, nylon and metal washer on sign face; holding bolt head to sign face, tighten nut from backside. nuts shall be tightened sufficiently so that the sign is held firmly against the post. Caution should be used not to twist sign sheeting.
11. Install date sticker on back lower corner closest to the road.
12. Install Post in anchor with corner bolts
13. Step back and review installation . Ensure no obstructions and that sign is correctly installed
14. Collect tools and all materials and ensure worksite is free of debris
15. Remove safety devices

Move to next sign location

**Special Considerations**

Crew should be provided with a packet of Standard Drawings applicable to sign operations.
If drilling holes, drill from front of sign to reduce sheeting tear.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 7 - 11 Signs | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Paint Centerline | CODE | 8300 |
|---|---|---|---|

**Purpose**

Restore visibility, retroreflectivity, and maintain traffic control by painting the centerline, lane markings, and black contrast markings on the roadway surface.

For this activity a centerline includes:

1. All Yellow Lines
2. White lines separating traffic traveling in the same direction, except for right turn lanes
3. Black contrast markings applied on white skip lines on concrete pavement. This activity includes both adding new contrast markings and refurbishing existing contrast markings

**Category** Traffic Markings

- ☒ **PM**
- ☒ **QA**
- ☒ **Plan Location**

**Scheduling & Coordination**

Schedule this work during the warmer moths with emphasis place on coordination with resurfacing and seal coating operations.

Schedule the centerline painting of durable markings based on the expected service life of the type of marking (4 years for thermoplastic and epoxy; 8 years for preformed plastic), contingent on retroreflectivity.

Temperature limitation for painting must be observed per paint manufacturer guidelines. Waterborne paints must be applied at 50 degree ambient temperature or higher.

All markings shall conform to the standards in the Indiana Manual on Uniform Traffic Control Devices.

Consider weather forecast for chance of rain when scheduling paint crew.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Paint Miles |
|---|---|---|---|---|---|

Accomplishment in the number of painted miles.

Painted Mile – total linear feet painted divided by 5280

Work done for control points shall be part of the paint card.

For additional work order reporting guidance see the Work Orders section of the Preface

**Crew Size** 3 Workers

| | QTY |
|---|---|
| Crew Leader | 1 |
| Laborer | 2 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

Centerliner

*Traffic Control Equipment is NOT shown here

**P.P.E.**

Base PPE

**Materials**

Paint – INDOT Spec Section 909.05

Glass Beads – INDOT Spec Section 921.02

**Other References**

INDOT Operations Memorandums 10-05

IMUTCD Chapter 3B

Standards and Specs 808.01

**Sub Activities**

| Average Daily Production | 24 – 50 Paint Miles | EFFECTIVE DATE | 2/12/2024 |
|---|---|---|---|

| ACTIVITY | Paint Centerline | CODE | 8300 |
|---|---|---|---|

## Work Method

1. Select appropriate centerlines to re-stripe – see Special Considerations section.
2. Set up control points if needed.
3. Visual inspection of paint guns, filters, air compressor, paint and bead lines; looking for obvious signs of leaks, clogged paint or bead shrouds, loose connections, worn hoses, etc.
4. Load truck with materials. Inspect the paint to be loaded to ensure it looks uniform and does not need to be stirred.
5. Optional: Perform wet film thickness tests – Paint over a flat surface (old sheet sign material works well) without using beads, but with the same vehicle speed and pressure planned to be used for the operation. Use wet film thickness gauge to check depth of wet paint on the flat surface. Record results on paint application form. Desired thickness is 15 mils.
6. Mobilize to job site.
7. Set up safety devices if needed and prep truck for painting operation.
8. Within the first 4 miles of painting (8 miles if step 3 performed), pull off roadway on area of level ground to measure paint levels and calculate application rates. Record results on paint application form. Also inspect quality of line (width, thickness, bead coverage, bead embedment).
9. Make adjustments as necessary.
10. Resume painting operations continually listening to and watching the paint and bead guns. Pay close attention to the sound the paint gun is making. If there is a whistling noise, or the sound changes that is likely and indication something is amiss. If you hear these noises or if gunners / back up drivers notice uneven coverage of paint / beads pull over as soon as possible to correct situation.
11. Flush paint guns as frequently as possible. Driver can alert gunner of upcoming intersections and roll through them to give time to flush the guns.
12. At the end of daily painting operations, flush all paint guns thoroughly to prevent paint hardening overnight. This will prevent time consuming cleaning before starting the next painting day.
13. Attach the paint application form to work order in WMS.

## Special Considerations

Lunch break is a good opportunity to re-fill the truck.

Monitor paint build up on and around paint guns and shrouds.

Avoid painting over raised pavement markers during striping operations.

Consider night painting in high volume urban areas.

Consider pulling over to let traffic through if it starts backing up or if a large vehicle is blocking signs.

### Evaluating and Restriping Centerline Pavement Markings

**Evaluation and Restriping of Waterborne Paint Centerline Pavement Markings**

- Acceptable Retroreflectivity Standards
  - Not applicable – waterborne paint centerline and edgeline markings will not be evaluated for retroreflectivity.
- Acceptable Evaluation Methods
  - Not Applicable
- Frequency of Evaluation
  - Waterborne paint centerlines and edgelines will not be evaluated for retroreflectivity.
- Acceptable Replacement Method
  - White and yellow waterborne paint centerline and edgeline markings will be replaced annually by painting over existing lines with waterborne paint of the same color.

**Evaluation and Restriping of Thermoplastic and Epoxy Durable Centerline Pavement Markings**

- Acceptable Retroreflectivity Standards
  - White markings: minimum 140 mcd/m$^2$/lux
  - Yellow markings: minimum 120 mcd/m$^2$/lux
- Acceptable Evaluation Methods
  - Mobile retroreflectometer unit (MRU) in accordance with ITM 931-23
  - Hand-held retroreflectometer unit in accordance with ITM 931-23
  - Consistent Parameters Visual Nighttime Inspection procedure in accordance with Chapter 4 of FHWA-SA-22-08, "Methods for Maintaining Pavement Marking Retroreflectivity"

## Special Considerations (Continued)

- Frequency of Evaluation
  - Thermoplastic and epoxy durable centerline and edgeline markings will be evaluated for retroreflectivity when they have reached the end of their expected service life of 4 years.
- Acceptable Replacement Method
  - Epoxy and thermoplastic durable centerline and edgeline markings that do not meet the acceptable retroreflectivity standards (or driving needs when visually inspected) will be painted over with waterborne traffic paint.

**Evaluation and Restriping of Preformed Plastic Durable Centerline Pavement Markings**

- Acceptable Retroreflectivity Standards
  - White markings: minimum 140 mcd/m$^2$/lux
  - Yellow markings: minimum 120 mcd/m$^2$/lux
- Acceptable Evaluation Methods
  - Mobile retroreflectometer unit (MRU) in accordance with ITM 931-23
  - Hand-held retroreflectometer unit in accordance with ITM 931-23
  - Consistent Parameters Visual Nighttime Inspection procedure in accordance with Chapter 4 of FHWA-SA-22-08, "Methods for Maintaining Pavement Marking Retroreflectivity"
- Frequency of Evaluation
  - Preformed plastic durable centerline and edgeline markings will be evaluated for retroreflectivity when they have reached the end of their expected service life of 8 years.
- Acceptable Replacement Method
  - Preformed plastic durable centerline and edgeline markings that do not meet the acceptable retroreflectivity standards (or driving needs when visually inspected) cannot be painted over with waterborne traffic paint and will be removed and replaced by contract when they do not meet the acceptable retroreflectivity standards (or driving needs when visually inspected).

**Evaluation and Restriping of Waterborne Paint Contrast Markings**

- Acceptable Retroreflectivity Standards
  - Not applicable – black contrast markings do not contain glass beads and are not retroreflective.
- Acceptable Evaluation Methods
  - Visual observation to determine condition of markings: markings that are fading, peeling, cracking, not adhering to pavement, or have any other deficiencies that cause the markings to have diminished visibility should be replaced.
- Frequency of Evaluation
  - Waterborne paint contrast lines should be evaluated one year after application.
- Acceptable Replacement Method
  - Waterborne paint contrast markings will be painted over with black waterborne paint when they are determined to be in need of replacement.

**Evaluation and Restriping of Epoxy and Thermoplastic Durable Contrast Markings**

- Acceptable Retroreflectivity Standards
  - Not applicable – black contrast markings do not contain glass beads and are not retroreflective.
- Acceptable Evaluation Methods
  - Visual observation to determine condition of markings: markings that are fading, peeling, cracking, not adhering to pavement, or have any other deficiencies that cause the markings to have diminished visibility should be replaced.
- Frequency of Evaluation
  - Epoxy and thermoplastic durable contrast markings will be evaluated when they have reached the end of their service life of 4 years.
- Acceptable Replacement Method
  - Epoxy and thermoplastic durable contrast markings will be painted over with black waterborne paint when they are determined to be in need of replacement.

## Special Considerations (Continued)

**Evaluation and Restriping of Preformed Plastic Durable Contrast Markings**

- Acceptable Retroreflectivity Standards
  - Not applicable – black contrast markings do not contain glass beads and are not retroreflective.
- Acceptable Evaluation Methods
  - Visual observation to determine condition of markings: markings that are fading, peeling, cracking, not adhering to pavement, or have any other deficiencies that cause the markings to have diminished visibility should be replaced.
- Frequency of Evaluation
  - Preformed plastic durable contrast markings will be evaluated when they have reached the end of their service life of 8 years.
- Acceptable Replacement Method
  - Preformed plastic contrast markings cannot be painted over. These markings need to be removed and replaced by contract when they are in need of replacement.

For New Applications of Black Waterborne Paint Contrast Markings:

- Black contrast markings should be painted adjacent to all white skip lines on concrete pavement.
- Contrast markings should be applied according to the locations and dimensions specified on the “Contrast Markings for In-House Painting Operations” diagram below.

For Re-striping of Black Contrast Markings of All Material Types:

- Contrast markings should be observed visually to determine their condition; markings that are fading, peeling, cracking, or not adhering to pavement, or have any other deficiencies that cause the markings to have diminished visibility should be painted over or replaced, depending on the type of pavement marking material.
- No retroreflectivity readings will be taken on black contrast markings; these markings have no glass beads and are not designed to be retroreflective.
- Waterborne paint, thermoplastic, and epoxy contrast markings will be painted over with black waterborne paint when they are determined to be in need of replacement.
- Preformed plastic contrast markings cannot be painted over. These markings need to be removed and replaced by contract when they are in need of replacement.

**Application Rate Guidance**

Application Rates to be determined.

After application rates are achieved, the above procedure shall be performed every 4 hours to ensure application rates are constant; this can be done when cleaning shrouds, breaking for lunch or when re-filling throughout the day.

Application rates can be adjusted with air pressure to the guns.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| **Average Daily Production** | **24 - 50 Paint Miles** | **EFFECTIVE DATE** | **2/12/2024** |

# Indiana Department of Transportation

## Activity 8300 QA Form - Paint Centerline

PK #:_____ District:_____
Work Order #:_____ Route:_____
Date completed:_____ Intersections:_____
Date inspected:_____ RP Start/End:_____
Inspector:_____
QA Window: 14 days -1 month

**Observations:**

1. Does the actual line width deviate from the intended line width?
   - 0 Yes, line is ≥ 1/4" too narrow
   - 7 Yes, line is ≥ 1/2" too wide
   - 14 No, line is within acceptable tolerances

2. Does the line cover the longitudinal joint at any point?
   - 0 Yes
   - 13 No

3. Is a crisp edge maintained throughout?
   - 0 No, there is greater than 1/2" overspray in at least one location
   - 13 Yes

4. What is the retroreflectivity rating?
   - 0 R = 0-99
   - 20 R = 100-124
   - 30 R = 125-134
   - 40 R = 135-149
   - 50 R = 150+

5. Is the application rate sheet attached and completed correctly?
   - 0 Sheet is not attached or completed incorrectly
   - 10 Sheet is attached and completed correctly

**Inspector Comments:**

**Score:**

| | Possible | Actual |
|---|---|---|
| **1** | 14 | |
| **2** | 13 | |
| **3** | 13 | |
| **4** | 50 | |
| **5** | 10 | |
| **Total:** | 100 | |

**Final % score (divide Actual by Possible):_____**

**INDIANA DEPARTMENT OF TRANSPORATION**

**DIVISION OF MAINTENANCE**

# Yellow Paint Daily Form

## Activity 8300 \ 8320

**The first test needs to be completed within the first 4 miles (21,120 Lft) of accomplishment, or within 8 miles (42,240 Lft) if wet film thickness is checked at start of day**

| Paint App Rate for 6" Lines | | |
|---|---|---|
| **Application Rate (gpm)** | | **Required Changes** |
| **Low** | **High** | |
| < 22.5 | >27.5 | Make adjustments, recheck after 2 painted miles |
| <23.5 | >26.5 | Make adjustments, recheck after 4 hours |
| 23.5 | 26.5 | No adjustments required, recheck after 4 hours |

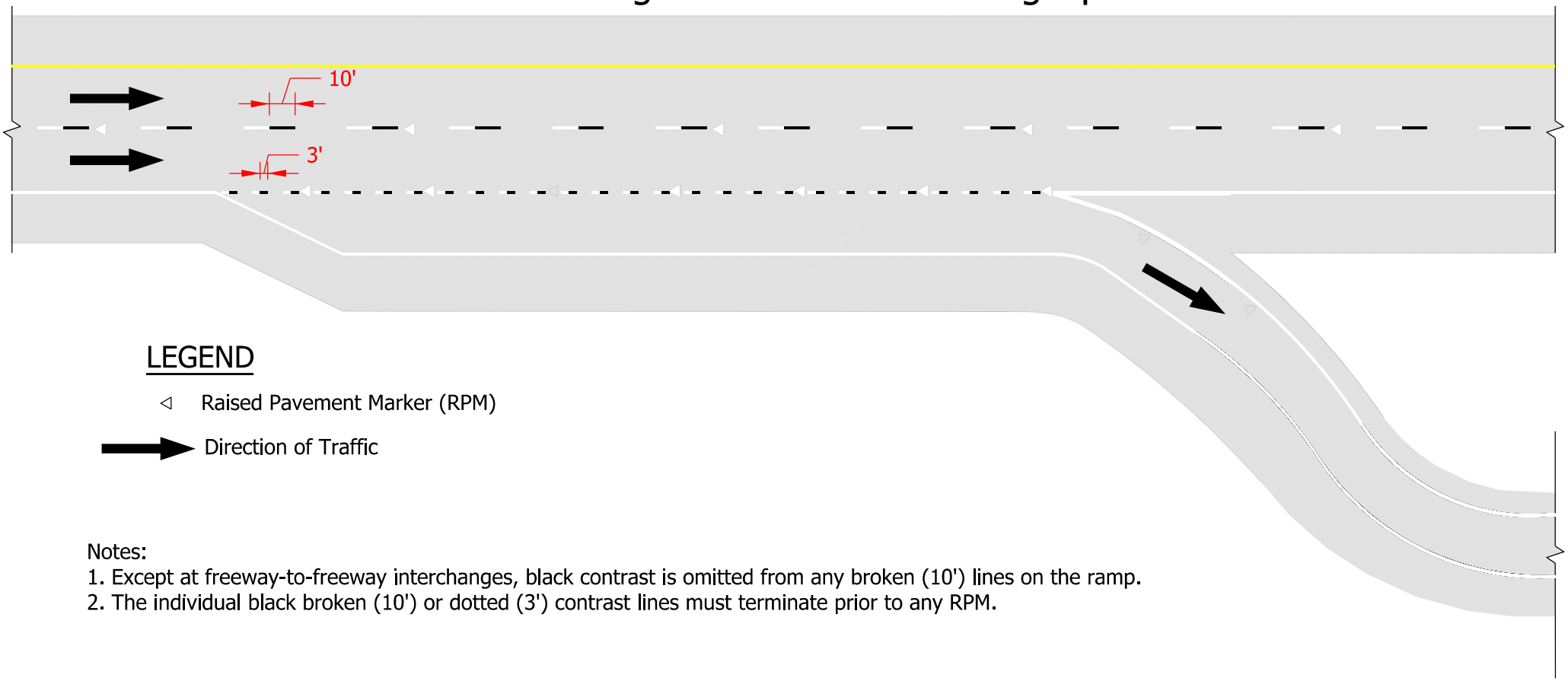
| Target Bead App Rate for 6" Lines | | | |
|---|---|---|---|
| Speed | 6 lbs/gal | 6.5 lbs/gal | 7 lbs/gal |
| 14 mph | 840 | 910 | 980 |
| 12 mph | 720 | 780 | 840 |
| 10 mph | 600 | 650 | 700 |
| 8 mph | 480 | 520 | 560 |

| | Date | Time | Speed (mph) | Gun 1 Thickness (mil) | Gun 1 Width (in) | Gun 2 Thickness (mil) | Gun 2 Width (in) | Comments |
|---|---|---|---|---|---|---|---|---|
| Wet Film, Restest if <13 mil or >17 mil | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| Paint Gun Settings | Gun Height | Gun Pressure |
|---|---|---|
| | | |

| Calculations | | | D | E = D2-D1 | F | G | H = F + G | I = H2 - H1 | J = I / 5280 | K = E / J | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Test** | **Date** | **Time** | **Total Paint Used (gal)** | **Gal From Last Test** | **Gun 1 Total Lft** | **Gun 2 Total Lft** | **Total Lft** | **Lft From Last Test** | **Mi from Last Test** | **Current Paint App Rate (gpm)** | **Lowest Bead Rate (mL/ 5 sec)** | **Changes Made / Comments** |
| 1 | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | |

# Contrast Markings for In-House Painting Operations




## LEGEND

◁ Raised Pavement Marker (RPM)

Direction of Traffic

Notes:
1. Except at freeway-to-freeway interchanges, black contrast is omitted from any broken (10') lines on the ramp.
2. The individual black broken (10') or dotted (3') contrast lines must terminate prior to any RPM.

INDOT Maintenance Roadway Striping Best Practices – Activities 8300 and 8320

**Striping Operations, Troubleshooting, and Field Checks**

- Quality checks to perform before leaving maintenance facility:
    - Visual inspection of paint truck components
        - Perform visual inspection of components at beginning of every day of striping work.
        - Items to inspect include:
            - Paint and bead Guns
            - Paint filters
            - Air compressor
            - Paint and bead lines
        - Check all items for:
            - Leaks
            - Clogs or blockages
            - Loose connections
            - Worn or damaged components, especially hoses
    - Wet film thickness test
        - Perform test in yard weekly.
        - Test procedure:
            - Lay down flat test surface (ex. scrap sheet sign material)
            - Spray line over test surface with paint truck
                - Do not apply beads.
                - Spray line using same vehicle speed and paint gun pressure as you would use to apply lines on roadway.
            - Check depth of line using wet film thickness gauge
                - Desired thickness for INDOT maintenance striping is 15 mils.
                - If thickness is not between 13 and 17 mils, paint pressure and truck speed should be adjusted to bring striping thickness into this range.
    - Bead application rate test
        - Perform test every 1-2 weeks.
        - Test procedure:
            - Place a graduated measuring cup under bead gun.
            - Run the bead gun for 5 seconds to spray beads into measuring cup. Use a stopwatch to accurately time the 5 second period of spraying beads.
            - Measure the amount of beads that have been sprayed into the measuring cup.
                - Check Yellow/White Paint Daily Form, which is shown in the Work Performance Standards with Activities 8300 and 8320, for target bead amounts (in mL) for different truck speeds.

- If amount sprayed differs from the target amount, perform the following troubleshooting steps:
    - Check tips of bead guns for any blockages and clean if needed.
    - Check and adjust the pressure on the glass bead tank. The recommended operating pressure for the glass bead tank is between 30 and 50 psi.
    - Check that correct size orifice tip is installed on bead gun. Tip sizes for different application speeds are listed in table below:

| **Application Speed** | **Recommended Tip Orifice Size** |
|---|---|
| 4-8 mph | #6 |
| 8-12 mph | #8 |
| 12-20 mph | #10 |

- Checks/procedures to perform while on road applying paint markings:
    - After approximately 4 miles of striping, stop to perform checks on quality of line(s) being striped and measurements to calculate application rate.
        - Measure level of paint remaining; compare to initial level of paint in tank/tote to calculate application rate.
            - Application rate can be calculated using the Yellow/White Paint Daily Form
        - Measure width of line applied.
        - Measure thickness of line using wet film thickness gauge
            - Must be measured as soon as possible after line is applied to ensure that paint is still wet.
        - Check bead application and distribution.
            - Inspect visually, can take close up picture with phone camera at 45-degree angle from surface of line.
            - Check for crispness/sharpness of edge of line and presence of overspray.
    - Adjust speed of truck, gun pressure, gun height, etc. to address any issues with the quality of line. Refer to attached Line Troubleshooting Guide for examples of common issues with lines and possible solutions for each.
    - Record all changes on Yellow or White Paint Daily Form in order to have a record of the desired settings to use for regular striping operation.
    - If changes are made, stripe for another 4 miles and perform checks again; repeat until lines are acceptable and settings can be finalized.
    - Perform these checks after every 4 hours of striping work.
- Things to consider during striping operations:
    - Flush paint guns as frequently as possible
        - Paint truck driver can alert stripers of good times to flush paint guns.
            - While driving through intersections
            - Driving between two striping locations

    - Personnel in trailing vehicles and attenuator trucks can observe lines and alert crew in paint truck of any potential issues.
        - Close following trail vehicles can visually monitor paint spray and bead application for any abnormalities.
        - Look for visibly narrow or wide lines, overspray, thin or thick application.
    - Sound can be good indicator of issues with paint/bead guns; if the sound of the application of paint or beads changes, inspect the guns and shrouds for blockages or clogs or other issues, and inspect quality of line to ensure that it has been applied correctly.
    - Make sure to record all changes made to gun height, truck speed, gun pressure, etc. so that settings can be recorded and used for future striping operation. Any adjustments made will also be needed to calculate application rates and final amounts of paint used for accomplishment recording purposes.
- Common Rates, Speeds, etc.
    - Application Rate
        - 23.5 to 26.5 gallons per mile
    - Truck speed
        - 8 to 14 miles per hour
    - Bead application weights
        - 6-7 lbs per gallon of paint
    - Line thickness
        - 15 mils
    - Line width
        - All waterborne paint markings applied should be 6 inches wide or greater in accordance with the INDOT Standard Drawings

**<u>Standards for Vehicles Used in Striping Operations</u>**

- Paint Train Configurations
    - Interstates and multi-lane roads
        - Edgeline and centerline painting operations: Paint trains will consist of the edgeliner or centerliner as the lead vehicle followed by protection vehicles as required in the current version of the INDOT Work Zone Safety Manual (WZSM).
    - All other roads
        - Edgeline painting operations: The edgeliner shall be the lead vehicle followed by protection vehicle as required in the current version of the WZSM.
        - Centerline painting operations: The lead vehicle shall be a front escort followed by the centerliner and protection vehicle as required by the current version of the WZSM. The lead vehicle is not required on 4-lane divided or one-way roads.
    - Spacing of protection vehicles
        - 2 lane roads: Protection vehicle should be 200-500 ft behind marking vehicle. Urban roadways may require shorter distances between protection vehicles. Spacing will be as directed by the crew supervisor.
        - 4 lane roads: follow directions of the current version of the WZSM.

- Vehicle and Signage Standards
  - Marking Vehicle (edgeliner or centerliner truck)
    - The vehicle shall have a rear facing flashing arrow sign or changeable message sign (CMS), an amber flashing/rotating warning light mounted near the center of the truck bed, and an amber strobe light (1-2 million candlepower) mounted on each rear comer of the truck bed. The amber flashing/rotating warning light and the amber strobe lights shall be mounted on retractable supports and shall be operated at a height of 12ft above the pavement.
    - The vehicle shall display a rear facing slow moving vehicle emblem when operating at speeds less than 25mph.
    - Marking vehicles shall be equipped with a TMA.
  - Front Escort Vehicle
    - The vehicle should be a pickup or crew cab truck.
    - The vehicle shall be equipped with a forward-facing sign, “PAINT CREW”, visible to approaching traffic.
    - The vehicle shall display a rear facing slow moving vehicle emblem when operating at speeds less than 25mph and shall be equipped with an amber flashing warning light mounted near the center and on top of the truck cab.
    - The spacing from marking vehicle will be as directed by the crew supervisor. The front escort vehicle should also be positioned ahead to the crest of a vertical curve or around a horizontal curve and wait until the marking vehicle nears and then proceeds as directed.
  - Rear Protection Vehicle(s)
    - Rear protection vehicles shall be either a snowplow truck or 2 ton stakebed vehicle with a TMA (refer to manufacturer guidelines for minimum and maximum truck weight limits). If extra weight is needed, only loose sand shall be added to dump type trucks to meet manufacturer guidelines.
    - All rear protection vehicles shall display a rear facing slow moving vehicle emblem when operating at speeds less than 25mph, be equipped with an amber flashing warning light mounted on top of the truck cab, and a have a Type C flashing arrow board or Changeable Message System (CMS). The CMS shall be the preferred display device. A flashing arrow board should only be used when a CMS is unavailable. When an arrow board is used for an extended period of time, the "ROAD WORK AHEAD" sign may be replaced with a " PAINT CREW" sign. For signage at other times, follow the current version of the WZSM. A "PAINT CREW" message should be one of CMS messages.
    - TMAs are required for all rear protection vehicles used in painting operations.
  - “Paint Crew” signs
    - Shall be at least 24 in. high by 72 in. wide with 10 in. series C black letters on fluorescent orange prismatic lens, high intensity, reflective sheeting.

    - Type C Arrow Boards and CMS
        - The mounting height (to bottom) of board/sign should be a minimum of 7ft and the maximum height (to top of sign) should be 13ft.
        - If only one CMS is utilized, it shall be mounted on the first protection vehicle visible to traffic approaching from the rear.
- Paint Vehicle Safety Equipment
    - Fire Extinguisher
        - Each truck shall be equipped with a minimum of one ABC fire extinguisher at least 5 lbs. in size.
        - The following items should be checked monthly during the painting season:
            - Weight of the extinguisher
            - Extinguisher seal – should not be broken.
            - Date of last check of extinguisher
            - Location and accessibility of extinguisher
    - First aid kit
        - An approved first aid kid shall be carried with each paint crew.

**<u>Waterborne Paint and Glass Bead Testing and Sampling</u>**

- Sampling Schedule
    - Every year, each district will be randomly assigned with the following:
        - One partial load number of white waterborne paint
        - One partial load number of yellow waterborne paint
        - Two delivery numbers of glass beads
    - Each district will take a representative sample of paint or beads from their assigned load/delivery numbers upon receiving the assigned delivery and send it to INDOT Materials and Tests to undergo testing
        - INDOT Office of Materials and Tests
          120 S. Shortridge Road
          Indianapolis, IN 46219
    - New partial load and delivery numbers will be assigned to each district every year
        - A sampling schedule with delivery number assignments will be created and distributed in January of each year
        - The selected partial loads and delivery numbers can be selected from any subdistrict included on the QPAs for beads and paint, as well as the main district order

- The partial delivery numbering system for waterborne paint is explained below:

| | | |
|---|---|---|
| D. | A partial delivery shall consist of only one color of paint (either white or yellow, not both). The quantity of paint delivered on any given truck to a location shall represent the quantity for partial payment with all shipping and payment documents reflecting this quantity. The full load size (3,025 gallons in totes) will be considered the normal amount for a partial delivery unless the successful contractor requests a different quantity and INDOT accepts such a modification in writing. | ☒ yes ☐ no |
| E. | The successful contractor shall identify each partial delivery of material by a partial delivery number. Each color of paint shall have separate partial delivery numbers and <u>these numbers shall not be duplicated within a delivery location.</u> The partial delivery number will have an "X#-W" format for white paint or "X#-Y" format for yellow paint as follows:<br>**1. The "X" will be the first letter of the district or sub district that the delivery is to be made to; "C" for Crawfordsville, "F" for Fort Wayne, "G" for Greenfield, "L" for LaPorte, "S" for Seymour, "V" for Vincennes, and "W" for Winamac. If necessary the "X" will stand for the first two letters of the sub district, for example, Cambridge City will have a "CA" partial delivery number.**<br>**2. The "#" will be the sequential partial delivery number for the location. The first delivery load will have partial delivery number one (1), the second delivery load will have partial delivery number two (2), the third delivery load will have partial delivery number three (3), etc.** | ☒ yes ☐ no |

- The delivery numbering system for glass beads is explained below:

| | | |
|---|---|---|
| F. | The contractor shall identify each delivery by a delivery number. The number shall appear clearly on all delivery and invoice documents. Delivery numbers shall be assigned to each delivery load, and be determined by the order of shipment. | ☒ yes ☐ no |
| G. | Delivery numbers shall begin with a letter and the number one (X-1), and continue with two (X-2) and so forth, where X represents the first letter of the delivery location and the number representing the chronological order of the delivery. These numbers shall not be duplicated within a contract or delivery location and shall have a unique abbreviation code. | ☒ yes ☐ no |

- Previous Sampling Schedule Example:

**2017 Sample Schedule**

| District | Beads Order | Paint Partial # |
|---|---|---|
| Crawfordsville | C-2 | C2-W |
| | C-5 | C4-Y |
| Fort Wayne | F-3 | F1-W |
| | F-9 | F6-Y |
| Greenfield | G-2 | G1-W |
| | G-6 | G3-Y |
| La Porte | L-2 | L5-W |
| | W-3 | L1-Y |
| Seymour | S-3 | S7-W |
| | S-8 | S3-Y |
| Vincennes | V-2 | V2-W |
| | V-7 | V8-Y |

| Delivery Abbreviation Codes: | |
|---|---|
| A | Greenfield District-Albany Subdistrict |
| C | Crawfordsville District |
| F | Fort Wayne District |
| G | Greenfield District |
| L | La Porte District |
| S | Seymour District |
| V | Vincennes District |
| W | La Porte District - Winamac Subdistrict |

In the example, in 2017, Crawfordsville district provided bead samples from order number C-2 and order number C-5. They provided a white paint sample from partial order number C2-W for white paint and partial order number C4-Y for yellow paint.

- Sampling Instructions for Traffic Paint
  - Paint should be sampled directly from a paint tote from the assigned partial order number
  - The paint in the tote should be mixed as much as possible before taking the sample to prevent settling
  - A sample of at least one quart is required to be sent in for testing
  - Samples should be placed in lined metal paint cans; plastic containers should not be used for the testing samples
  - A Sitemanager record should be created for each sample before it is sent to Materials and Tests
    - A separate record will need to be created for the white and yellow paint samples
    - Your district's testing department can help with the creation of a Sitemanager record if needed
  - Each paint sample can that is sent to Materials and Tests should be labelled with the following:
    - Sitemanager record number
    - District
    - Date of sampling
    - Manufacturer's lot number of paint
    - Paint partial delivery number (ex. C-4Y)
    - Identify paint color (white or yellow)

- Sampling Instructions for Glass Beads
    - Samples will be taken from three randomly selected (by the sampler) separate bulk containers from each delivery number of beads
        - The sampled beads should be placed in one quart metal paint cans and should come close to filling the can
        - Three cans will consist of one sample of beads to represent a delivery number; one can from each of the three bulk containers selected
    - A Sitemanager record should be created for each sample before it is sent to Materials and Tests
        - One Sitemanager record will represent one delivery number that has provided samples for testing (one record will represent all three sample cans from one specific delivery number)
        - Your district's testing department can help with the creation of a Sitemanager record if needed
    - Each paint sample can that is sent to Materials and Tests should be labelled with the following:
        - Sitemanager record number
        - District
        - Date of sampling
        - Manufacturer's lot number of beads
        - Bead Delivery Number (ex. C-5)
- Notification of Results
    - Materials and Tests will send all test results to the district contact individuals listed in the paint and beads QPA documents.

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Paint Edgelines | CODE | 8320 |
|---|---|---|---|

**Purpose**

Restore visibility, retroreflectivity, and maintain traffic control by painting the edgelines of the roadway.

For this activity, an edgeline is all longitudinal roadway markings along the right edge of the roadway.

**Category** Traffic Markings

- ☒ **PM**
- ☒ **QA**
- ☒ **Plan Location**

**Scheduling & Coordination**

Schedule this work during the warmer moths with emphasis place on coordination with resurfacing and seal coating operations.

Schedule the centerline painting of durable markings based on the expected service life of the type of marking (4 years for thermoplastic and epoxy; 8 years for preformed plastic), contingent on retroreflectivity.

Temperature limitation for painting must be observed per paint manufacturer guidelines. Waterborne paints must be applied at 50 degree ambient temperature or higher.

All markings shall conform to the standards in the Indiana Manual on Uniform Traffic Control Devices.

Consider weather forecast for chance of rain when scheduling paint crew.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Paint Miles |
|---|---|---|---|---|---|

Accomplishment in the number of painted miles.

Painted Mile – total linear feet painted divided by 5280

Work done for control points shall be part of the paint card.

For additional work order reporting guidance see the Work Orders section of the Preface

**Crew Size** 3 Workers

| | QTY |
|---|---|
| Crew Leader | 1 |
| Laborer | 1 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

Centerliner

*Traffic Control Equipment is NOT shown here

**P.P.E.**

Base PPE

**Materials**

Paint – INDOT Spec Section 909.05

Glass Beads – INDOT Spec Section 921.02

**Other References**

INDOT Operations Memorandums 10-05

IMUTCD Chapter 3B

Standards and Specs 808.01

**Sub Activities**

| Average Daily Production | 24 - 50 Paint Miles | EFFECTIVE DATE | 2/12/2024 |
|---|---|---|---|

| ACTIVITY | Paint Edgeline | CODE | 8320 |
|---|---|---|---|

**Work Method**

1. Select appropriate locations to re-stripe edgelines – see special considerations section.
2. Set up control points if needed.
3. Visual inspection of paint guns, filters, air compressor, paint and bead lines; looking for obvious signs of leaks, clogged paint or bead shrouds, loose connections, worn hoses, etc.
4. Load truck with materials. Inspect the paint to be loaded to ensure it looks uniform and does not need to be stirred.
5. Optional: Perform wet film thickness tests – Paint over a flat surface (old sheet sign material works well) without using beads, but with the same vehicle speed and pressure planned to be used for the operation. Use wet film thickness gauge to check depth of wet paint on the flat surface. Record results on paint application form. Desired thickness is 15 mils.
6. Mobilize to job site.
7. Set up safety devices if needed and prep truck for painting operation
8. Within the first 4 miles of painting (8 miles if step 3 performed), pull off roadway on area of level ground to measure paint levels and calculate application rates. Record results on paint application form. Also inspect quality of line (width, thickness, bead coverage, bead embedment).
9. Make adjustments as necessary.
10. Resume painting operations continually listening to and watching the paint and bead guns. Pay close attention to the sound the paint gun is making. If there is a whistling noise, or the sound changes that is likely and indication something is amiss. If you hear these noises or if gunners / back up drivers notice uneven coverage of paint / beads pull over as soon as possible to correct situation.
11. Flush paint guns as frequently as possible. Driver can alert gunner of upcoming intersections and roll through them to give time to flush the guns.
12. At the end of daily painting operations, flush all paint guns thoroughly to prevent paint hardening overnight. This will prevent time consuming cleaning before starting the next painting day.
13. Attach the paint application form to work order in WMS.

**Special Considerations**

Lunch break is a good opportunity to re-fill the truck

Monitor paint build up on and around paint guns and shrouds

Consider night painting in high volume urban areas

Consider pulling over to let traffic through if it starts backing up or if a large vehicle is blocking signs.

## Evaluating and Restriping Edgeline Pavement Markings

### Evaluation and Restriping of Waterborne Paint Edgeline Pavement Markings

- Acceptable Retroreflectivity Standards
  - Not applicable – waterborne paint centerline and edgeline markings will not be evaluated for retroreflectivity.
- Acceptable Evaluation Methods
  - Not Applicable
- Frequency of Evaluation
  - Waterborne paint centerlines and edgelines will not be evaluated for retroreflectivity.
- Acceptable Replacement Method
  - White and yellow waterborne paint centerline and edgeline markings will be replaced annually by painting over existing lines with waterborne paint of the same color.

### Evaluation and Restriping of Thermoplastic and Epoxy Durable Edgeline Pavement Markings

- Acceptable Retroreflectivity Standards
  - White markings: minimum 140 mcd/m$^2$/lux
  - Yellow markings: minimum 120 mcd/m$^2$/lux
- Acceptable Evaluation Methods
  - Mobile retroreflectometer unit (MRU) in accordance with ITM 931-23
  - Hand-held retroreflectometer unit in accordance with ITM 931-23
  - Consistent Parameters Visual Nighttime Inspection procedure in accordance with Chapter 4 of FHWA-SA-22-08, "Methods for Maintaining Pavement Marking Retroreflectivity"

## Special Considerations (Continued)

- Frequency of Evaluation
  - Thermoplastic and epoxy durable centerline and edgeline markings will be evaluated for retroreflectivity when they have reached the end of their expected service life of 4 years.
- Acceptable Replacement Method
  - Epoxy and thermoplastic durable centerline and edgeline markings that do not meet the acceptable retroreflectivity standards (or driving needs when visually inspected) will be painted over with waterborne traffic paint.

**Evaluation and Restriping of Preformed Plastic Durable Edgeline Pavement Markings**

- Acceptable Retroreflectivity Standards
  - White markings: minimum 140 mcd/m$^2$/lux
  - Yellow markings: minimum 120 mcd/m$^2$/lux
- Acceptable Evaluation Methods
  - Mobile retroreflectometer unit (MRU) in accordance with ITM 931-23
  - Hand-held retroreflectometer unit in accordance with ITM 931-23
  - Consistent Parameters Visual Nighttime Inspection procedure in accordance with Chapter 4 of FHWA-SA-22-08, "Methods for Maintaining Pavement Marking Retroreflectivity"
- Frequency of Evaluation
  - Preformed plastic durable centerline and edgeline markings will be evaluated for retroreflectivity when they have reached the end of their expected service life of 8 years.
- Acceptable Replacement Method
  - Preformed plastic durable centerline and edgeline markings that do not meet the acceptable retroreflectivity standards (or driving needs when visually inspected) cannot be painted over with waterborne traffic paint and will be removed and replaced by contract when they do not meet the acceptable retroreflectivity standards (or driving needs when visually inspected).

**Application Rate Guidance**

Application Rates to be determined.

After application rates are achieved, the above procedure shall be performed every 4 hours to ensure application rates are constant; this can be done when cleaning shrouds, breaking for lunch or when re-filling throughout the day.

Application rates can be adjusted with air pressure to the guns.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| **Average Daily Production** | **24 - 50 Paint Miles** | **EFFECTIVE DATE** | **2/12/2024** |

# Indiana Department of Transportation

## Activity 8320 QA Form - Paint Edgelines

PK #:_____ District:_____
Work Order #:_____ Route:_____
Date completed:_____ Intersections:_____
Date inspected:_____ RP Start/End:_____
Inspector:_____
QA Window: 14 days -1 month

**Observations:**

1. Does the actual line width deviate from the intended line width?
   - 0 Yes, line is ≥ 1/4" too narrow
   - 7 Yes, line is ≥ 1/2" too wide
   - 14 No, line is within acceptable tolerances

2. Does the line cover the longitudinal joint at any point?
   - 0 Yes
   - 13 No

3. Is a crisp edge maintained throughout?
   - 0 No, there is greater than 1/2" overspray in at least one location
   - 13 Yes

4. What is the retroreflectivity rating?
   - 0 R = 0-174
   - 20 R = 175-219
   - 30 R = 220-234
   - 40 R = 235-249
   - 50 R = 250+

5. Is the application rate sheet attached and completed correctly?
   - 0 Sheet is not attached or completed incorrectly
   - 10 Sheet is attached and completed correctly

**Inspector Comments:**

**Score:**

| | Possible | Actual |
|---|---|---|
| **1** | 14 | |
| **2** | 13 | |
| **3** | 13 | |
| **4** | 50 | |
| **5** | 10 | |
| **Total:** | 100 | |

**Final % score (divide Actual by Possible):_____**

**INDIANA DEPARTMENT OF TRANSPORATION**

**DIVISION OF MAINTENANCE**

# White Paint Daily Form

## Activity 8300 \ 8320

**The first test needs to be completed within the first 4 miles (21,120 Lft) of accomplishment, or within 8 miles (42,240 Lft) if wet film thickness is checked at start of day**

| Paint App Rate for 6" Lines | | |
|---|---|---|
| **Application Rate (gpm)** | | **Required Changes** |
| **Low** | **High** | |
| < 22.5 | >27.5 | Make adjustments, recheck after 2 painted miles |
| <23.5 | >26.5 | Make adjustments, recheck after 4 hours |
| 23.5 | 26.5 | No adjustments required, recheck after 4 hours |

| Target Bead App Rate for 6" Lines | | | |
|---|---|---|---|
| Speed | 6 lbs/gal | 6.5 lbs/gal | 7 lbs/gal |
| 14 mph | 840 | 910 | 980 |
| 12 mph | 720 | 780 | 840 |
| 10 mph | 600 | 650 | 700 |
| 8 mph | 480 | 520 | 560 |

| | Date | Time | Speed (mph) | Gun 1 Thickness (mil) | Gun 1 Width (in) | Gun 2 Thickness (mil) | Gun 2 Width (in) | Comments |
|---|---|---|---|---|---|---|---|---|
| Wet Film, Restest if <13 mil or >17 mil | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| Paint Gun Settings | Gun Height | Gun Pressure |
|---|---|---|
| | | |

| Calculations | | | D | E = D2-D1 | F | G | H = F + G | I = H2 - H1 | J = I / 5280 | K = E / J | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Test** | **Date** | **Time** | **Total Paint Used (gal)** | **Gal From Last Test** | **Gun 1 Total Lft** | **Gun 2 Total Lft** | **Total Lft** | **Lft From Last Test** | **Mi from Last Test** | **Current Paint App Rate (gpm)** | **Lowest Bead Rate (mL/ 5 sec)** | **Changes Made / Comments** |
| 1 | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# PERFORMANCE STANDARD

| ACTIVITY | Ramp or Parking Lot Painting | CODE | 8340 |
|---|---|---|---|

**Purpose**

To restore and maintain adequate traffic control by painting the ramp edgelines or parking lot roadway surface. Parking lots to be included in this activity are INDOT Facility lots, Rest Areas, and Weigh Stations.

**Category** Traffic Markings

- ☐ **PM**
- ☐ **QA**
- ☐ **Unit Cost**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule this work during the warmer months with emphasis on coordination with resurfacing operations.

Schedule the painting of durable markings as necessary

Seasonal and temperature limitations for painting must be observed per paint manufacturer guidelines.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Paint Miles |
|---|---|---|---|---|---|

Special Markings in the lots that are not standard 4" lines, such as stop bars, turn arrows, etc. should be reported to Activity 8360, Special Marking Maintenance

Accomplishment is the number of painted miles.

Painted Mile - the total linear feet painted divided by 5280

Report ramp painting to Subactivity 360, Ramp Painting.

Report parking lot striping to Subacivity 361, Parking Lot Painting

For additional work order reporting guidance see the Work Orders section of the Preface

**Crew Size** 2 - 3 Workers

| | QTY |
|---|---|
| Crew Leader | 1 |
| Laborer | 1 - 2 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

Centerliner / Edgeliner

Portable Paint Machine

Thermoplastic Melter

Thermoplastic Applicator

*Traffic Control Equipment is NOT shown here

**P.P.E.**

Base PPE

**Materials**

Paint – INDOT Spec Section 909.05

Glass Beads – INDOT Spec Section 921.02

Thermoplastic – INDOT Spec Section 921.02

**Other References**

INDOT Operations Memorandums

IMUTCD Chapter 3B

Standards and Specs 808.07

**Sub Activities**

360 - Ramp Painting

361 - Parking Lot Painting

| Average Daily Production | 5 - 15 Paint Miles | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Ramp or Parking Lot Painting | CODE | 8340 |
|---|---|---|---|

**Work Method**

Using Paint Truck:

1. Visual inspections of paint guns, paint filters, air compressor.
2. Load truck with materials. This can also be performed at the end of the day.
3. Mobilize to job site.
4. Pull off of road, set up safety devices, prep truck for painting.
5. Paint approximately 1 mile, pull off road to check quality of line (width, thickness, and bead coverage)
6. Begin paint operations.
7. Backup drivers should be observing line and notify crew leader of any problems or concerns. (This includes traffic back ups or line quality issues)
8. At the end of painting operations, flush all paint lines and guns as needed.
9. Return to load site.

Using Portable Paint Machine:

1. Visually inspect portable paint machine; look for obvious signs of wear or leaks.
2. Load material into paint machines at yard; ensure to load enough extra paint and beads to complete project.
3. Set up any required safety devices.
4. Sweep or use blower to clean area of debris.
5. Layout stencils or line off areas to be painted.
6. Test application rate using a wet film gage. The ideal thickness is 15 mil. When using the gage, do not apply beads.
7. Paint the markings.
8. Remove any safety devices

Melted Thermoplastics:

1. Visually inspect thermoplastic melter and applicator when used; looking for obvious signs of wear or leaks.
2. Load materials; ensure enough material is on trailer or truck to complete days work.
3. Light melting pot and begin melting material while in route to jobsite.
4. Mobilize to jobsite.
5. Set up safety devices.
6. Prep equipment; set up portable applicator pot with appropriate applicator “shoes”; continue to melt the appropriate amount of material in melting pot. Material should be heated to a minimum of 385 and maximum of 450 degrees Fahrenheit.
7. Remove markings if necessary with grinder, and clean marking area with broom or blower to remove excess loose material.
8. Layout markings with stencils or line markings
9. Begin marking operations; ensure all safety procedures are followed to ensure accidental splashing does not occur. Do not drop blocks or bags of material into melting pot. Use material chutes, and let material slide into pot. Thermoplastic should be applied at 125 mil. Beads should be applied with bead bar located directly behind the application shoe. The beads are gravity applied. Throwing beads onto melted thermoplastic after the machine is finished is ineffective. The beads need to be applied as the thermoplastic hits the roadway, otherwise the beads will not achieve proper embedment depth.
10. At the end of the operation, ensure all thermoplastic shoes are emptied and cleaned.
11. Remove safety devices.

**Special Considerations**

Keep close eye on paint build up around paint guns and shrouds
Consider night painting in high volume urban areas
Consider weather forecast for chance of rain when scheduling paint crew

**APPROVED BY**

Director, Highway Maintenance

| Average Daily Production | 5 - 15 Paint Miles | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Curb Painting | CODE | 8350 |
|---|---|---|---|

**Purpose**

To restore and maintain adequate visibility of curbs in communities, on ramps, and at rest parks.

**Category** Traffic Markings

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule this work during the warmer months.

Schedule this painting as lines deteriorate or Engineering judgement. Typically not every year.

Seasonal and temperature limitations for painting must be observed per paint manufacturer guidelines. Waterborne paints must be applied at 50 degrees ambient temperature or higher.

All markings shall conform to the standards in the Manual on Uniform Traffic Control Devices.

Consider weather forecast for chance of rain when scheduling paint crews

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Linear Feet |
|---|---|---|---|---|---|

Accomplishment is the linear feet of painted curb.

When painting top and side of curb on separate passes, it is still only 1 accomplishment per foot of curb.

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** 2 Workers

| | QTY |
|---|---|
| Crew Leader | 1 |
| Laborer | 1 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

Centerliner / Edgeliner

*Traffic Control Equipment is NOT shown here

**P.P.E.**

Base PPE

**Materials**

Paint – INDOT Spec Section 909.05

Glass Beads – INDOT Spec Section 921.02

**Other References**

INDOT Operations Memorandums

IMUTCD Chapter 3B

Standards and Specs 808.06

**Sub Activities**

| Average Daily Production | 5,000 Linear Feet | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Curb Painting | CODE | 8350 |
|---|---|---|---|

**Work Method**

1. Visual inspections of paint guns, paint filters, air compressor, paint and bead lines; looking for obvious signs of leaks, clogged paint or bead shrouds, loose connections, or worn hoses.
2. Load truck with materials. This can also be performed at the end of the day.
3. Mobilize to job site.
4. Pull off of road, set up safety devices, prep truck for curb painting; lower carriage to prescribed height determined by the specific curb to be painted. Place safety chains or connect steel bars to carriage to prevent it from accidently falling or moving during this operation. This will prevent damage to the carriage itself and the paint and bead guns. Position paint and bead guns to paint the desired curbs.
5. Begin paint operations. Drive slowly approximately 5 MPH or less to prevent damage to paint guns. Application rates should be the same as 4" painted lines; 16.5 gallons of paint per painted mile and 6 pounds of glass beads per gallon of paint.
6. Backup drivers should be observing painted curb and notify crew leader of any problems or concerns. (This includes traffic backups or line quality issues)
7. At the end of painting operations, flush all paint guns as needed.
8. Return to load site.

**Special Considerations**

Keep close eye on paint build up around paint guns and shrouds.
Consider night painting in high volume urban areas.
Consider coordinating painting with special events in the communities.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 5,000 Linear Feet | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Special Marking Maintenance | CODE | 8360 |
|---|---|---|---|

**Purpose**

Maintain visibility and retroreflectivity of existing arrows, crosswalks, stop bars, railroad markings, gore areas, cross hatching, etc. with paint, thermoplastics, or other cold plastics.

This activity includes removal of unnecessary special markings.

**Category** Traffic Markings

- ☒ **PM**
- ☒ **QA**
- ☒ **Unit Cost**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule during warm months when possible, but this work can be performed throughout the year. Emphasis should be placed on coordination with new construction, seal coating, resurfacing and centerline / edgeline painting operations.

Seasonal and temperature limitations must be observed for the marking material used. All markings should conform to the Manual on Uniform Traffic Control Devices.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Square Feet |
|---|---|---|---|---|---|

Accomplishment is reported as square footage of marking material placed. See table below for estimates.

Unless no new marking is installed, removal of markings is not an accomplishment.

New special markings installed at new locations are reported to activity 8400

Painting of INDOT facility parking lots, including rest parks and weigh stations, should be reported to Activity 8340.

**Square Footage Table**

| | | |
|---|---|---|
| 4" Material = 0.33 sq ft | Straight Arrow = 12.5 sq ft | Any Letter = 6.0 sq ft |
| 6" Material = 0.50 sq ft | Left and Right Arrow = 15.5 sq ft | 2 Letters = 12.0 sq ft |
| 8" Material = 0.67 sq ft | Combo Arrow = 28.0 sq ft | 3 Letters = 18.0 sq ft |
| 12" Material = 1.0 sq ft | R X R = 69.0 sq ft | 4 Letters = 24.0 sq ft |
| 16" Material = 1.33 sq ft | 39" Handicap Symbol = 3.3 sq ft | 5 Letters = 30.0 sq ft |
| 24" Material = 2.0 sq ft | 48" Handicap Symbol = 4.3 sq ft | 6 Letters = 36.0 sq ft |
| 42" Color Handicap = 12.0 sq ft | | |

Report to the appropriate subactivity for the specific material used.

For additional work order reporting guidance see the Work Orders section of the Preface

*Report to the special markings asset. If asset is not in special markings inventory, report to Pavement Key.

**Crew Size** 2 - 3 Workers

| | QTY |
|---|---|
| Crew Leader | 1 |
| Laborer | 1 - 2 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

Thermoplastic Applicator

Thermoplastic Melter

Portable Paint Machine

Portable Line Remover

*Traffic Control Equipment is NOT shown here

**P.P.E.**

1) Base PPE
2) Approved APF 10 Respirator (See "Silicosis Awareness")

**Materials**

Thermoplastic* Cold Plastic* Glass Beads*

Waterborne Paint – INDOT SPEC Section 909.05

*INDOT Spec Section 921.02

**Other References**

IMUTCD Chapter 3B

Attached area estimates

Material Safety Data Sheet for each material (received with shipment of materials)

Standards and Spec 808.01

Silica Exposure Control Plan (WPS Preface)

| Sub Activities | 357 - Thermoplastic 359 - Preformed Plastic 358 - Waterborne Paint | | |
|---|---|---|---|
| Average Daily Production | 500 – 1,000 Square Ft | EFFECTIVE DATE | 7/12/2023 |

| ACTIVITY | Special Marking Maintenance | CODE | 8360 |
|---|---|---|---|

**Work Method**

Work methods vary depending on material used.

Melted thermoplastics:

1. Visually inspect thermoplastic melter and applicator when used; looking for obvious signs of wear or leaks.
2. Load materials; ensure enough material is on trailer or truck to complete days work.
3. When using thermoplastic, light melting pot and begin melting material while in route to jobsite.
4. Mobilize to job site.
5. Set up safety devices.
6. Prep equipment; set up portable applicator pot with appropriate applicator "shoes"; continue to melt the proper amount of material in melting pot. Material should be heated to a minimum of 385 and maximum of 450 degrees.
7. Remove markings if necessary with grinder. Clean marking area with broom or blower removing loose material.
8. Layout markings with stencils or line markings
9. Begin marking operations; ensure all safety procedures are followed to ensure accidental splashing does not occur, do not drop blocks or bags of material into melting pot; use material chutes and let material slide into pot, thermoplastic should be applied at 125 mil. Beads should be applied with bead bar located directly behind the application shoe. The beads are gravity applied. Throwing beads onto melted thermoplastic after the machine is finished is ineffective. The beads need to be applied as the material is applied to the roadway, a crust forms almost immediately and this prevents beads from being embedded to proper depth when thrown on afterwards.
10. At the end of marking operations, ensure all thermoplastic shoes are emptied and clean.
11. Remove safety devices

Pre-formed thermoplastic:

1. Check propane torches prior to leaving yard; torches should be rated at 750 degrees in order to effectively melt the pre-formed plastic. Always carry extra propane tanks. Load enough material to perform scheduled work.
2. Mobilize to job site; set up safety devices
3. Sweep or use blower to clean area of debris
4. Mark roadway, if necessary, and lay out pre-formed markings.
5. Heat markings uniformly until plastic is fully melted and adheres to the pavement. Typically a small amount of bubbling will occur and the plastic will change colors slightly.
6. Remove safety devices.

Cold applied tape:

1. Load material; mobilize to job site.
2. Sweep or use blower to clean area of debris
3. Mark roadway, if necessary, apply activator (glue) to area and let it set up; apply tape and roll it with weighted roller per manufactures specification.
4. Remove safety devices.

| ACTIVITY | Special Marking Maintenance - Cont'd | CODE | 8360 |
|---|---|---|---|

Waterborne paint:

1. Visually inspect protable paint machine; look for obvious signs of wear or leaks.
2. Load material into paint machines at yard; ensure to load enough extra paint and beads to complete project.
3. Sweep or use blower to clean area of debris
4. Layout stensils or line off areas to be painted;
5. Paint markings; application rate is as close to the painted mile rates as possible using the portable machine. A wet film gage can be used to measure line thickness. Ideal thickness is 15 mil. When using this gage do not apply beads; this test should be used prior to markings application.
6. Remove safety devices

**Silicosis Awareness**

All efforts should be made to eliminate/reduce the generation of dust while performing this activity, specifically pavement grinding. If the grinder is equipped with a water system it must be used. If not, manually spray water to control dust during grinding.
If the generation of dust cannot be eliminated through the use of water or other controls, then the workers operating the grinder or within 20' must wear an approved facepiece respirator that they are fit tested to wear.

**Special Considerations**

Try to perform activity in warm months to allow use of block or bag thermoplastics or waterborne paint. Higher productivity rates can be achieved with these particular markings.

Pre-formed markings can be used in colder weather, but are more expensive and much less productivity can be expected.

When melting pot is on, consider having one crew member monitor pot at all times for safety.

For pavement marking not done in accordance with the Standard Specifications, a brief, engineering-judgement based justification must be provided by district Technical Services and included in the work order. If a justification is not provided, the markings will receive 0 points for placement on the QA evaluation.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 500 – 1,000 Square Ft | EFFECTIVE DATE | 7/12/2023 |

# Indiana Department of Transportation

## Activity 8360 QA Form - Special Marking Maintenance

Asset Inventory #:_____ District/Sub/Unit:_____
Work Order #:_____ Route:_____
Date completed:_____ Intersections:_____
Date inspected:_____ RP Start/End:_____
Inspector:_____ Special marking type:_____
QA Window: 7 days -1 month

**Observations:**

| | | |
|---|---|---|
| 1. Placement | | |
| | 0 | Not proper placement |
| | 10 | Placed according to specifications |

| | | |
|---|---|---|
| 2. Size of marking | | |
| | 0 | Size is not correct according to spec |
| | 20 | Correct size according to marking type & spec |

| | | |
|---|---|---|
| 3. Retroreflectivity | | |
| | 0 | R < 250 |
| | 20 | 250 ≥ R < 300 |
| | 30 | R ≥ 300 |

| | | |
|---|---|---|
| 4. Crispness | | |
| | 1 | > 1/2" overspray |
| | 2 | > 1/4" to ≤ 1/2" overspray |
| | 5 | ≤ 1/4" overspray |

| | | |
|---|---|---|
| 5. Adherance to pavement | | |
| | 0 | Any part not adhering to road |
| | 20 | Material 100% adhering to road |

**Inspector Comments:**

| |
|---|
| |

**Score:**

| | Possible | Actual |
|---|---|---|
| **1** | 10 | |
| **2** | 20 | |
| **3** | 30 | |
| **4** | 5 | |
| **5** | 20 | |
| **Total:** | 85 | |

**Final % score (divide Actual by Possible):_____**

INDOT Work Performance Standards
Activity 8360 – Special Marking Maintenance
Guide for Applying Melted Thermoplastic Special Markings

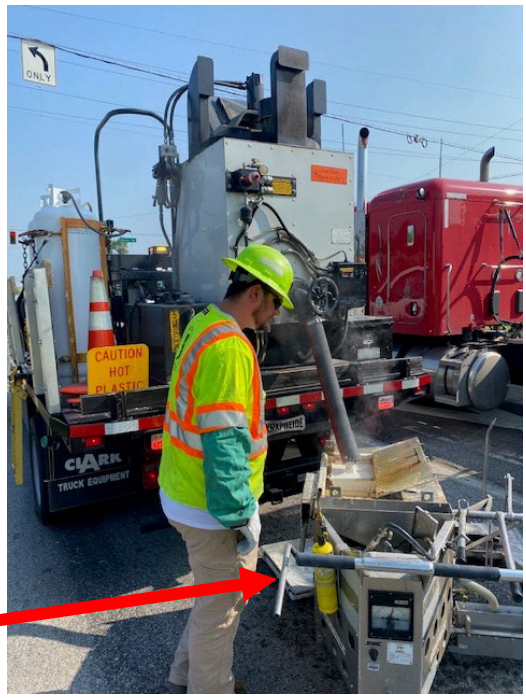
**Setup of Jobsite and Equipment**

- Place warning signs ahead of the portion of the road where you will be applying the special markings. If applying markings at an intersection, make sure to place signs at all approaches to the intersection.

- Use leaf blower to clean off locations where markings will be applied to remove dirt, rocks, or other debris on the ground on application site. Any debris on the site of the application can prevent the thermoplastic from adhering correctly to the pavement or could be covered with thermoplastic and create an uneven surface of the marking.

- Always use gloves, arm shields, and eye protection when loading cart and at any time you are working with hot thermoplastic material.
- When loading application cart with thermoplastic material, make sure to load material through the basket filters on the cart. The baskets will keep any large chunks of unmelted material from entering the cart.

- Keep drip pan at edge of cart underneath the loading hose while loading material into the cart to keep any stray drips of material from falling on to the pavement. After loading cart, keep drip pan under loading hose for a short time to catch any remaining material that may drip from hose.




Drip Pan

- Before beginning the application of thermoplastic, test the application of the material by releasing a small amount of material into the drip pan from the cart. Check that the material is fully melted and is free of chunks of material. If chunks of material are present, the material is not properly melted. The temperature of the cart heater may need to be increased if the material is not properly melting.

- Load beads into hopper evenly across the width of the hopper; this will help to allow the beads to feed down to the application bar properly. Load beads to roughly 2 inches from the top of the hopper to prevent beads from spilling out of the hopper.

**Applying Thermoplastic Markings**

- When applying markings, align the guide arm on the cart with the outside edge of the line that is to be painted over. Push the cart at a slow, steady pace when applying markings; try to avoid stopping the cart while applying to get an even application of material. When releasing material into the application shoe, make sure that the shoe does not run out of material or become overfilled; this can lead to gaps in coverage of the material (when the shoe becomes empty) or spillage of material (when the shoe becomes overfilled).

- Make sure to monitor the bead application to check that the beads are being released from the application bar at a consistent rate.
- Check the temperature of the cart heater periodically during the time when the material is being applied to check that it is at a consistent temperature that is in the appropriate range for melting the material. The cart heater temperature should be between 385 and 400 degrees Fahrenheit; if the temperature is too low the material will not melt correctly, and if it is too high the material can burn and become discolored.

- Check the application shoe periodically throughout the day to make sure it is clean and not collecting too much dried material. Keeping the shoe clean will ensure that the line applied is even and crisp. If a thick film of material is present across the shoe, it will need to be cleaned. The shoe can be cleaned by scraping material off of it with a putty knife.


**Finishing Up Marking Application**

- Water can be poured over the markings after they are applied to cool the material and help the markings to dry faster. This can be helpful when applying markings in a high traffic area.

- At the end of each day of application work, make sure that the application shoe is emptied of thermoplastic material and cleaned. Cleaning can be done with a putty knife and is easier to do directly after finishing up application work when material is not fully dried and is more pliable.

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Inspect/Replace Reflector | CODE | 8390 |
|---|---|---|---|

**Purpose**

To restore and maintain adequate traffic control, inspect or replace missing or damaged reflectors on barrier walls and/or guardrail.

**Category** Safety Devices

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule this work throughout the year as needed. Seasonal and temperature limitations for adhesive must be observed. All work shall conform to the Manual on Uniform Traffic Control Devices and the INDOT Standards Sheets

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Reflectors |
|---|---|---|---|---|---|

Accomplishment is number of new reflectors placed. Removal of markings is not an accomplishment.

Report RPM work to 2560 only.

Report Delineator to 8140 only.

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** 2 Workers

| | QTY |
|---|---|
| Laborers | 2 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

*Traffic Control Equipment is NOT shown here

**P.P.E.**

Base PPE

**Materials**

Special Reflectors – INDOT Spec Section 926.02

**Other References**

INDOT Standards and Specs 808.11

**Sub Activities**

| Average Daily Production | 50 - 100 Reflectors | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Inspect/Replace Reflector | CODE | 8390 |
|---|---|---|---|

**Work Method**

1. Place safety devices
2. Replace reflectors
3. Clean up work areas
4. Remove safety devices

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 50 - 100 Reflectors | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | New Special Marking Installation | CODE | 8400 |
|---|---|---|---|

**Purpose**

This activity includes installation of new markings in new locations, traffic islands, channelization through intersections, and new pavement messages to help direct traffic. (Adding new markings to the markings field inventory)

**Category** Traffic Markings

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Traffic Engineering will provide locations for new special markings.

Schedule during warm months when possible, but this work can be performed throughout the year. Emphasis should be placed on coordination with new construction, seal coating, resurfacing and centerline / edgeline painting operations.

Seasonal and temperature limitations must be observed for the marking material used. Melted Thermoplastic shall be applied when pavement temperatures are at 40 degrees or higher; Pre-formed Thermoplastic can be applied at temperatures of 20 degrees as long as pavement has been heated to the point all moisture is removed. Waterborne paint can be applied at ambient temperatures of 50 degrees or higher; Cold applied tape can be applied at 50 degrees or higher. All markings should conform to the Manual on Uniform Traffic Control Devices.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Square Feet |
|---|---|---|---|---|---|

Existing special marking maintenance should be reported to activity 8360

Accomplishment is reported as square footage of marking material placed. Use table below for area estimates.

Removal of existing markings is not an accomplishment.

For additional work order reporting guidance see the Work Orders section of the Preface.

**Square Footage Table**

| | | |
|---|---|---|
| 4" Material = 0.33 sq ft | Straight Arrow = 12.5 sq ft | Any Letter = 6.0 sq ft |
| 6" Material = 0.50 sq ft | Left and Right Arrow = 15.5 sq ft | 2 Letters = 12.0 sq ft |
| 8" Material = 0.67 sq ft | Combo Arrow = 28.0 sq ft | 3 Letters = 18.0 sq ft |
| 12" Material = 1.0 sq ft | R X R = 69.0 sq ft | 4 Letters = 24.0 sq ft |
| 16" Material = 1.33 sq ft | 39" Handicap Symbol = 3.3 sq ft | 5 Letters = 30.0 sq ft |
| 24" Material = 2.0 sq ft | 48" Handicap Symbol = 4.3 sq ft | 6 Letters = 36.0 sq ft |
| 42" Color Handicap = 12.0 sq ft | | |

**Crew Size** 2 - 3 Workers

| | QTY |
|---|---|
| Crew Leader | 1 |
| Laborer | 1 - 2 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

Thermoplastic Applicator
Thermoplastic Melter
Portable Paint Machine
Portable Line Remover
*Traffic Control Equipment is NOT shown here

**P.P.E.**

Base PPE

**Materials**

Thermoplastic* Cold Plastic* Glass Beads*
Waterborne Paint – INDOTR Spec Section 909.05
*INDOT Spec Section 921.02

**Other References**

IMUTCD Chapter 3B Standard/Spec 808.01
Attached area estimates
Material Safety Data Sheet (received with materials)

**Sub Activities**

| Average Daily Production | 300 - 450 Square Ft | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | New Special Marking Installation | CODE | 8400 |
|---|---|---|---|

**Work Method**

Work methods vary depending on material used.

Melted thermoplastics:

1. Visually inspect thermoplastic melter and applicator when used; looking for obvious signs of wear or leaks.
2. Load materials; ensure enough material is on trailer or truck to complete day's work.
3. When using thermoplastic, light melting pot and begin melting material while in route to jobsite.
4. Mobilize to job site.
5. Set up safety devices.
6. Prep equipment; set up portable applicator pot with appropriate applicator "shoes"; continue to melt the proper amount of material in melting pot. Material should be heated to a minimum of 385 and maximum of 450 degrees.
7. Remove markings if necessary with grinder. Clean marking area with broom or blower removing loose material.
8. Layout markings with stencils or line markings
9. Begin marking operations; ensure all safety procedures are followed to ensure accidental splashing does not occur; do not drop blocks or bags of material into melting pot; use material chutes and let material slide into pot, thermoplastic should be applied at 125 mil. Beads should be applied with bead bar located directly behind the application shoe. The beads are gravity applied. Throwing beads onto melted thermoplastic after the machine is finished is ineffective. The beads need to be applied as the material is applied to the roadway; a crust forms almost immediately and this prevents beads from being embedded to proper depth when thrown on afterwards.
10. At the end of marking operations, ensure all thermoplastic shoes are emptied and clean.
11. Remove safety devices

Pre-formed thermoplastic:

1. Check propane torches prior to leaving yard; torches should be rated at 750 degrees in order to effectively melt the pre-formed plastic. Always carry extra propane tanks. Load enough material to perform scheduled work.
2. Mobilize to job site; set up safety devices
3. Sweep or use blower to clean area of debris
4. Mark roadway, if necessary, and lay out pre-formed markings.
5. Heat markings uniformly until plastic is fully melted and adheres to the pavement. Typically, a small amount of bubbling will occur and the plastic will change colors slightly.
6. Remove safety devices.

Cold applied tape:

1. Load material; mobilize to job site.
2. Sweep or use blower to clean area of debris
3. Mark roadway, if necessary, apply activator (glue) to area and let it set up; apply tape and roll it with weighted roller per manufactures specification.
4. Remove safety devices.

| ACTIVITY | New Special Marking Installation | CODE | 8400 |
|---|---|---|---|

Waterborne paint:

1. Visually inspect portable paint machine; look for obvious signs of wear or leaks.
2. Load material into paint machines at yard; ensure to load enough extra paint and beads to complete project.
3. Sweep or use blower to clean area of debris
4. Layout stencils or line off areas to be painted;
5. Paint markings; application rate is as close to the painted mile rates as possible using the portable machine. A wet film gage can be used to measure line thickness. Ideal thickness is 15 mil. When using this gage do not apply beads; this test should be used prior to markings application.
6. Remove safety devices

**Special Considerations**

If there is not a full day of work, consider scheduling with Activity 8360 in the same area.

Try to preform activity in warm months to allow use of block or bag thermoplastics or waterborne paints. Higher productivity rates can be achieved with these particular markings.

Preformed markings can be used in colder weather, but are more expensive and much less productivity can be expected.

When melting pot is on, consider having one crew member monitor pot at all times for safety.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 300 - 450 Square Ft | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Signal Maintenance Response | CODE | 8500 |
|---|---|---|---|

**Purpose**

Respond to a malfunctioning signal to restore it to an acceptable operating mode, conduct repairs and replacement of traffic signals, flashing beacons, and pre-warning flashers to include wiring, detection, controllers, controller programming changes, setting clocks, and any other changes to control devices.

**Category** Signals

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

**Scheduling & Coordination**

The district shall have a technician on 24-hour call duty at all times. A two-hour response time is required for emergency trouble reports. The district shall have an approved action plan to coordinate call-outs to contractor and LPA maintained signals on the state highway system and the response for any non-emergency trouble reports.

Conduct this activity as required, it is not routinely scheduled.

| Reporting | | Asset to Report to | Signals* | Reporting Units | Comm. Nos. |
|---|---|---|---|---|---|

An accomplishment is reported for each commission number serviced.

There are two sub activities:

Sub Activity 300 (Accident Damage) - issue caused by vehicle accident

Sub Activity 350 (Storm Damage) - issue caused by weather

*Report to the signal asset. If asset is not in signals inventory, contact the WMS Analysts.

**Crew Size** 1 Workers

| | QTY |
|---|---|
| Electrician Tech 2 | 1 |

**Job Specific Equipment**

| | |
|---|---|
| Signal Van | 1 |

**P.P.E.**

Base PPE

**Materials**

Determined by specific work to be performed.

**Other References**

Equipment Manuals - should be in cabinets

Timing Sheet in cabinet

IMUTCD Chapter 4B

Standard Drawings

INDOT Standards and Specs Section 805

**Sub Activities**

300 Accident Damage

350 Storm Damage

| Average Daily Production | 3 - 5 Comm. No. | EFFECTIVE DATE | 2/12/2024 |
|---|---|---|---|

| ACTIVITY | Signal Maintenance Response | CODE | 8500 |
|---|---|---|---|

**Work Method**

1. Confirm response to dispatcher
2. Set up traffic control and signs if necessary
3. Determine extent of malfunction
4. Secure intersection
5. Complete necessary adjustments or repairs
6. Document repairs on cabinet card
7. Observe function of facility to ensure acceptable operating mode
8. Remove any temporary traffic controls
9. Report signal back in operation
10. Update cabinet maintenance card

**Special Considerations**

Knowing time of malfunction before going out to signal can help if there is a timing issue in a signal with multiply timings.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 3 - 5 Comm. No. | EFFECTIVE DATE | 2/12/2024 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Signal Preventive Maintenance | CODE | 8510 |
|---|---|---|---|

**Purpose**

To keep equipment fully operational, reliable, and safe by scheduling routine inspections and repair/replacing deficient equipment such as controllers, amplifiers, relays, loops, wiring, interconnects, and electrical components.

**Category** Signals

- ☒ **PM**
- ☒ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule work throughout the year.

Each comm. Number should have 2 scheduled visits per year

The following must be done on at least once per year

1. Conflict Monitor (MMU) changed out
2. Perform a detection loop test
3. If signal has railroad preemption, a co-inspection with a railroad representative to ensure functionality

| Reporting | | Asset to Report to | Signals* | Reporting Units | Comm. Nos. |
|---|---|---|---|---|---|

An accomplishment is reported in the number of commission numbers serviced.

Performing a routine maintenance, testing loops, and replacing MMU for a commission number is 1 accomplishment.

For additional work order reporting guidance see the Work Orders section of the Preface.

*Report to the signal asset. If asset is not in signals inventory, contact the WMS Analysts.

**Crew Size** 1 Workers

| | QTY |
|---|---|
| Electrical Tech 2 | 1 |

**Job Specific Equipment**

| | |
|---|---|
| Signal Van | 1 |

**P.P.E.**

Base PPE

**Materials**

**Other References**

Equipment Manuals - should be in cabinets

Timing Sheet in cabinet

IMUTCD - Chapter 4

Standard Drawings

Signal PM Procedure

INDOT Standards and Specs Section 805

**Sub Activities**

| Average Daily Production | 4 - 6 Comm. No. | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Signal Preventive Maintenance | CODE | 8510 |
|---|---|---|---|

**Work Method**

Contact railroad representative to set up a date if railroad preemption testing is needed.

1. Follow through Traffic Signal PM Checklist.
2. Complete the necessary replacements, adjustments, or repairs.
3. Replace conflict monitor (MMU), if necessary (once per year).
4. Test Loops with inductive loop analyzer, if necessary (once per year).
5. Observe function of unit to ensure proper operation.
6. Update cabinet maintenance card.

**Special Considerations**

Replacing MMU will put signal into flash, so consider time of day and weather conditions when shutting signal down for MMU replacement.

Railroads should be inspecting their intersections once a month.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 4 - 6 Comm. No. | EFFECTIVE DATE | 7/12/2023 |

# INDIANA DEPARTMENT OF TRANSPORTATION (INDOT)

## Activity 8510 QA Form - Signal Preventive Maintenance

**District:** **Evaluation Date:**

**Route:** **RP Start:** **End:** **Direction:**

**Date Project completed:** **Evaluated by:**

**WO#:** **Inventory Asset:**

**MMU:**

| | | |
|---|---|---|
| 1) | MMU not changed in past 12 months or not certified in past 15 months | **PASS/FAIL** |

| **Detection** | | Amount | Unit | | Value | Deductions |
|---|---|---|---|---|---|---|
| 1 | Vehicle detection malfunctioning: Not documented or > 3 month | 0 | lanes | x | 15 | 0 |
| 2 | Vehicle detection malfunctioning: Documented and < 3 months old | 0 | lanes | x | 10 | 0 |
| 3 | Any rack or shelf mount harness not labeled | 0 | amplifier | x | 4 | 0 |
| 4 | Any rack or shelf mount harness labeled but not w/ label maker | 0 | amplifier | x | 2 | 0 |
| | | | | **Total Deductions** | | **0** |
| | | **40** | **Pnts Possible minus Deductions:** | | | **40** |

| **Cabinet Documentation** | | Amount | Unit | | Value | Deductions |
|---|---|---|---|---|---|---|
| 1 | Missing or extra timing sheets in cabinet other than the current timing sheet. | 0 | | | 5 | 0 |
| 2 | Missing/extra emergency and routine maintenance cards in cabinet (Current plus one expected) | 0 | | | 5 | 0 |
| 3 | Missing or extra cabinet print is in cabinet | 0 | | | 5 | 0 |
| 4 | Signal wiring (detection lead in or overhead) label missing | 0 | wires | x | 1 | 0 |
| | | | | **Total Deductions:** | | **0** |
| | | **20** | **Pnts Possible minus Deductions:** | | | **20** |

| **Miscellaneous** | | Amount | Unit | | Value | Deductions |
|---|---|---|---|---|---|---|
| 1 | Any indications (vehicle or pedestrian) not working | 0 | indications | x | 5 | 0 |
| 2 | Signal heads vertically or horizontally misaligned; visors damaged, loose, or missing | 0 | heads | x | 3 | 0 |
| 3 | Broken, missing or visibly sagging span or tether wire | 0 | wires | x | 5 | 0 |
| 4 | Obvious cabinet filter dirty, missing, not secured, etc | 0 | | | 5 | 0 |
| 5 | Cabinet is dirty, shelves not clean, trash in bottom of cabinet | 0 | | | 10 | 0 |
| 6 | Heavy overgrowth or poison ivy makes access difficult | 0 | | | 3 | 0 |
| 7 | Cabinet is defaced (graffiti, posters, etc.) | 0 | | | 2 | 0 |
| 8 | No padlock on signal service | 0 | | | 5 | 0 |
| | | | | **Total Deductions:** | | **0** |
| | | **40** | **Pnts Possible minus Deductions:** | | | **40** |

**Note: if MMU is 'fail', score is 0** **Score:** **100**

**Inspector Comments:**

**Score:**

| | Possible | Actual |
|---|---|---|
| **MMU** | -100 *or* 0 | |
| **Detection** | 40 | |
| **Cabinet Documentation** | 20 | |
| **Miscellaneous** | 40 | |
| **Total:** | 100 | |

| Activity 8510 - TRAFFIC SIGNAL | | | |
|---|---|---|---|
| PREVENTATIVE MAINTENANCE CHECKLIST | | | |
| LOCATION | | COMM. NO. | |
| DATE | | BY | |

| OK | NOT OK | DATE CORRECTED | DESCRIPTION |
|---|---|---|---|
| | | | **1. Signal Indications & Heads:** |
| ☐ | ☐ | | a. All indications lighting |
| ☐ | ☐ | | b. Visors broken, loose, missing |
| ☐ | ☐ | | c. Proper height? |
| ☐ | ☐ | | d. Proper alignment - horizontal, vertical, and rotation. |
| ☐ | ☐ | | e. No pinnacles missing. |
| ☐ | ☐ | | f. Visibility, sight distance. |
| ☐ | ☐ | | **2. Overhead Spans, Cables & Signs:** |
| ☐ | ☐ | | a. Proper spacing of cable rings. |
| ☐ | ☐ | | b. Tether broken, loose, missing |
| ☐ | ☐ | | c. Sagging or loose spans or "A" wires? |
| ☐ | ☐ | | d. Check to insure all signs are installed and in satisfactory condition. |
| ☐ | ☐ | | **3. Service Disconnect Box:** |
| ☐ | ☐ | | a. Box and conduit mounted securely? |
| ☐ | ☐ | | b. All connections snug? |
| ☐ | ☐ | | c. Ground wire secured to pole? |
| ☐ | ☐ | | d. Ground rod clamp snug (if possible) |
| ☐ | ☐ | | e. Lock on securely? |
| ☐ | ☐ | | f. General inspection for condition missing covers, etc. |
| ☐ | ☐ | | **4. Poles :** |
| ☐ | ☐ | | a. Access plates missing? |
| ☐ | ☐ | | b. Skirts missing? |
| ☐ | ☐ | | c. General condition of poles. |
| ☐ | ☐ | | **5. Check Condition of Detection:** |
| ☐ | ☐ | | a. Look for conditions indicative of upcoming failures. |
| ☐ | ☐ | | **6. Check handholds -** High, low, damaged? |
| ☐ | ☐ | | **7. Special markings:** |
| ☐ | ☐ | | a. Condition of stop bar. |
| ☐ | ☐ | | b. Condition of Pedestrian crossing. |

| Activity 8510 - TRAFFIC SIGNAL | | | | | |
|---|---|---|---|---|---|
| PREVENTATIVE MAINTENANCE CHECKLIST | | | | | |
| LOCATION | | | | COMM. NO. | |
| DATE | | | BY | | |
| | | | | | |
| OK | NOT OK | DATE CORRECTED | DESCRIPTION | | |
| ☐ | ☐ | | **8. Signal Controller Cabinet:** | | |
| ☐ | ☐ | | a. Mounted & sealed securely to pedestal, pole or foundation? | | |
| ☐ | ☐ | | b. Check door gaskets for water tightness. | | |
| ☐ | ☐ | | c. External conduit mounted securely, if present? | | |
| ☐ | ☐ | | d. Check fan & convenience lamp installed and working? | | |
| ☐ | ☐ | | e. Check cabinet cleanliness. | | |
| ☐ | ☐ | | f. Check cabinet filter. | | |
| ☐ | ☐ | | g. Connections snug? | | |
| ☐ | ☐ | | h. Proper line voltage? | | |
| ☐ | ☐ | | **9. Signal Equipment:** | | |
| ☐ | ☐ | | a. Current timing sheet present? | | |
| ☐ | ☐ | | b. Cabinet maintenace cards present? | | |
| ☐ | ☐ | | c. Controller programed as per current timing sheet? | | |
| ☐ | ☐ | | d. Controller Date & Time correct? | | |
| ☐ | ☐ | | e. Cabinet print present & correct? | | |
| ☐ | ☐ | | f. All cables & detection correctly labeled? | | |
| ☐ | ☐ | | g. MMU meet certification criteria (within 15 months) | | |
| ☐ | ☐ | | h. Detectors putting calls into proper phases? | | |
| ☐ | ☐ | | i. Comunications working? | | |
| ☐ | ☐ | | j. Preemption working? (Railroad or Emergency Vehicle) | | |
| **Comments:** | | | | | |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Flasher Preventive Maintenance | CODE | 8511 |
|---|---|---|---|

**Purpose**

To keep equipment full operational, reliable, and safe by scheduling routine inspections of equipment such as flasher controllers, wiring, and electrical components.

**Category** Signals

- ☒ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule throughout the year.

Each comm. number should have 1 scheduled visit per year.

Any repairs should be reported to Activity 8500.

| Reporting | | Asset to Report to | Signals* | Reporting Units | Comm. Nos. |
|---|---|---|---|---|---|

An accomplishment is reported in the number of commission numbers serviced.

For additional work order reporting guidance see the Work Orders section of the Preface.

*Report to the signal asset. If asset is not in signals inventory, contact the WMS Analysts.

**Crew Size** 1 Workers

| | QTY |
|---|---|
| Electrician Tech 2 | 1 |

**Job Specific Equipment**

| | |
|---|---|
| Signal Van | 1 |

**P.P.E.**

Base PPE

**Materials**

**Other References**

IMUTCD - Chapter 4D

Flasher PM Procedure

**Sub Activities**

| Average Daily Production | 8 - 10 Comm. No. | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Flasher Preventive Maintenance | CODE | 8511 |
|---|---|---|---|

**Work Method**

1. Follow through Flasher Preventative Maintenance Checklist.
2. Complete the necessary replacements, adjustments, or repairs.
3. Observe function of unit to ensure proper operation
4. Update cabinet maintenance card.

**Special Considerations**

School Zone flashers will have a timed clock.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 8 - 10 Comm. No. | EFFECTIVE DATE | 7/12/2023 |

# Activity 8511 - FLASHER

## PREVENTATIVE MAINTENANCE CHECKLIST

| | | | |
|---|---|---|---|
| LOCATION | | COMM. NO. | |
| DATE | | BY | |

| OK | NOT OK | DATE CORRECTED | DESCRIPTION |
|---|---|---|---|
| | | | **1. Indications & Heads:** |
| | | | a. All indications lighting |
| | | | b. Visors broken, loose, missing |
| | | | c. Proper height? |
| | | | d. Proper alignment - horizontal, vertical, and rotation. |
| | | | e. No pinnacles missing. |
| | | | f. Visibility, sight distance. |
| | | | **2. Overhead Spans & Cables:** |
| | | | a. Proper spacing of cable rings. |
| | | | b. Tether broken, loose, missing |
| | | | c. Sagging or loose spans or "A" wires? |
| | | | **3. Service Disconnect Box:** |
| | | | a. Box and conduit mounted securely? |
| | | | b. All connections snug? |
| | | | c. Ground wire secured to pole? |
| | | | d. Ground rod clamp snug (if possible) |
| | | | e. Lock on securely? |
| | | | f. General inspection for condition missing covers, etc. |
| | | | **4. Poles:** |
| | | | a. Access plates missing? |
| | | | b. Skirts missing? |
| | | | c. General condition of poles. |
| | | | **5. Check handholds -** High, low, damaged? |
| | | | **6. Special Markings :** |
| | | | a. Condition of stop bar. |
| | | | b. Condition of Pedestrian crossing. |

# Activity 8511 - FLASHER
## PREVENTATIVE MAINTENANCE CHECKLIST

| | | | |
|---|---|---|---|
| LOCATION | | COMM. NO. | |
| DATE | | BY | |

| OK | NOT OK | DATE CORRECTED | DESCRIPTION |
|---|---|---|---|
| | | | **7. Flasher Cabinet:** |
| | | | a. Mounted & sealed securely to pedestal, or pole? |
| | | | b. Check door gaskets for water tightness. |
| | | | c. External conduit mounted securely, if present? |
| | | | d. Check fan operation |
| | | | e. Check cabinet cleanliness. |
| | | | f. Connections snug? |
| | | | g. Proper line voltage? |
| | | | **8. School Flasher Equipment:** |
| | | | a. Current School timings sheet present? |
| | | | b. Timer programmed to match school timings |
| | | | c. Timer, Date & Time correct? |
| | | | d. All cables correctly labeled? |
| | | | e. Cabinet Maintenance cards present? |
| | | | |
| | | | |
| | | | |
| | | | |

**Comments:**

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Signal Shop Activities | CODE | 8520 |
|---|---|---|---|

**Purpose**

Testing, programming, refurbishing, and assembling equipment in the signal shop in preparation of field implementation, and other related work.

**Category** Signals

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule work throughout the year or as directed by supervisor.

| Reporting | | Asset to Report to | None | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Accomplishment is reported in person hours.

Do not report materials used on this card. Materials will be reported on the card when installed.

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** 1 Workers

| | QTY |
|---|---|
| Electrician Tech 2 | 1 |

**P.P.E.**

Base PPE

**Materials**

Determined by specific work performed

**Job Specific Equipment**

**Other References**

Signal as built designs

Signal timing datatbase

**Sub Activities**

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Signal Shop Activities | CODE | 8520 |
|---|---|---|---|

**Work Method**

1. Repair or replace system components as determined by specific work to be performed.
2. Recertify conflict monitor (MMU)
3. Program controllers
4. Set up signal cabinet according to as builts
5. Wire signal heads

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Scheduled Signal/Flasher Indication Replacement | CODE | 8530 |
|---|---|---|---|

**Purpose**

Prevent signal indication outages by conducting LED replacement and cleaning of signal indicators and flashing beacons to ensure that the expected life of LEDs are not exceeded according to policy. Helps ensure signal faces remain clear and bright.

**Category** Signals

- ☒ **PM**
- ☐ **QA**
- ☒ **Plan Location**

**Scheduling & Coordination**

Schedule work throughout the year.

Schedule work according to the WMS Annual Work Plan.

LED replacement cycle should be per current policy (see OM 06-05).

| Reporting | | Asset to Report to | Signals* | Reporting Units | Indications |
|---|---|---|---|---|---|

Accomplishment is the total number of LED indications replaced.

Emergency or unscheduled replacements should be reported to activity 8535.

For additional work order reporting guidance see the Work Orders section of the Preface.

*Report to the signal asset. If asset is not in signals inventory, contact the WMS Analysts.

**Crew Size** 2 Workers

| | QTY |
|---|---|
| Electrician Tech 2 | 1 |
| Laborer | 1 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | |
|---|---|
| Aerial Bucket/Lift Truck | 1 |
| Signal Van | 1 |

*Traffic Control Equipment is NOT shown here

**P.P.E.**

1) Base PPE
2) Safety Harness/Fall Protection when using aerial lift

**Materials**

Bulb or LED Indications – INDOT Spec Section 922.03

**Other References**

OM 06-05

**Sub Activities**

| Average Daily Production | 20 - 40 Indications | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Scheduled Signal/Flasher Indication Replacement | CODE | 8530 |
|---|---|---|---|

**Work Method**

1. Place work area safety signs and devices
2. Replace LED's
3. Clean signal lenses and reflectors that will not be replaced
5. Check condition of wiring
6. Check condition of balance adjuster and visors
7. Check splices, span wire, mounting brackets to ensure everything is secured and not sagging.
8. Update cabinet maintenance card.
9. Remove work area safety signs and devices

**Special Considerations**

One signal tech with a ladder can replace PED lights.

Signals require three workers with an aerial bucket truck or platform lift.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 20 - 40 Indications | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Non-Scheduled Signal/Flasher Indication Replacement | CODE | 8535 |
|---|---|---|---|

**Purpose**

Replacement of signal and flasher indications that are not functioning.

**Category** Signals

- ☐ PM
- ☐ QA
- ☐ Plan Location

**Scheduling & Coordination**

Perform this activity as outages occur

The type of light out should be considered. Red lights (if only one head) and green turn arrow should be considered for replacement on an emergency basis.

| Reporting | | Asset to Report to | Signals* | Reporting Units | Indications |
|---|---|---|---|---|---|

Accomplishment is the total number of LED indications replaced.

Scheduled change outs should reported to activity 8530

For additional work order reporting guidance see the Work Orders section of the Preface.

*Report to the signal asset. If asset is not in signals inventory, contact the WMS Analysts.

**Crew Size** 2 Workers

| | QTY |
|---|---|
| Electrician Tech 2 | 1 |
| Laborer | 1 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | |
|---|---|
| Aerial Bucket | 1 |

*Traffic Control Equipment is NOT shown here

**P.P.E.**

1) Base PPE
2) Safety Harness/Fall Protection when using aerial lift

**Materials**

Bulb or LED Indications – INDOT Spec Section 922.03

**Other References**

OM 06-05

**Sub Activities**

| Average Daily Production | 2 - 4 Indications | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Non Scheduled Signal/Flasher Indication Replacement | CODE | 8535 |
|---|---|---|---|

## Work Method

1. Place work area safety signs and devices
2. Replace LED's
3. Clean signal lenses and reflectors that will not be replaced
5. Check condition of wiring
6. Check condition of balance adjuster and visors
7. Check splices, span wire, mounting brackets to ensure everything secured and not sagging.
8. Update cabinet maintenance card.
9. Remove work area safety signs and devices

## Special Considerations

If there is a non scheduled signal replacement, but that intersection has scheduled replacements later in the same year, consider replacing all LED's at location.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 2 - 4 Indications | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Detector Loop Splice Repair or Install | CODE | 8541 |
|---|---|---|---|

**Purpose**

Splice and repair existing vehicle detection loops including testing in the detector housing and re-splicing (sealing) the existing loops.

Install or replace vehicle detection wire at determined locations. This would include sawing, placement of wire, splicing, sealing, testing all loops affected by the new loop, and sealing of saw slot.

**Category** Signals

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule work as required based on loop failures or new installations. This work can be done year round.

| Reporting | | Asset to Report to | Signals* | Reporting Units | Splices |
|---|---|---|---|---|---|

Accomplishment: The number of splices repaired or installed.

For additional work order reporting guidance see the Work Orders section of the Preface.

*Report to the signal asset. If asset is not in signals inventory, contact the WMS Analysts.

**Crew Size** 2 Workers

| | QTY |
|---|---|
| Electrician Tech 2 | 2 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | |
|---|---|
| Signal Van | 1 |
| Concrete Saw | 1 |

*Traffic Control Equipment is NOT shown here

**P.P.E.**

1) Base PPE

2) Approved APF 10 Respirator (See "Silicosis Awareness")

**Materials**

Sealant – INDOT Spec Section 922.15

Loop Wire – INDOT Spec Section 922.13

Detector Loop – INDOT Spec Section 922.13

**Other References**

INDOT Standard and Specs 805.09

**Sub Activities**

351 Install/Replace Loop

| Average Daily Production | 10 - 14 Splices | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Detector Loop Splice Repair or Install | CODE | 8541 |
|---|---|---|---|

## Work Method

1. Place signs and other safety devices
2. Visual inspection of intersection looking for failed pavement around loops or broken loops.
3. Test loops by opening conductor loop lead and using inductive loop analyzer to determine if loop is functioning.
4. Install loops if necessary
   - -Lay out loops and mark pavement for cuts if necessary
   - -Saw pavement as marked if necessary
   - - Properly clean saw slot to prepare for loop wire installation and backer rod
   - - Install backer rod as required
5. Perform preliminary acceptance tests
6. Seal saw slot if necessary
7. Make splice to 2C/16 lead-in and sealing
8. Perform final acceptance test
9. Update cabinet maintenance card
10. Clean up
11. Remove signs and safety devices
12. Observe loops are functioning properly with traffic

## Silicosis Awareness

All efforts should be made to eliminate/reduce the generation of dust while performing this activity, specifically pavement sawing. A wet saw should be used, or if not available, manually spray water to control dust.

If the generation of dust cannot be eliminated through use of water or other controls, then workers operating the saw or within 20’ must wear an approved facepiece respirator that they are fit tested to wear.

## Special Considerations

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 10 - 14 Splices | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | New Signal or Flasher Inspection or Turn On | CODE | 8550 |
|---|---|---|---|

**Purpose**

Inspection of new signal or flasher installation to ensure compliance to plans and specification. This can include assisting with loop layouts. Report supervision of the contractor during activation of the new or modernized traffic signal or flasher to confirm signal is properly functioning.

**Category** Signals

- ☐ PM
- ☐ QA
- ☐ Plan Location

**Scheduling & Coordination**

Schedule as needed, in coordination with Construction activities.

| Reporting | | Asset to Report to | Signals* | Reporting Units | Comm. Nos. |
|---|---|---|---|---|---|

Accomplishment: Each commission number inspected.

For additional work order reporting guidance see the Work Orders section of the Preface.

*Report to the signal asset. If asset is not in signals inventory, contact the WMS Analysts.

**Crew Size** 1-2 Workers

| | QTY |
|---|---|
| Electrician Tech 2 | 1 |
| Laborer | 0 - 1 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | |
|---|---|
| Signal Van / Aerial Bucket Truck | 1 |

*Traffic Control Equipment is NOT shown here

**P.P.E.**

Base PPE

**Materials**

**Other References**

INDOT Standard and Specs 805

**Sub Activities**

| Average Daily Production | 4 Comm. No. | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | New Signal or Flasher Inspection or Turn On | CODE | 8550 |
|---|---|---|---|

**Work Method**

1. Respond to request for inspection from Project Engineer
2. Place signs and other safety devices (if needed)
3. Inspect installation for compliance with plans, specifications, and work order
4. Install proper timing and/or verify timing
5. Turn on signal
6. Check system for proper operation
7. Ensure all loops are properly detecting vehicles
8. During Turn On, fill out the attached final field signal checklist (punchlist). Not all items will be applicable to signal.
9. Give punchlist to project supervisor, who will give the list to contractor to correct any issues.
9. Sign cabinet maintenance log or place new cabinet card if one is not present.
10. Remove signs and other safety devices
11. Project Supervisor should notify traffic when punchlist has been corrected and signal is ready for reinspection.

**Special Considerations**

1 electrician tech may perform this work unless overhead work will be performed. An additional laborer is required for performing overhead work.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 4 Comm. No. | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | New Lighting Inspection | CODE | 8551 |
|---|---|---|---|

**Purpose**

Inspection of new highway illumination installation to ensure proper functioning, compliance to plans, specifications, and work order.

**Category** Lighting

- ☐ PM
- ☐ QA
- ☐ Plan Location

**Scheduling & Coordination**

Schedule as needed, in coordination with Construction activities.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Structures |
|---|---|---|---|---|---|

Accomplishment: The number of structures inspected.

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** 1 Workers

| | QTY |
|---|---|
| Electrician Tech 2 / Electrician 1 | 1 |

**Job Specific Equipment**

| | |
|---|---|
| Signal Van / Pickup | 1 |

**P.P.E.**

Base PPE

**Materials**

**Other References**

INDOT Standards and Specs Section 807

**Sub Activities**

| Average Daily Production | 15 Structures | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | New Lighting Inspection | CODE | 8551 |
|---|---|---|---|

**Work Method**

1. Set up traffic control if required
2. Inspect installation for compliance with plans specifications
3. Make sure lights are functioning
4. Complete the attached final field checklist (punch list). Not all items on list will be applicable for the light.
5. Send final checklist to project supervisor, who will give to contractor for correction
6. Project supervisor should let traffic know when contractor has completed any necessary repairs and is ready for reinspection.

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 15 Structures | EFFECTIVE DATE | 7/12/2023 |

# *FINAL FIELD CHECK LIST (PUNCH-LIST)*
## Activities 8550 and 8551

COMM. #: _____

INTERSECTION: _____

CITY: _____ CONTRACT NO. _____

COUNTY: _____

TURN ON DATE: _____

TURN ON TIME: _____

CONTRACTOR: _____

| *APPROVED* | *REJECTED* | *CORRECTED* | *OVERHEAD INSTALLATION* |
|---|---|---|---|
| | | | ***1) Signal Heads*** |
| | | | A) Adequate Clearance<br>____1) Mast arm, span / Caternary 17-19 ft.<br>____2) Pole (side mount) greater than 10' |
| | | | B) Drip loops proper on heads, splice boxes, pole weather heads. |
| | | | C) All electrical connections tight<br>____1) Heads<br>____2) Disconnects and splice boxes |
| | | | D) Seal installed where nipple goes into head |
| | | | E) Stranded wire #14 home run from splice box to heads |
| | | | F) Check for proper bulb size<br>____1) 12" Head- Reds & Arrows - Approved LED<br>Green & Amber - Approved LED<br>____2) Pedestrian (all) LED insert |
| | | | |
| | | | G) Proper installation of span hanger and balance adjuster |
| | | | H) Check for proper instalation of LED Lenes.<br>Check for warranty sticker on back of LED |
| | | | I) Tethered heads are tied down properly |
| | | | J) Pelco \ Louver programmed<br>Heads - proper degree of tilt and angle |
| | | | K) Proper lane alignment Veh. And Peds/LED Heads |
| | | | L) Horizontal spacing - 12' desired, 8' min. |
| | | | M) Check for proper visors (standard, tunnel, louvered tunnel |
| | | | |
| | | | O) Proper distance to stop bar (40' minimum) |
| | | | |
| | | | ***2) Traffic Signal Signs*** |
| | | | A) Assure that all traffic signal signs are accounted for and placed in proper location |
| | | | B) Verify that all traffic signal signs have a proper renewal sticker on its respective back side |

| *APPROVED* | *REJECTED* | *CORRECTED* | *POLES* |
|---|---|---|---|
| | | | ***3) Poles*** |
| | | | A) Caps if required (top & over anchor bolts) |
| | | | B) All leveling nuts tight against base and all threads used on nuts |
| | | | C) Washer for leveling and anchor nuts |
| | | | D) Anchor nuts tight |
| | | | E) Proper grouting (Weep Holes 1") or pole base banding properly bolted |
| | | | F) Grounded properly, no splices |
| | | | G) Check for damaged wire in pole |
| | | | H) Spices in pole waterproofed |
| | | | I) Entrance Switch<br>____1) Fasten properly (4' above ground properly connected to poles, separate entrances for service and load)<br>____2) Grounded properly (no splices)<br>____3) Contains breaker (50 Amps)<br>____4) Insulation on wire not damaged<br>____5) Proper color code (White-nuet.)<br>____6) Sealed and Waterproofed<br>____7) Meter Base installed properly |
| | | | J) Conduit properly fasten to pole (less than 3' from terminus, coupling; 10' max. vertical spacing) |
| | | | L) Raked properly (steel-near vertical; wood-1')<br>(Steel strain Poles no raking) |
| | | | M) Weather head looks proper (insert in) |
| | | | N) All locations where pole, mast arm, or hardware has field installations (welded nipples for entrance switch, weather head, etc.) shall have proper protective coating (2 Coats rust inhibiting aluminum paint) |
| | | | O) Pole access cover (handhole) installed and tight. |

| *APPROVED* | *REJECTED* | *CORRECTED* | *SPAN AND CATENARY & CABINET* |
|---|---|---|---|
| | | | ***4) Span and Catenary*** |
| | | | A) Check for proper tightness |
| | | | B) Proper no. of Crosby clamps @ "A" frames;<br>must be clamped (not under the span hanger) |
| | | | C) Minimum of 2 rope clamps on aerial cables<br>at poles and down guides |
| | | | D) Proper loops for cables at changes in<br>alignment and taped properly |
| | | | E) Proper # of cable rings (12" C-C) |
| | | | F) Square plates for eye bolts through wood<br>poles (intersection side) |
| | | | H) Down guide fastened to same eye bolt as<br>span/catenary cable/Wire Rope in Saddles @ Pole Bands |
| | | | I) Check for Service clips |
| | | | J) Tether cable to heads fastened properly |
| | | | ***5) CABINET*** |
| | | | A) Placed such that one looking can observe<br>intersection (traffic flow) |
| | | | B) Bolted down properly (washers) |
| | | | C) Grounded properly<br>____1) Ground wire connected to conduit and<br>cabinet grounding lug using solid, unspliced copper<br>wire NO SMALLER THAN # 6<br>____2) All terminal block of cabinet grounded<br>properly to ground rod<br>____3 Ground connection tagged with resistance in ohms |
| | | | D) Check cabinet wirng<br>____1) Loop lead-in to proper terminal and labeled<br>____2) Field wiring<br>____a) Confirm field wiring connected to<br>proper signal head<br>____b) Connected to proper cabinet terminal<br>____c) Check color code<br>____3) Check for damaged field wire |
| | | | E) All electrical connections are tight |
| | | | F) All spade lugs & crimp on connections tight |
| | | | G) Foundation drain has screen and cap, check<br>to see if foundation will drain properly |
| | | | H) Thermostat of fan set at (95-100 F) |
| | | | I) Fan is pulling air out of cabinet |
| | | | J) Proper literature and schematics in plastic pouch |
| | | | K) Clean filter in cabinet |
| | | | L) Cabinet clean and orderly fashion |
| | | | M) All scratches painted, unless stainless steel or<br>aluminum |
| | | | N) Cabinet proper height, G-38" + 2"to bottom;<br>"M", "P"- on raised foundation with step PAD |

| *APPROVED* | *REJECTED* | *CORRECTED* | *CONTROLLER* |
|---|---|---|---|
| | | | ***6) CONTROLLER*** |
| | | | I) General<br>A) Check flash operation<br>____1) Police panel switch<br>____2) Preferentiality, controller code properly set |
| | | | B) Breaker operation<br>____1) Small breaker (10 amp) controller only, allows flash operation for controller replacement<br>____2) Large Breaker (50 amps) kills intersection |
| | | | C) Controller setup per authorized timing sheet |
| | | | D) Check heat lamp and 115 receptable |
| | | | E) Check interconnect color code. Fiber connected properly. Radio Modem Programed is applicable. |
| | | | F) Check time clock program as per sheet, if needed |
| | | | G) Check all heads in intersection for proper signal indications at proper time |
| | | | II) Interconnect<br>A) Check interconnect communications (fiber/radio) operation of controller |
| | | | B) Check for proper operation of various functions, manual cycle 1,2,3,4 splits, and offsets |
| | | | C) Check key board for proper operation |
| | | | D) If no timing given for other than cycle 1 then place same timings in other cycles and splits for safety |
| | | | E) Check for proper fuse sizes<br>____1) Interconnect 5 Amps if required<br>____2) Auxiliary power 15 Amps |
| | | | F) Cabinet prints and any speciality panel prints present and correct. |
| | | | III) Actuated<br>A) Check key board operation and ease of reading screen |
| | | | B) Observe traffic flow as it relates to controller operation |
| | | | C) Check & tune loop amps/check |
| | | | D) Check cabinet wiring schematic to assure loop identifications is consistent with phasing and signal field terminal identification is consistent with phasing as indicated elsewhere on print |
| | | | E) Check conflict card for proper jumpers |
| | | | F) If overlap card required check for proper jumpers, or proper dip switches are turned on |
| | | | G) Confirm loops are putting calls to:<br>____1) Proper loop amp<br>____2) Proper controller phase |
| | | | H) Check placement of load switched and flash relays, assure proper number |

| APPROVED | REJECTED | CORRECTED | CONTROLLER (Continued) |
|---|---|---|---|
| | | | I) Controller phases are operating respective signal heads per intersection phasing |
| | | | J) Conflict monitor set properly |
| | | | K) Use loop checker to check loops in proper range (50-1000 uH) |

| Phase/Appr | uH reading | Phase/Appr | uH reading |
|---|---|---|---|
| | | | |
| | | | |
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| | | | |
|---|---|---|---|
| | | | L) Check Controller Warranty Sticker, if Applicable |
| | | | M) Check controller initialization, codes |
| | | | N) Check for proper programming of auxiliary functions, such as: Dual entry, SGO, pre-emption program, overlaps, Det. Call program, etc. |
| | | | O) Check coordination programs |
| | | | ***7) Handholes*** |
| | | | A) Proper lid and resting firmly |
| | | | B) Bushing on conduit |
| | | | C) Grouted where conduit enters handhole |
| | | | D) Drain in bottom |
| | | | E) Approximately 10' of slack in hole for each cable run |
| | | | F) Check conduit fill |
| | | | G) If splices present, then check waterproofing |
| | | | ***8) MK Housing*** |
| | | | A) 4 bolts and 4 washers present |
| | | | B) Splices waterproofed properly |
| | | | C) Small amount of slack present |
| | | | D) Check to see if loops wired in series |
| | | | ***9) Approved & Authorized Changed DWG*** |
| | | | If applicable, Approved and Authorized Changed Drawing (As-built) must be received by District Traffic Section |

***SIGNATURES OF INSPECTORS:*** ***INSPECTION DATE:_____ TIME:_____***

***NAME*** ***TITLE***

***NAME*** ***TITLE***

***ALL ITEMS ARE APPROVED OR CORRECTED. SIGNAL RECOMMENDED FOR ACCEPTANCE.***

***NAME*** ***TITLE*** ***DATE***

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Signal/Flasher Equipment Replacement / Repair | CODE | 8560 |
|---|---|---|---|

**Purpose**

This activity is for scheduled repair, replacement, and aerial inspections of existing traffic signal or flasher equipment.

Examples: Signal heads, disconnect hangers, junction box, span cables, wiring, signal cabinet change-out, poles, cantilevers, pedestals, service point, pedestrian heads, pedestal mount heads, side mounted head, pulling wiring, conduit repair, and other underground work.

**Category** Signals

- ☐ **PM**
- ☐ **QA**
- ☒ **Plan Location**

**Scheduling & Coordination**

This activity should be scheduled and performed throughout the year.

Schedule work according to planned equipment upgrades.

Aerial Inspection should be performed once every 5 years on each signal.

| Reporting | | Asset to Report to | Signals* | Reporting Units | Comm. Nos. |
|---|---|---|---|---|---|

Accomplishment: Number of commission numbers with components replaced or repaired. Only one accomplishment shall be reported for each commission number.

Non-scheduled repairs should be reported to activity 8500

Bulb changeouts should be reported to activity 8530 or 8535

Equipment updates or upgrades reported to activity 8570

For additional work order reporting guidance see the Work Orders section of the Preface.

*Report to the signal asset. If asset is not in signals inventory, contact the WMS Analysts.

**Crew Size** 1 - 2 Workers

| | QTY |
|---|---|
| Electrician Tech 2 | 1 - 2 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | |
|---|---|
| Signal Van | 1 |
| Aerial Bucket / Lift Truck | 1 |

*Traffic Control Equipment is NOT shown here

**P.P.E.**

1) Base PPE

2) Safety Harness/Fall Protection when using aerial lift

**Materials**

Determined by specific work to be performed

**Other References**

INDOT Standars and Specs Section 805

OM 06-05 Aerial Inspections

**Sub Activities**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 352 | Aerial Work | 353 | Signal Cabinet | 354 | Underground Work | 345 | Aerial Inspection |

| Average Daily Production | 1 - 5 Comm. No. | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Signal/Flasher Equipment Replacement / Repair | CODE | 8560 |
|---|---|---|---|

**Work Method**

1. Place work area safety signs and devices
2. Repair / replace signal equipment
3. Sign cabinet maintenance card
4. Remove work area safety signs and devices
5. Observe signal to ensure proper function

AERIAL INSPECTION

1. Place work area safety signs and devices
2. Check and repair signal support cables, structures, and hardware such as pins, clevises, hangers, pole bands, cable clamps, etc.
3. Visually check signal head alignment and ensure proper orientation
4. Clean all LED module faces
5. Sign cabinet maintenance card
6. Remove work area safety signs and devices
7. Observe signal to ensure proper function

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 1 - 5 Comm. No | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Signal and Flasher Equipment Upgrade | CODE | 8570 |
|---|---|---|---|

**Purpose**

Scheduled installation of equipment upgrades at an existing signal or flasher installation such as left turn signal heads, back-plates, radio antennas, and signs.

**Category** Signals

- ☐ PM
- ☐ QA
- ☒ Plan Location

**Scheduling & Coordination**

This activity can be scheduled and performed throughout the year.

Schedule work according to planned equipment upgrades.

| Reporting | | Asset to Report to | Signals* | Reporting Units | Comm. Nos. |
|---|---|---|---|---|---|

Accomplishment: The number of commission numbers serviced.

Only one accomplishment can be reported for each commission number.

Bulb changeouts should be reported to Activity 8530 or Activity 8535

Replacement of existing equipment reported to Activity 8560.

For additional work order reporting guidance see the Work Orders section of the Preface.

*Report to the signal asset. If asset is not in signals inventory, contact the WMS Analysts.

**Crew Size** 2 Workers

| | QTY |
|---|---|
| Electrician Tech 2 | 2 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | |
|---|---|
| Signal Van | 1 |
| Arial Bucket / Lift Truck | 1 |

*Traffic Control Equipment is NOT shown here

**P.P.E.**

1) Base PPE

2) Safety Harness/Fall Protection when using aerial lift

**Materials**

Determined by specific work to be performed.

**Other References**

**Sub Activities**

| Average Daily Production | 1 – 3 Comm. No. | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Signal and Flasher Equipment Upgrade | CODE | 8570 |
|---|---|---|---|

**Work Method**

1. Place work area safety signs and devices
2. Install new equipment specified by work order
3. Update signal maintenance card.
4. Clear up work area
5. Remove work area safety signs and devices
6. Observe signal operation

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 1 – 3 Comm. No. | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Signal and Flasher Installation / Removal | CODE | 8590 |
|---|---|---|---|

**Purpose**

Installation or removal of an entire signal or flasher complete with structures and cabinet.

**Category** Signals

- ☐ PM
- ☐ QA
- ☒ Plan Location

**Scheduling & Coordination**

This activity can be scheduled and performed throughout the year

Schedule should be based on planned locations.

| Reporting | | Asset to Report to | Signals* | Reporting Units | Comm. Nos. |
|---|---|---|---|---|---|

Accomplishment: Number of complete signals or flashers installed or removed. An accomplishment is given for any removal or install

For additional work order reporting guidance see the Work Orders section of the Preface.

*Report to the signal asset. If asset is not in signals inventory, contact the WMS Analysts.

**Crew Size** 3 Workers

| | QTY |
|---|---|
| Electrician Tech 2 | 2 |
| HT 3 | 1 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | |
|---|---|
| Signal Van | 1 |
| Arial Bucket / Lift Truck | 1 |
| Crane / Auger Truck | 1 |
| Pole Trailer | 1 |

*Traffic Control Equipment is NOT shown here

**P.P.E.**

1) Base PPE
2) Safety Harness/Fall Protection when using aerial lift

**Materials**

Determined by specific work to be performed.

**Other References**

INDOT Standards and Specs Section 807

**Sub Activities**

355 Installation

356 Removal

| Average Daily Production | 0.22 - 1 Comm. No. | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Signal and Flasher Installation / Removal | CODE | 8590 |
|---|---|---|---|

**Work Method**

INSTALL

1. Place work area safety signs and devices
2. Install all items according to plans:

   Foundations handholes and conduit, loops, structures, span cables, wiring and junction box, marking and signs, controller and cabinet, and signal heads.
3. Test that signal is functioning properly
4. Clean up work area
5. Remove work area safety signs and devices
6. Observe signal operation

REMOVAL

1. Place work area safety signals and devices
2. Remove all signal equipment and structures at intersection (ex. cabinet, poles, span wire, signal heads).
3. Clean up work area
4. Remove work area safety signs and devices

**Special Considerations**

Not recommended as winter activity to help prevent accidents. Drivers may take time recognize signal install / removal, and stop times are likely to be increased during the winter.

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 0.22 - 1 Comm. No. | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Lighting Surveillance | CODE | 8610 |
|---|---|---|---|

**Purpose**

Routine inspection of all lighting facilities for documenting outages and malfunctions.

**Category** Lighting

- ☐ PM
- ☐ QA
- ☒ Plan Location

**Scheduling & Coordination**

Each light should be inspected monthly.

Should be performed at night unless unique circumstances exist.

| Reporting | | Asset to Report to | None | Reporting Units | Fixtures |
|---|---|---|---|---|---|

Accomplishment: Reported in fixtures.

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** 1 Workers

| | QTY |
|---|---|
| Laborer | 1 |

**Job Specific Equipment**

| | |
|---|---|
| Pickup Truck / Sedan | 1 |

**P.P.E.**

Base PPE

**Materials**

**Other References**

District Lighting Maps

**Sub Activities**

| Average Daily Production | 300 - 1,200 Fixtures | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Lighting Surveillance | CODE | 8610 |
|---|---|---|---|

**Work Method**

1. During hours of darkness
   a. Observe lights
2. During daylight hours
   a. Cover photocell or operate by-pass switch
   b. Observe lights
3. Record outages, malfunctions, and knockdowns

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 300 - 1,200 Fixtures | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Lighting Repairs / Replacements | CODE | 8620 |
|---|---|---|---|

**Purpose**

Repairing or replacing components of roadway, sign, underpass, and high mast illumination facilities, such as replacing bulbs, ballasts, fixtures, pulling wiring, repairing cable duct, conduit repair, and other maintenance work required to keep illumination functional.

**Category** Lighting

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule work based on citizens' complaints or results of monthly inspections (Activity 8610)

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Fixtures |
|---|---|---|---|---|---|

Accomplishment: The number fixtures repaired or replaced.

Scheduled bulb replacement reported to Activity 8621

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** 2 Workers

| | QTY |
|---|---|
| Electrician Tech 2 / Electrician 1 | 1 |
| HT 2 | 1 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

| | |
|---|---|
| Signal Van / Pickup | 1 |
| Platform Truck | 1 |

*Traffic Control Equipment is NOT shown here

**P.P.E.**

1) Base PPE
2) Safety Harness/Fall Protection when using aerial lift

**Materials**

Bulbs / LED Indications – INDOT Spec Section 922.03

Determined by specific work to be performed

**Other References**

INDOT Standards and Specs Section 807

**Sub Activities**

| Average Daily Production | 6 - 12 Fixtures | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Lighting Repairs / Replacements | CODE | 8620 |
|---|---|---|---|

**Work Method**

1. Place work area safety signs and devices
2. Verify outage. Use manual override if lights are currently off
3. Check fuse and voltage at base of pole
4. Use arial equipment to check bulbs and ballast
5. Follow all lock out / tag out procedures if repairing any electrical component.
6. Repair/replace necessary lighting components
7. Clean up work area
8. Remove work area safety signs and devices
9. Observe lighting operation

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 6 - 12 Fixtures | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Scheduled Lighting Bulb Replacement | CODE | 8621 |
|---|---|---|---|

**Purpose**

Prevent light outages by conducting a scheduled lighting bulb replacement to ensure the expected life of the bulb is not exceeded.

**Category** Lighting

- ☒ **PM**
- ☐ **QA**
- ☒ **Plan Location**

**Scheduling & Coordination**

This activity should be scheduled year round; one third of feature inventory should be changed out yearly.

High mast towers can have bulbs changed out without a platform truck

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Bulbs |
|---|---|---|---|---|---|

Accomplishment is the total bulbs replaced.

Non-scheduled bulb replacements are to be reported to 8620

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** 2 Workers

| | QTY |
|---|---|
| Laborer | 2 |

*Traffic Control Personnel are NOT shown here

**Job Specific Equipment**

60 ft Platform Truck

*Traffic Control Equipment is NOT shown here

**P.P.E.**

1) Base PPE
2) Safety Harness/Fall Protection when using aerial lift

**Materials**

Lighting bulbs – INDOT Spec Section 922.03

Cleaning solution

**Other References**

District lighting maps

**Sub Activities**

| Average Daily Production | 20 – 40 Bulbs | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Scheduled Lighting Bulb Change | CODE | 8621 |
|---|---|---|---|

**Work Method**

1. Review lighting maps and schedule route
2. Load truck with appropriate bulbs
3. Set up safety signs and devices
4. Follow lock out / tag out procedures.
5. Standard lights use bucket/lift truck to access bulbs.
6. High mast towers lower the ballast to access bulbs.
7. Remove lens
8. Replace bulbs
9. Secure lens
10. Clean luminaire with cleaning solution
11. Inspect luminaire for obvious defects
12. Remove safety signs and devices

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | 20 – 40 Bulbs | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Underground Location Work | CODE | 8630 |
|---|---|---|---|

**Purpose**

Locating underground signal and lighting conduits, handholes, detectors and housing, service wire, and other underground wiring by request from contractors or work orders to eliminate wire or conduit damage when digging.

**Category** Signals or Lighting

- ☐ **PM**
- ☐ **QA**
- ☐ **Plan Location**

**Scheduling & Coordination**

Schedule locations as required.

| Reporting | | Asset to Report to | Various* | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Accomplishment: Reported in Person Hours

When performing locate work related to a signal or flasher, report to the commission number.

For additional work order reporting guidance see the Work Orders section of the Preface.

*Work orders for underground location work for signals should be created in the Signals module under the Signals Project/Category in WMS and reported to the signal asset. If asset is not in signals inventory, contact the WMS analysts.

*Work orders for underground location work for lighting should be created in the Roadway module under the Lighting Project/Category in WMS and reported to the Pavement Key.

**Crew Size** 1 Workers

| | QTY |
|---|---|
| Electrician Tech 2 | 1 |

**Job Specific Equipment**

| | |
|---|---|
| Locator | 1 |

**P.P.E.**

Base PPE

**Materials**

Marking Paint

**Other References**

As built plans

**Sub Activities**

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Underground Location Work | CODE | 8630 |
|---|---|---|---|

**Work Method**

1. Place work area safety signs and devices as needed
2. Contact locate requestor to ensure exactly what and where needs to be located.
3. Review as built plans or other available documents (typically available in signal cabinets)
4. Determine closest access point to area of locate
5. Connect C-Clamp of locator to the utility line that will be located
6. Use locator and marking paint to sufficiently mark utility so the exact location is easily identifiable.
7. Remove work area safety signs and devices

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Gather Field Data | CODE | 8920 |
|---|---|---|---|

**Purpose**

Collecting or editing field data for various roadway asset inventories and performing pavement marking retroreflectivity measurements.

**Category** Right-of-Way

- ☐ PM
- ☐ QA
- ☐ Unit Cost
- ☐ Plan Location

**Scheduling & Coordination**

Perform throughout the year as required to gather necessary information.

For Underground Utility Locates: Buried utility locate requests must be submitted at least 2 full business days prior to work beginning. Prior to any soil disturbance occurring, it is imperative that all utilities have responded- be it on site, or electronically. Continue submitting requests until all utilities have responded.

| Reporting | | Asset to Report to | Pavement Keys | Reporting Units | Person Hours |
|---|---|---|---|---|---|

Accomplishment: Total person hours worked

Traffic control for QA's should be reported to activity 2791

For all Underground Utility Locates completed, the Locate Request Reference number for both Indiana 811 and INDOT Buried Facilities shall be included in the “Comments” portion of the Work Order.

Example: “Indiana 811 Reference number 24681012 and Buried Facilities Reference # 2450”

For additional work order reporting guidance see the Work Orders section of the Preface.

**Crew Size** 1 - 2 Workers

| | QTY |
|---|---|
| Laborer | 1 - 2 |

**P.P.E.**

Base PPE

**Materials**

**Job Specific Equipment**

| | |
|---|---|
| Sedan / Pickup | 1 |
| Pavement Marking Retroreflectometer | 1 |
| Tablet | 1 |
| ATV/Utility Vehicle | 1-2 |

**Other References**

Road Logs
Sign Logs
Feature Inventories
Maintenance OP 1 - Maintenance Features Inventory
Operations Memo 10-06
Indiana Test Method 931
Indiana Design Manual Chapter 76

**Sub Activities**

78 - Pavement Marking Inspection
88 - Underground Utility Locates

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

| ACTIVITY | Gather Field Data | CODE | 8920 |
|---|---|---|---|

**Work Method**

Gather features inventory.

Various methods can be used including: Tablet/ESRI Application, GPS, Road Reference System, etc.

For Pavement Marking inspection:

1. Ensure retroreflectometer is fully charged and calibrated prior to leaving the office.
2. Place any needed safety devices.
3. Pull vehicle fully off road in a safe location.
4. Perform reflectivity readings in accordance with INDOT policies. Record readings and location.
5. Remove any safety devices.
6. Drive to next location, noting visual condition of markings along the way.

For Underground Utility Locates

1. Submit utility locate requests through Indiana 811 Web Ticket Entry and INDOT Buried Facilities Application at least 2 working days prior to work beginning.

2. Confirm that Indiana 811 and INDOT Buried Facilities have been located and/or negative responses have been received from all utilities.

   a. Do not proceed until all utilities have responded

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Disability/Workman's Compensation Leave | CODE | 9000 |
|---|---|---|---|

**Purpose**

Report time spent by personnel on disability and/or workman's compensation leave.

**Category** Leave Time

- ☐ PM
- ☐ QA
- ☐ Plan Location

**Scheduling & Coordination**

Coordinate with District HR personnel to establish timeline for employees PeopleSoft status changes.

| Reporting | | Asset to Report to | None | Reporting Units | Person Hours |
|---|---|---|---|---|---|

New Parental Leave & Family Medical Leave is not reported in WMS. These types of leave must be reported directly into PeopleSoft by the employee.

For additional work order reporting guidance see the Work Orders section of the Preface.

| Crew Size | Workers | QTY |
|---|---|---|

**P.P.E.**

**Materials**

**Job Specific Equipment**

**Other References**

**Sub Activities**

| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |
|---|---|---|---|

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# WORK PERFORMANCE STANDARD

| ACTIVITY | Disability/Workman's Compensation Leave | CODE | 9000 |
|---|---|---|---|

**Work Method**

**Special Considerations**

| | | APPROVED BY | |
|---|---|---|---|
| | | Director, Highway Maintenance | |
| Average Daily Production | Person Hours | EFFECTIVE DATE | 7/12/2023 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# Appendix A



SQUARE YARDS OF ROAD SURFACE FOR VARIOUS ROAD WIDTHS

| Road Width | Square Yards of Road Surface | | |
|---|---|---|---|
| | Per Linear Foot | Per 100 Feet | Per Mile |
| 6’ | 0.67 | 66.67 | 3,520 |
| 7’ | 0.78 | 77.78 | 4,107 |
| 8’ | 0.89 | 88.89 | 4,693 |
| 9’ | 1.00 | 100.00 | 5,280 |
| 10’ | 1.11 | 111.11 | 5,867 |
| 11’ | 1.22 | 122.22 | 6,453 |
| 12’ | 1.33 | 133.33 | 7,040 |
| 13’ | 1.44 | 144.44 | 7,627 |
| 14’ | 1.56 | 155.56 | 8,213 |
| 15’ | 1.67 | 166.67 | 8,800 |
| 16’ | 1.78 | 177.78 | 9,387 |
| 17’ | 1.89 | 188.89 | 9,973 |
| 18’ | 2.00 | 200.00 | 10,560 |
| 20’ | 2.22 | 222.22 | 11,733 |
| 22’ | 2.44 | 244.44 | 12,907 |

| Road Width | Square Yards of Road Surface | | |
|---|---|---|---|
| | Per Linear Foot | Per 100 Feet | Per Mile |
| 24’ | 2.67 | 266.67 | 14,080 |
| 25’ | 2.78 | 277.78 | 14,667 |
| 26’ | 2.89 | 288.89 | 15,253 |
| 28’ | 3.11 | 311.11 | 16,427 |
| 30’ | 3.33 | 333.33 | 17,600 |
| 32’ | 3.56 | 355.56 | 18,773 |
| 34’ | 3.78 | 377.78 | 19,947 |
| 36’ | 4.00 | 400.00 | 21,120 |
| 38’ | 4.22 | 422.22 | 22,293 |
| 40’ | 4.44 | 444.44 | 23,467 |
| 50’ | 5.56 | 555.55 | 29,333 |
| 60’ | 6.67 | 666.67 | 35,200 |
| 70’ | 7.78 | 777.78 | 41,067 |
| 75’ | 8.33 | 833.33 | 44,000 |
| 80’ | 8.89 | 888.89 | 46,933 |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# APPENDIX B



Mowing Swath Mile Chart
**LENGTH (Miles)**

| Average Width of Cut (feet) | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.5 | 0.8 | 1.0 | 1.3 | 1.5 | 1.8 | 2.0 | 2.3 | 2.5 |
| **2** | 0.1 | 0.1 | 0.2 | 0.2 | 0.3 | 0.3 | 0.4 | 0.4 | 0.5 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 |
| **3** | 0.1 | 0.2 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.6 | 0.7 | 0.8 | 1.5 | 2.3 | 3.0 | 3.8 | 4.5 | 5.3 | 6.0 | 6.8 | 7.5 |
| **4** | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 2.0 | 3.0 | 4.0 | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 |
| **8** | 0.2 | 0.4 | 0.6 | 0.8 | 1.0 | 1.2 | 1.4 | 1.6 | 1.8 | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 | 12.0 | 14.0 | 16.0 | 18.0 | 20.0 |
| **12** | 0.3 | 0.6 | 0.9 | 1.2 | 1.5 | 1.8 | 2.1 | 2.4 | 2.7 | 3.0 | 6.0 | 9.0 | 12.0 | 15.0 | 18.0 | 21.0 | 24.0 | 27.0 | 30.0 |
| **16** | 0.4 | 0.8 | 1.2 | 1.6 | 2.0 | 2.4 | 2.8 | 3.2 | 3.6 | 4.0 | 8.0 | 12.0 | 16.0 | 20.0 | 24.0 | 28.0 | 32.0 | 36.0 | 40.0 |
| **20** | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 10.0 | 15.0 | 20.0 | 25.0 | 30.0 | 35.0 | 40.0 | 45.0 | 50.0 |
| **24** | 0.6 | 1.2 | 1.8 | 2.4 | 3.0 | 3.6 | 4.2 | 4.8 | 5.4 | 6.0 | 12.0 | 18.0 | 24.0 | 30.0 | 36.0 | 42.0 | 48.0 | 54.0 | 60.0 |
| **28** | 0.7 | 1.4 | 2.1 | 2.8 | 3.5 | 4.2 | 4.9 | 5.6 | 6.3 | 7.0 | 14.0 | 21.0 | 28.0 | 35.0 | 42.0 | 49.0 | 56.0 | 63.0 | 70.0 |
| **32** | 0.8 | 1.6 | 2.4 | 3.2 | 4.0 | 4.8 | 5.6 | 6.4 | 7.2 | 8.0 | 16.0 | 24.0 | 32.0 | 40.0 | 48.0 | 56.0 | 64.0 | 72.0 | 80.0 |
| **36** | 0.9 | 1.8 | 2.7 | 3.6 | 4.5 | 5.4 | 6.3 | 7.2 | 8.1 | 9.0 | 18.0 | 27.0 | 36.0 | 45.0 | 54.0 | 63.0 | 72.0 | 81.0 | 90.0 |
| **40** | 1.0 | 2.0 | 3.0 | 4.0 | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 | 20.0 | 30.0 | 40.0 | 50.0 | 60.0 | 70.0 | 80.0 | 90.0 | 100.0 |
| **44** | 1.1 | 2.2 | 3.3 | 4.4 | 5.5 | 6.6 | 7.7 | 8.8 | 9.9 | 11.0 | 22.0 | 33.0 | 44.0 | 55.0 | 66.0 | 77.0 | 88.0 | 99.0 | 110.0 |
| **48** | 1.2 | 2.4 | 3.6 | 4.8 | 6.0 | 7.2 | 8.4 | 9.6 | 10.8 | 12.0 | 24.0 | 36.0 | 48.0 | 60.0 | 72.0 | 84.0 | 96.0 | 108.0 | 120.0 |
| **52** | 1.3 | 2.6 | 3.9 | 5.2 | 6.5 | 7.8 | 9.1 | 10.4 | 11.7 | 13.0 | 26.0 | 39.0 | 52.0 | 65.0 | 78.0 | 91.0 | 104.0 | 117.0 | 130.0 |
| **56** | 1.4 | 2.8 | 4.2 | 5.6 | 7.0 | 8.4 | 9.8 | 11.2 | 12.6 | 14.0 | 28.0 | 42.0 | 56.0 | 70.0 | 84.0 | 98.0 | 112.0 | 126.0 | 140.0 |
| **60** | 1.5 | 3.0 | 4.5 | 6.0 | 7.5 | 9.0 | 10.5 | 12.0 | 13.5 | 15.0 | 30.0 | 45.0 | 60.0 | 75.0 | 90.0 | 105.0 | 120.0 | 135.0 | 150.0 |
| **64** | 1.6 | 3.2 | 4.8 | 6.4 | 8.0 | 9.6 | 11.2 | 12.8 | 14.4 | 16.0 | 32.0 | 48.0 | 64.0 | 80.0 | 96.0 | 112.0 | 128.0 | 144.0 | 160.0 |
| **68** | 1.7 | 3.4 | 5.1 | 6.8 | 8.5 | 10.2 | 11.9 | 13.6 | 15.3 | 17.0 | 34.0 | 51.0 | 68.0 | 85.0 | 102.0 | 119.0 | 136.0 | 153.0 | 170.0 |
| **72** | 1.8 | 3.6 | 5.4 | 7.2 | 9.0 | 10.8 | 12.6 | 14.4 | 16.2 | 18.0 | 36.0 | 54.0 | 72.0 | 90.0 | 108.0 | 126.0 | 144.0 | 162.0 | 180.0 |
| **76** | 1.9 | 3.8 | 5.7 | 7.6 | 9.5 | 11.4 | 13.3 | 15.2 | 17.1 | 19.0 | 38.0 | 57.0 | 76.0 | 95.0 | 114.0 | 133.0 | 152.0 | 171.0 | 190.0 |
| **80** | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 | 12.0 | 14.0 | 16.0 | 18.0 | 20.0 | 40.0 | 60.0 | 80.0 | 100.0 | 120.0 | 140.0 | 160.0 | 180.0 | 200.0 |
| **84** | 2.1 | 4.2 | 6.3 | 8.4 | 10.5 | 12.6 | 14.7 | 16.8 | 18.9 | 21.0 | 42.0 | 63.0 | 84.0 | 105.0 | 126.0 | 147.0 | 168.0 | 189.0 | 210.0 |
| **88** | 2.2 | 4.4 | 6.6 | 8.8 | 11.0 | 13.2 | 15.4 | 17.6 | 19.8 | 22.0 | 44.0 | 66.0 | 88.0 | 110.0 | 132.0 | 154.0 | 176.0 | 198.0 | 220.0 |
| **92** | 2.3 | 4.6 | 6.9 | 9.2 | 11.5 | 13.8 | 16.1 | 18.4 | 20.7 | 23.0 | 46.0 | 69.0 | 92.0 | 115.0 | 138.0 | 161.0 | 184.0 | 207.0 | 230.0 |
| **96** | 2.4 | 4.8 | 7.2 | 9.6 | 12.0 | 14.4 | 16.8 | 19.2 | 21.6 | 24.0 | 48.0 | 72.0 | 96.0 | 120.0 | 144.0 | 168.0 | 192.0 | 216.0 | 240.0 |
| **100** | 2.5 | 5.0 | 7.5 | 10.0 | 12.5 | 15.5 | 17.5 | 20.0 | 22.5 | 25.0 | 50.0 | 75.0 | 100.0 | 125.0 | 150.0 | 175.0 | 200.0 | 225.0 | 250.0 |

# APPENDIX B



EXAMPLE CALCULATIONS
SWATH MILES OF MOWING

EXAMPLE 1

The average width of the right-of-way mowed is 15 feet.
The distance mowed is 1 mile.

By use of the chart the swath miles are determined to be:

| |
|---|
| 1.0 mile @ average width 15 feet =3.8 swath miles mowed |

EXAMPLE 2

The average width of the right-of-way mowed is 40 feet.
The distance mowed is 2.7 miles.

By use of the chart the swath miles are determined to be:

| | |
|---|---|
| 2.0 miles @ average width 40 feet = | 20.0 swath miles mowed |
| 0.7 miles @ average width 40feet = | 7.0 swath miles mowed |
| Total | 27.0 swath miles mowed |

EXAMPLE 3

The average width of the right-of-way mowed is 18 feet.
The distance mowed is 7.8 miles.

By use of the chart the swath miles are determined to be:

| | |
|---|---|
| 7.0 miles @ average width 16 feet = | 28.0 swath miles mowed |
| 0.8 miles @ average width 16 feet = | 3.2 swath miles mowed |
| 7.0 miles @ average width 3 feet = | 5.3 swath miles mowed |
| 0.8 miles @ average width 3 feet = | 0.6 swath miles mowed |
| Total | 37.1 swath miles mowed |

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE

# Appendix C



## Acreage Chart

**LENGTH (Miles)**

| Width (Feet) | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1' | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.4 | 0.5 | 0.6 | 0.7 | 0.9 | 1.0 | 1.1 | 1.2 |
| 2' | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.5 | 0.7 | 1.0 | 1.2 | 1.5 | 1.7 | 1.7 | 2.2 | 2.4 |
| 3' | 0.0 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.4 | 0.7 | 1.1 | 1.5 | 1.8 | 2.2 | 2.6 | 2.9 | 3.3 | 3.6 |
| 4' | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.4 | 0.4 | 0.5 | 1.0 | 1.5 | 1.9 | 2.4 | 2.9 | 3.4 | 3.9 | 4.4 | 4.9 |
| 5' | 0.1 | 0.1 | 0.2 | 0.2 | 0.3 | 0.4 | 0.4 | 0.5 | 0.6 | 0.6 | 1.2 | 1.8 | 2.4 | 3.0 | 3.6 | 4.2 | 4.9 | 5.5 | 6.1 |
| 6' | 0.1 | 0.2 | 0.2 | 0.3 | 0.4 | 0.4 | 0.5 | 0.6 | 0.7 | 0.7 | 1.5 | 2.2 | 2.9 | 3.6 | 4.4 | 5.1 | 5.8 | 6.5 | 7.3 |
| 7' | 0.1 | 0.2 | 0.3 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.7 | 2.6 | 3.4 | 4.2 | 5.1 | 5.9 | 6.8 | 7.6 | 8.5 |
| 8' | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.9 | 2.9 | 3.9 | 4.9 | 5.8 | 6.8 | 7.8 | 8.7 | 9.7 |
| 9' | 0.1 | 0.2 | 0.3 | 0.4 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 2.2 | 3.3 | 4.4 | 5.5 | 6.5 | 7.6 | 8.7 | 9.8 | 10.9 |
| 10' | 0.1 | 0.2 | 0.4 | 0.5 | 0.6 | 0.7 | 0.9 | 1.0 | 1.1 | 1.2 | 2.4 | 3.6 | 4.9 | 6.1 | 7.3 | 8.5 | 9.7 | 10.9 | 12.1 |
| 20' | 0.2 | 0.5 | 0.7 | 1.0 | 1.2 | 1.5 | 1.7 | 1.9 | 2.2 | 2.4 | 4.9 | 7.3 | 9.7 | 12.1 | 14.6 | 17.0 | 19.4 | 21.8 | 24.2 |
| 30' | 0.4 | 0.7 | 1.1 | 1.5 | 1.8 | 2.2 | 2.6 | 2.9 | 3.3 | 3.6 | 7.3 | 10.9 | 14.6 | 18.2 | 21.8 | 25.5 | 29.1 | 32.7 | 36.4 |
| 40' | 0.5 | 1.0 | 1.5 | 1.9 | 2.4 | 2.9 | 3.4 | 3.9 | 4.4 | 4.9 | 9.7 | 14.6 | 19.4 | 24.2 | 29.1 | 33.9 | 38.8 | 43.6 | 48.5 |
| 50' | 0.6 | 1.2 | 1.8 | 2.4 | 3.0 | 3.6 | 4.2 | 4.9 | 5.5 | 6.1 | 12.1 | 18.2 | 24.2 | 30.3 | 36.4 | 42.4 | 48.5 | 54.6 | 60.6 |
| 60' | 0.7 | 1.5 | 2.2 | 2.9 | 3.6 | 4.4 | 5.1 | 5.8 | 6.6 | 7.3 | 14.6 | 21.8 | 29.1 | 36.4 | 43.6 | 50.9 | 58.2 | 65.5 | 72.7 |
| 70' | 0.9 | 1.7 | 2.6 | 3.4 | 4.2 | 5.1 | 5.9 | 6.8 | 7.6 | 8.5 | 17.0 | 25.5 | 33.9 | 42.4 | 50.9 | 59.4 | 67.6 | 76.4 | 84.9 |
| 80' | 1.0 | 1.9 | 2.9 | 3.9 | 4.9 | 5.8 | 6.8 | 7.8 | 8.7 | 9.7 | 19.4 | 29.1 | 38.8 | 48.5 | 58.2 | 67.9 | 77.6 | 87.3 | 97.0 |
| 90' | 1.1 | 2.2 | 3.3 | 4.4 | 5.5 | 6.6 | 7.6 | 8.7 | 9.8 | 10.9 | 21.8 | 32.7 | 43.6 | 54.6 | 65.5 | 76.4 | 87.3 | 98.2 | 109.1 |
| 100' | 1.2 | 2.4 | 3.6 | 4.9 | 6.1 | 7.3 | 8.5 | 9.7 | 10.9 | 12.1 | 24.2 | 36.4 | 48.5 | 60.6 | 72.7 | 84.9 | 97.0 | 109.1 | 121.2 |

# Appendix C



EXAMPLE CACULATIONS
ACRES

EXAMPLE 1

The average width of the right-of-way sprayed is 30 feet. The distance sprayed is 1 mile.

By use of the chart acreage sprayed is determined to be:

| |
|---|
| 1.0 mile @ average width 30 feet = 3.6 acres sprayed |

EXAMPLE 2

The average width of the right-of-way sprayed is 40 feet. The distance is 2.7 miles.

By use of the acreage sprayed is determined to be:

| | |
|---|---|
| 2.0 miles @ average width 40 feet = | 9.7 acres sprayed |
| 0.7 miles @ average width 40 feet = | 3.4 acres sprayed |
| Total | 13.1 acres sprayed |
| | |

EXAMPLE 3

The average width of the right-of-way sprayed is 35 feet. The distance mowed is 7.8 miles

By use of the chart acreage sprayed is determined to be:

| | |
|---|---|
| 7.0 miles @ average width 30 feet = | 25.5 acres sprayed |
| 0.8 miles @ average width 30 feet = | 2.9 acres sprayed |
| 7.0 miles @ average width 5 feet = | 4.2 acres sprayed |
| 0.8 miles @ average width 5 feet = | 0.5 acres sprayed |
| Total | 33.1 acres sprayed |

# INDIANA DEPARTMENT OF TRANSPORTATION
## DIVISION OF MAINTENANCE
# APPENDIX D



STORAGE CAPACITY (IN TONS)
OF CONE – OR TENT- SHAPE STOCKPILES OF CRUSHED STONE
Base Width (Diameter) In Feet

| | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 5 | | | | | | | | | | | | | |
| 12.5 | 8 | | | | | | | | | | | | | |
| 15 | 11 | 19 | | | | | | | | | | | | |
| 17.5 | 13 | 24 | | | | | | | | | | | | |
| 20 | 16 | 30 | 44 | | | | | | | | | | | |
| 22.5 | 19 | 36 | 54 | | | | | | | | | | | |
| 25 | 21 | 42 | 65 | 86 | | | | | | | | | | |
| 27.5 | 24 | 48 | 75 | 100 | | | | | | | | | | |
| 30 | 26 | 54 | 86 | 120 | 150 | | | | | | | | | |
| 32.5 | 29 | 60 | 96 | 130 | 170 | | | | | | | | | |
| 35 | 32 | 66 | 110 | 150 | 200 | 240 | | | | | | | | |
| 37.5 | 34 | 72 | 120 | 170 | 220 | 270 | | | | | | | | |
| 40 | 37 | 78 | 130 | 180 | 240 | 300 | 350 | | | | | | | |
| 42.5 | 40 | 83 | 140 | 200 | 270 | 330 | 390 | | | | | | | |
| 45 | 42 | 89 | 150 | 220 | 290 | 360 | 440 | 500 | | | | | | |
| 47.5 | 45 | 95 | 160 | 230 | 310 | 400 | 480 | 550 | | | | | | |
| 50 | 47 | 100 | 170 | 250 | 340 | 430 | 520 | 610 | 690 | | | | | |
| 52.5 | 50 | 110 | 180 | 270 | 360 | 460 | 560 | 660 | 750 | | | | | |
| 55 | 53 | 110 | 190 | 280 | 380 | 490 | 600 | 710 | 820 | 910 | | | | |
| 57.5 | 55 | 120 | 200 | 300 | 400 | 520 | 640 | 770 | 880 | 990 | | | | |
| 60 | 58 | 120 | 210 | 320 | 430 | 560 | 690 | 820 | 950 | 1100 | 1200 | | | |
| 62.5 | 61 | 130 | 220 | 330 | 450 | 590 | 730 | 870 | 1000 | 1200 | 1300 | | | |
| 65 | 63 | 140 | 230 | 350 | 480 | 620 | 770 | 920 | 1100 | 1200 | 1400 | 1500 | | |
| 67.5 | 66 | 140 | 240 | 360 | 500 | 650 | 800 | 980 | 1100 | 1300 | 1500 | 1600 | | |
| 70 | 68 | 150 | 250 | 380 | 5340 | 680 | 850 | 1000 | 1200 | 1400 | 1600 | 1700 | 1900 | |
| 72.5 | 71 | 150 | 260 | 400 | 550 | 720 | 900 | 1100 | 1300 | 1500 | 1700 | 1800 | 2000 | |
| 75 | 74 | 160 | 270 | 410 | 570 | 750 | 940 | 1100 | 1300 | 1500 | 1800 | 2000 | 2100 | 2300 |
| | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 |

# INDIANA DEPARTMENT OF TRANSPORTATION
## DIVISION OF MAINTENANCE
# APPENDIX D



STORAGE CAPACITY (IN TONS)
OF CONE – OR TENT- SHAPE STOCKPILES OF SAND
Base Width (Diameter) In Feet

| | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 4 | | | | | | | | | | | | | |
| 12.5 | 6 | | | | | | | | | | | | | |
| 15 | 8 | 15 | | | | | | | | | | | | |
| 17.5 | 10 | 19 | | | | | | | | | | | | |
| 20 | 13 | 24 | 34 | | | | | | | | | | | |
| 22.5 | 15 | 28 | 43 | | | | | | | | | | | |
| 25 | 17 | 33 | 51 | 67 | | | | | | | | | | |
| 27.5 | 19 | 38 | 59 | 80 | | | | | | | | | | |
| 30 | 21 | 42 | 67 | 93 | 116 | | | | | | | | | |
| 32.5 | 23 | 47 | 75 | 106 | 135 | | | | | | | | | |
| 35 | 25 | 51 | 84 | 118 | 153 | 184 | | | | | | | | |
| 37.5 | 27 | 56 | 92 | 131 | 171 | 209 | | | | | | | | |
| 40 | 29 | 61 | 100 | 144 | 190 | 235 | 275 | | | | | | | |
| 42.5 | 31 | 65 | 106 | 157 | 208 | 260 | 308 | | | | | | | |
| 45 | 33 | 70 | 116 | 170 | 227 | 285 | 341 | 392 | | | | | | |
| 47.5 | 35 | 74 | 125 | 183 | 245 | 310 | 374 | 433 | | | | | | |
| 50 | 37 | 79 | 133 | 195 | 264 | 335 | 406 | 475 | 537 | | | | | |
| 52.5 | 39 | 83 | 141 | 208 | 282 | 360 | 439 | 516 | 589 | | | | | |
| 55 | 41 | 88 | 149 | 283 | 301 | 385 | 472 | 558 | 640 | 715 | | | | |
| 57.5 | 43 | 93 | 157 | 234 | 319 | 410 | 505 | 599 | 691 | 777 | | | | |
| 60 | 45 | 98 | 166 | 247 | 338 | 436 | 538 | 641 | 742 | 839 | 928 | | | |
| 62.5 | 47 | 102 | 174 | 259 | 356 | 461 | 570 | 682 | 794 | 901 | 1002 | | | |
| 65 | 49 | 107 | 182 | 272 | 374 | 486 | 603 | 724 | 845 | 963 | 1076 | 1180 | | |
| 67.5 | 51 | 111 | 190 | 285 | 393 | 511 | 636 | 765 | 896 | 1025 | 1150 | 1267 | | |
| 70 | 54 | 116 | 198 | 298 | 411 | 536 | 669 | 807 | 947 | 1087 | 1224 | 1354 | 1474 | |
| 72.5 | 56 | 121 | 207 | 311 | 430 | 561 | 702 | 849 | 999 | 1149 | 1298 | 1440 | 1575 | |
| 75 | 58 | 125 | 215 | 324 | 448 | 586 | 734 | 890 | 1050 | 1211 | 1371 | 1527 | 1675 | 1813 |
| | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 |

# INDIANA DEPARTMENT OF TRANSPORTATION
## DIVISION OF MAINTENANCE
# APPENDIX D



STORAGE CAPACITY (IN TONS)
OF CONE – OR TENT- SHAPE STOCKPILES OF SALT
Base Width (Diameter) In Feet

| | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 3 | | | | | | | | | | | | | |
| 12.5 | 5 | | | | | | | | | | | | | |
| 15 | 6 | 11 | | | | | | | | | | | | |
| 17.5 | 8 | 15 | | | | | | | | | | | | |
| 20 | 10 | 18 | 26 | | | | | | | | | | | |
| 22.5 | 11 | 22 | 33 | | | | | | | | | | | |
| 25 | 13 | 25 | 39 | 51 | | | | | | | | | | |
| 27.5 | 14 | 29 | 454 | 61 | | | | | | | | | | |
| 30 | 16 | 32 | 51 | 71 | 89 | | | | | | | | | |
| 32.5 | 17 | 36 | 58 | 81 | 103 | | | | | | | | | |
| 35 | 19 | 39 | 64 | 90 | 117 | 141 | | | | | | | | |
| 37.5 | 21 | 43 | 70 | 100 | 131 | 160 | | | | | | | | |
| 40 | 22 | 46 | 76 | 110 | 145 | 179 | 210 | | | | | | | |
| 42.5 | 24 | 50 | 83 | 120 | 159 | 198 | 235 | | | | | | | |
| 45 | 25 | 53 | 89 | 130 | 173 | 218 | 260 | 299 | | | | | | |
| 47.5 | 27 | 57 | 95 | 139 | 187 | 237 | 285 | 331 | | | | | | |
| 50 | 28 | 60 | 101 | 149 | 201 | 256 | 310 | 363 | 410 | | | | | |
| 52.5 | 30 | 64 | 108 | 159 | 216 | 275 | 335 | 394 | 450 | | | | | |
| 55 | 31 | 67 | 114 | 169 | 230 | 294 | 360 | 426 | 489 | 546 | | | | |
| 57.5 | 33 | 71 | 120 | 179 | 244 | 313 | 386 | 458 | 528 | 594 | | | | |
| 60 | 35 | 75 | 127 | 188 | 258 | 339 | 411 | 489 | 567 | 641 | 709 | | | |
| 62.5 | 36 | 78 | 133 | 198 | 272 | 352 | 436 | 521 | 606 | 688 | 766 | | | |
| 65 | 38 | 82 | 139 | 208 | 286 | 371 | 461 | 553 | 645 | 736 | 822 | 902 | | |
| 67.5 | 39 | 85 | 145 | 218 | 300 | 390 | 486 | 585 | 685 | 783 | 878 | 968 | | |
| 70 | 41 | 89 | 152 | 228 | 314 | 109 | 511 | 616 | 724 | 831 | 935 | 1034 | 1126 | |
| 72.5 | 42 | 92 | 158 | 237 | 328 | 429 | 536 | 648 | 763 | 878 | 991 | 1100 | 1203 | |
| 75 | 44 | 96 | 164 | 247 | 342 | 448 | 561 | 680 | 802 | 925 | 1048 | 1166 | 1280 | 1385 |
| | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 |

# INDIANA DEPARTMENT OF TRANSPORTATION
## DIVISION OF MAINTENANCE
# APPENDIX E



**** US TO METRIC CONVERSION TABLES ****

*** LINEAR MEASUREMENTS ***

| US MEASURE | UNITS | US MEASURE | UNITS | METRIC MEASURE | UNIT | METRIC MEASURE | UNIT |
|---|---|---|---|---|---|---|---|
| 1 | in | 0.08333 | ft | 2.54 | cm | 25.4 | mm |
| 1 | ft | 12 | in | 0.3048 | m | 30.48 | cm |
| 1 | yd | 3 | ft | 0.914402 | m | 91.4402 | cm |
| 1 | sta | 100 | ft | 30.48 | m | 0.03048 | km |
| 1 | mi | 5,280 | ft | 1,609.35 | m | 1.60935 | km |
| 0.03937 | in | 0.003281 | ft | 1 | mm | 0.001 | m |
| 0.3937 | in | 0.032808 | ft | 1 | cm | 10 | mm |
| 39.37 | in | 3.2808 | ft | 1 | m1. | 1.000 | mm |
| 1.093611 | yd | 0.032808 | sta | 1 | m | 100 | cm |
| 3,280.8 | Ft | 0.62137 | mi | 1 | km | 1,000 | m |

*** SQUARE MEASUREMENTS ***

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | sq in | 0.006944 | sq ft | 6.4516 | sq cm | 0.00064816 | sq m |
| 1 | sq in | 144 | sq in | 929.0341 | sq cm | 0.09290341 | sq m |
| 1 | sq yd | 9 | sq ft | 8,361.307 | sq cm | 0.8361307 | sq m |
| 1 | ac | 43,560 | sq ft | 4,046.873 | sq m | 0.4046873 | ha |
| 1 | sq mi | 640 | ac | 258.9998 | ha | 2.589998 | sq km |
| 0.00155 | sq in | | | 1 | sq mm | 0.01 | sq cm |
| 0.155 | sq in | 0.0010764 | sq ft | 1 | sq cm | 100 | sq mm |
| 10.7639 | sq ft | 1.19598 | sq yd | 1 | sq m | 10,000 | cq cm |
| 11,959.8 | sq yd | 2.471 | ac | 1 | ha | 10,000 | sq m |
| 1,195,985 | sq yd | 247.104 | ac | 1 | sq km | 1,000,000 | sq m |

*** CUBIC MEASUREMENTS ***

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | cu in | 0.0005787 | cu ft | 16.3872 | cu mm | 0.000016387 | cu m |
| 1 | cu ft | 0.037037 | cu yd | 0.000028317 | cu m | 28.31701 | l |
| 1 | cu yd | 27 | cu ft | 0.76456 | cu m | 764,560 | cu cm |
| | | 0.000061023 | cu in | 1 | cu mm | | |
| 0.061023 | cu in | 0.0000353 | cu ft | 1 | cu cm | 1000 | cu mm |
| 35.314 | cu ft | 1.30794 | cu yd | 1 | cu m | 1,000,000 | cu cm |
| 61.026 | cu in | 0.035316 | cu ft | 1 | l | 1,000 | cu cm |

*** WEIGHT MEASUREMENTS ***

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | grain | 0.0022857 | oz | 0.064799 | g | 64.799 | mg |
| 1 | oz | 0.0625 | lb | 28.349 | g | | |
| 1 | lb | 16 | oz | 453.592 | g | 0.45359 | kg |
| 1 | hund wt | 100 | lb | 45.359 | kg | 0.0453592 | mt |
| 1 | t | 2000 | lb | 907.18 | kg | 0.907185 | mt |
| 0.035274 | oz | 0.0022046 | lb | 1 | g | 1000 | mg |
| 2.20462 | lb | 0.0011023 | t | 1 | kg | 1000 | g |
| 2,204.62 | lb | 1.10231 | t | 1 | mt | 1000 | kg |

*** VOLUME MEASUREMENTS ***

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | pt | 28.875 | cu in | 0.473167 | l | 473.167 | cu cm |
| 1 | qt | 57.75 | cu in | 0.94633 | l | | |
| 1 | gal | 231 | cu in | 3.78531 | l | 0.0037854 | cu m |
| 1 | bar | 31.5 | gal | 119.238 | l | 0.119238 | kl |
| 0.264178 | gal | 1.05668 | qt | 1 | l | | |
| 61.025 | cu in | 0.035316 | cu ft | 1 | l | | |

# APPENDIX E



**ABBREVIATIONS**

| | | |
|---|---|---|
| in = inches | sq = square | mm = millimeters |
| ft = feet | cu = cubic | cm = centimeters |
| yd = yards | | m = meters |
| sta = stations (100 feet ) | | km = kilometers |
| ac = acres | | ha = hectare |
| mi = miles | | ml = milliliters |
| oz = ounces | | l = liters |
| lb = pounds | | kl = kiloliters |
| hund wt = hundred weight | | mg = milligrams |
| t = short tons | | cg = centigrams |
| pt = pints | | g = grams |
| qt = quart | | kg = kilograms (kilos) |
| gal = gallon | | mt = metric tons |
| bar = barrel | | °C = Celsius |
| F= Fahrenheit | | °K = Kelvin |

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**TEMPERATURE CONVERSIONS**

To convert degrees Fahrenheit to degrees Celsius, use this formula:

**°Fahrenheit minus 32, times 5, divided by 9 = degrees Celsius**

EXAMPLE 68 °F – 32 = 36 x 5 = 180, 180/9 = 20 °C ( Celsius)

To convert degrees Celsius to degrees Fahrenheit, use this formula:

**°Celsius time 9, divided by 5, plus 32 = Fahrenheit**

Example: 20° C x 9 = 180, 180/5 = 36, + 32 = 68 °F

# APPENDIX F



## LIST OF COUNTY NAMES AND NUMBERS

| No. | Name | No. | Name |
|---|---|---|---|
| 01 | Adams | 47 | Lawrence |
| 02 | Allen | 48 | Madison |
| 03 | Bartholomew | 49 | Marion |
| 04 | Benton | 50 | Marshall |
| 05 | Blackford | 51 | Martin |
| 06 | Boone | 52 | Miami |
| 07 | Brown | 53 | Monroe |
| 08 | Carroll | 54 | Montgomery |
| 09 | Cass | 55 | Morgan |
| 10 | Clark | 56 | Newton |
| 11 | Clay | 57 | Noble |
| 12 | Clinton | 58 | Ohio |
| 13 | Crawford | 59 | Orange |
| 14 | Daviess | 60 | Owen |
| 15 | Dearborn | 61 | Parke |
| 16 | Decatur | 62 | Perry |
| 17 | Dekalb | 63 | Pike |
| 18 | Delaware | 64 | Porter |
| 19 | Dubois | 65 | Posey |
| 20 | Elkhart | 66 | Pulaski |
| 21 | Fayette | 67 | Putman |
| 22 | Floyd | 68 | Randolph |
| 23 | Fountain | 69 | Ripley |
| 24 | Franklin | 70 | Rush |
| 25 | Fulton | 71 | St. Joseph |
| 26 | Gibson | 72 | Scott |
| 27 | Grant | 73 | Shelby |
| 28 | Greene | 74 | Spencer |
| 29 | Hamilton | 75 | Starke |
| 30 | Hancock | 76 | Steuben |
| 31 | Harrison | 77 | Sullivan |
| 32 | Hendricks | 78 | Switzerland |
| 33 | Henry | 79 | Tippecanoe |
| 34 | Howard | 80 | Tipton |
| 35 | Huntington | 81 | Union |
| 36 | Jackson | 82 | Vanderburgh |
| 37 | Jasper | 83 | Vermillion |
| 38 | Jay | 84 | Vigo |
| 39 | Jefferson | 85 | Wabash |
| 40 | Jennings | 86 | Warren |
| 41 | Johnson | 87 | Warrick |
| 42 | Knox | 88 | Washington |
| 43 | Kosciusko | 89 | Wayne |
| 44 | LaGrange | 90 | Wells |
| 45 | Lake | 91 | White |
| 46 | LaPorte | 92 | Whitley |

# INDIANA DEPARTMENT OF TRANSPORTATION DIVISION OF MAINTENANCE

# APPENDIX G

## Work Performance Standards - List of Revisions

| Revision Date | Code | Activity Name | Revision |
|---|---|---|---|
| December 1, 2013 | 1000 | LOANED OUT | Added subactivity for Shop Work |
| December 1, 2013 | 2020 | DEEP PATCHING | Corrected typo in concrete conversion |
| December 1, 2013 | 8125 | PANEL SIGN INSPECTION/MAINTENANCE | Revised work method |
| December 1, 2013 | 2770 | ROADWAY SWEEPING | Typo on PPE section |
| December 1, 2013 | 8510 | SIGNAL PREVENTIVE MAINTENANCE | Added pedestrian ADA to checklist |
| December 1, 2013 | 2991 | MAJOR SURFACE/SHOULDER IMPROVEMENTS | Added subactivity for major patching |
| December 1, 2013 | 1010 | INTERNAL LOANED OUT | Clarified reporting |
| April 1, 2014 | 1020 - 1950 | LEAVE ACTIVITIES | Added standards to book |
| April 1, 2014 | 2230 | Herbicide Spot Treatment | Added subactivity for facilities spraying |
| April 1, 2014 | 2231 | Herbicide Broadcast Treatment | Revised subactivity for invasives |
| April 1, 2014 | 2310 | MAJOR CLEAN AND RESHAPE DITCHES | Clarified cleaning paved side ditch reporting |
| April 1, 2014 | 2311 | SPOT DITCHING | Clarified cleaning paved side ditch reporting |
| April 1, 2014 | 2320 | SMALL CULVERT INSPECTION | Added inspection form |
| April 1, 2014 | 2350 | SMALL STRUCTURE CLEANING | Clarified cleaning paved side ditch reporting |
| April 1, 2014 | 2360 | UNDERDRAIN CLEAN/INSPECTION | Revised inspection form |
| April 1, 2014 | 2390 | OTHER DRAINAGE MAINTEANNCE | Added cleaning paved side ditches to activity |
| April 1, 2014 | 2750 | FULL WIDTH LITTER PICKUP | Corrected subactivity reference |
| July 1, 2014 | Index | MANMADE AND NATURAL SNOW FENCE | Corrected numbers with name |
| July 1, 2014 | 2050 | MAINLINE SEAL COAT | Added application rate form. |
| July 1, 2014 | 2190 | OTHER ROADWAY AND SHOULDER MAINTENANCE | Clarified what types of work are covered |
| July 1, 2014 | 2230 | HERBICIDE SPOT TREATMENT | Added subactivity |
| July 1, 2014 | 2270 | SPOT MOWING | Added clarification for mowing vacant lots, added subactivities |
| July 1, 2014 | 2291 | ROADWAY SLIDE MAINTENANCE | Clarify washouts > 50 tons |
| July 1, 2014 | 2390 | OTHER DRAINAGE MAINTEANNCE | Clarify washouts < 50 tons |
| July 1, 2014 | 2490 | OTHER BRIDGE MAINTENANCE | Added subactivity for approach repair |
| July 1, 2014 | 2610 | EMERGENCY MAINTENANCE | Corrected subactivity references in work method |
| July 1, 2014 | 2680 | MANMADE SNOW FENCE | Added subactivity for removal |
| July 1, 2014 | 8340 | RAMP OR LOT PAINTING | Added parking lot painting into this activity. |
| July 1, 2014 | 8360 | SPECIAL MARKING MAINTENANCE | Removed parking lot painting from this activity. Added subactivities for specific material used. |
| July 1, 2014 | 8510 | SIGNAL PREVENTIVE MAINTENANCE | Added revised QA form |
| July 1, 2014 | 8630 | UNDERGROUND LOCATION WORK | Clarify report to signal/flasher commission number |

## Work Performance Standards - List of Revisions (Cont'd)

| Revision Date | Code | Activity Name | Revision |
|---|---|---|---|
| January 1, 2015 | 2050 | MAINLINE SEAL COAT | Modified application rate form, revised QA form |
| January 1, 2015 | 2241 | SPOT SEEDING AND FERTILIZING | Corrected application rates |
| January 1, 2015 | 2310/ 2311 | MAJOR DITCHING/SPOT DITCHING | Added language requiring material disposal form be attached to WO, revised QA form |
| January 1, 2015 | 2360 | UNDERDRAIN CLEANING/INSPECTION | Clarified WMS online inspection form only required if follow up repairs needed. |
| January 1, 2015 | 2451 | PERMANENT BRIDGE DECK PATCHING | Revised QA form |
| January 1, 2015 | 2550 | IMPACT ATTENUATOR/GUARDRAIL END TREATMENT REPAIR | Changed subactivities, added language about maintenance of obsolete units |
| January 1, 2015 | 2551 | IMPACT ATTENUATOR/GUARDRAIL END TREATMENT INSPECTION | Added inspection form, added language about creating a work request for follow up repairs |
| January 1, 2015 | 2630 | SNOW AND ICE REMOVAL | Clarified comments on WO only required for special/unusual circumstances. Corrected subactivities. |
| January 1, 2015 | 8300/ 8320 | PAINT CENTERLINES/PAINT EDGELINES | Modified application rate check from first 2 miles to 4, revised QA form |
| January 1, 2015 | 8510 | SIGNAL PREVENTIVE MAINTENANCE | Clarified MMU changeout cycle |
| April 1, 2015 | 2010 | PERMANENT SHALLOW PATCHING | Split this activity into "permanent" and "temporary" |
| April 1, 2015 | 2011 | TEMPORARY SHALLOW PATCHING | Split this activity into "permanent" and "temporary" |
| April 1, 2015 | 2050 | MAINLINE SEAL COAT | Clarified wording to more closely match specifications, added info on CRS 2P |
| April 1, 2015 | 2090 | MAINLINE CRACK ROUTE AND SEAL | Revised to align with new Activity 2095 |
| April 1, 2015 | 2095 | RESEALING CONCRETE PAVEMENT JOINTS | New activity for concrete joint sealing. |
| April 1, 2015 | 2190 | OTHER ROADWAY AND SHOULDER MAINTENANCE | Added subactivities for typical uses of this activity |
| April 1, 2015 | 2210 | MOWING | Added language to report mowing native vegetation to this activity, added subactivity for this. |
| April 1, 2015 | 2220 | MANUAL BRUSH CUTTING | Added diagrams to help in measurement of square feet. |
| April 1, 2015 | 2221 | MECHANICAL BRUSH CUTTING | Added diagrams to help in measurement of square feet. |
| April 1, 2015 | 2350 | MANUAL DRAIN CLEANING | Split this activity into "manual" and "mechanical" to differentiate simply cleaning leaves vs. utilizing a vac truck |
| April 1, 2015 | 2351 | MECHANICAL SMALL STRUCTURE CLEANING | Split this activity into "manual" and "mechanical" to differentiate simply cleaning leaves vs. utilizing a vac truck |
| April 1, 2015 | 2470 | BRIDGE DECK CRACK FILLING | New activity for filling cracks in concrete bridge decks |
| April 1, 2015 | 2471 | BRIDGE DECK BROADCAST SEALING | New activity for spray sealing concrete bridge decks |
| April 1, 2015 | 2690 | OTHER WINTER MAINTENANCE | Changed reporting of clearing drains to Activity 2350. |
| April 1, 2015 | 8530 | SCHEDULED SIGNAL/FLASHER INDICATION REPLACMENT | LED changout cycle has changed from 6 to current policy. |
| April 1, 2015 | 8560 | SIGNAL/FLASHER EQUIPMENT REPLACEMENT/REPAIR | Added subactivity and work method for overhead inspections. |

## Work Performance Standards - List of Revisions (Cont'd)

| Revision Date | Code | Activity Name | Revision |
|---|---|---|---|
| October 1, 2015 | 2010 | PERMANENT SHALLOW PATCHING | Remove reference to cold mix. |
| October 1, 2015 | 2015 | MAINLINE FOG SEAL | Updated wording for better clarity. |
| October 1, 2015 | 2070 | MAINLINE CRACK FILLING | Revise to match new crack treatment guidance. |
| October 1, 2015 | 2071 | SHOULDER CRACK FILLING | Revise to match new crack treatment guidance. |
| October 1, 2015 | 2090 | MAINLINE CRACK ROUTE AND SEAL | Revise to match new crack treatment guidance. |
| October 1, 2015 | 2091 | SHOULDER CRACK ROUTE AND SEAL | Revise to match new crack treatment guidance. |
| October 1, 2015 | 2095 | RESEALING CONCRETE PAVEMENT JOINTS | Revised diagrams and material requirements. |
| October 1, 2015 | 2220 | MANUAL BRUSH CUTTING | Added reporting guidance based on new activity for storm debris removal. |
| October 1, 2015 | 2551 | IMPACT ATTENUATOR/GUARDRAIL END TREATMENT INSPECTION | Added reporting guidance on inspection form, more detail on end treatment inspections. |
| October 1, 2015 | 2610 | EMERGENCY MAINTENANCE | Added clarification for purpose and reporting |
| October 1, 2015 | 2611 | STORM DEBRIS REMOVAL | New activity for removing storm debris from R/W. |
| October 1, 2015 | 2760 | SPOT LITTER PICK UP | Added reporting guidance based on new activity for storm debris removal. |
| October 1, 2015 | 2890 | OTHER SUPPORT ACTIVITIES | Corrected subactivity. |
| October 1, 2015 | PREFACE | EQUIPMENT REPORTING | Added guidance on reporting equipment hours. Revised index with new activities. |
| July 1, 2016 | PREFACE | WORK ORDERS | Revised guidance on work order comments. Added section on calling in utility locates. |
| July 1, 2016 | 2010 | PERMANENT SHALLOW PATCHING | Removed cold mix as a material, added roller to equipment. |
| July 1, 2016 | 2020 | DEEP PATCHING | Added guidance on calling utility locates. |
| July 1, 2016 | 2070 | MAINLINE CRACK FILLING | Revised ADP. |
| July 1, 2016 | 2090 | MAINLINE CRACK ROUT AND SEAL | Revised ADP. |
| July 1, 2016 | 2190 | OTHER ROADWAY AND SHOULDER MAINTENANCE | Added guidance on calling utility locates. |
| July 1, 2016 | 2220 | MANUAL BRUSH CUTTING | Added details on reporting when work performed near a bridge. |
| July 1, 2016 | 2320 | SMALL CULVERT INSPECTION | Added references, details on birds/bats, updated inspection and inventory forms. |
| July 1, 2016 | 2336 | PIPE LINING - SMALL PIPE | Added guidance on calling utility locates. |
| July 1, 2016 | 2337 | PIPE LINING - LARGE PIPE | Added guidance on calling utility locates. |
| July 1, 2016 | 2390 | OTHER DRAINAGE MAINTENANCE | Added guidance on calling utility locates. |
| July 1, 2016 | 2410 | BRIDGE CLEANING | Revised ADP. |
| July 1, 2016 | 2440 | BRIDGE FLUSHING | Revised ADP. |
| July 1, 2016 | 2550 | IMPACT ATTENUATOR/GUARDRAIL END TREATMENT REPAIR | Added guidance that if completely replacing a unit, does not have to be the same brand as existing. |

## Work Performance Standards - List of Revisions (Cont'd)

| Revision Date | Code | Activity Name | Revision |
|---|---|---|---|
| July 1, 2016 | 2590 | OTHER SAFETY DEVICE MAINTENANCE | Took out guidance on marking of control points. That work should be reported to the marking activity. |
| July 1, 2016 | 2610 | EMERGENCY MAINTENANCE | Corrected typo. |
| July 1, 2016 | 7000 | SUPPORT WORK ASSIGNMENTS | Added guidance that teambuilding type activities may be reported to this activity. |
| July 1, 2016 | 8100 | SHEET SIGN MODERNIZATION | Corrected typo. |
| July 1, 2016 | 8110 | SHEET SIGN MAINTENANCE | Added guidance on calling utility locates. Added direction about NOT installing signs on utility poles. |
| July 1, 2016 | 8140 | DELINEATION MAINTENANCE PROGRAM | Added guidance on calling utility locates. |
| July 1, 2016 | 8300 | PAINT CENTERLINE | Added guidance on marking/reporting control points. Revised application rate form. |
| July 1, 2016 | 8320 | PAINT EDGELINES | Added guidance on marking/reporting control points. Revised application rate form. |
| July 1, 2016 | 8510 | SIGNAL PREVENTIVE MAINTENANCE | Added guidance on joint railroad inspections for preemption. |
| April 1, 2017 | 1970 | PREFACE | Removed Activity 1970, Supervision of DOC Personnel, from index. This activity has been deactivated. |
| April 1, 2017 | 2020 | DEEP PATCHING | Improved clarity on activity. Added guidance on using geogrid. Added guidance on installing French drains. |
| April 1, 2017 | 2070 | MAINLINE CRACK FILLING | Combined Routing into 2070 |
| April 1, 2017 | 2071 | SHOULDER CRACK FILLING | Combined Routing into 2071 |
| April 1, 2017 | 2090 | MAINLINE CRACK ROUT AND SEAL | Remove Activity 2090 - has been combined with 2070. |
| April 1, 2017 | 2091 | SHOULDER CRACK ROUT AND SEAL | Remove Activity 2091 - has been combined with 2071. |
| April 1, 2017 | 2320 | SMALL CULVERT INSPECTION | Added guidance on creating work requests for any follow up work. Renamed "culvert rating" to "barrel rating". |
| April 1, 2017 | 2360 | UNDERDRAIN CLEANING AND INSPECTION | Added guidance on creating work requests for any follow up work. |
| April 1, 2017 | 2410 | BRIDGE CLEANING | Renamed Activity as “Bridge Top Cleaning and Flushing”. Revised limits of work and work process required for various components. |
| April 1, 2017 | 2440 | BRIDGE FLUSHING | Renamed Activity as “Superstructure/Substructure Cleaning and Flushing”. Revised limits of work and work process required for various components. |
| April 1, 2017 | 2470 | BRIDGE DECK CRACK FILLING | Described timing and material requirements. |
| April 1, 2017 | 2471 | BRIDGE DECK BROADCAST SEALING | Clarified what surfaces are to be sealed. Further described application method and constraints. Described timing and material requirements. |
| April 1, 2017 | 2510 | NOISE WALL REPAIR | Added guidance on storing spare panels |

## Work Performance Standards - List of Revisions (Cont'd)

| Revision Date | Code | Activity Name | Revision |
|---|---|---|---|
| April 1, 2017 | 2530 | CABLE BARRIER REPAIR | Added guidance on common tools |
| April 1, 2017 | 2551 | IMPACT ATTENUATOR/GUARDRAIL END TREATMENT REPAIR | Added guidance on identifying and checking end treatment heads |
| April 1, 2017 | 2770 | ROADWAY SWEEPING | Added reference to reimbursement rate policy |
| April 1, 2017 | 8125 | PANEL SIGN INSPECTION/MINOR MAINTENANCE | Added guidance on checking fuse plates, and creating work requests for any followup work. |
| October 1, 2017 | 2010 | PERMANENT SHALLOW PATCHING | Silica Awareness |
| October 1, 2017 | 2011 | TEMPORARY SHALLOW PATCHING | Corrected typo in Purpose |
| October 1, 2017 | 2020 | DEEP PATCHING | Silica Awareness |
| October 1, 2017 | 2030 | SPOT PAVING | Silica Awareness |
| October 1, 2017 | 2040 | FULL WIDTH SHOULDER SEAL COAT | Silica Awareness |
| October 1, 2017 | 2041 | SHOULDER FOG SEAL | Silica Awareness |
| October 1, 2017 | 2050 | MAINLINE SEAL COAT | Silica Awareness |
| October 1, 2017 | 2051 | MAINLINE FOG SEAL | Silica Awareness |
| October 1, 2017 | 2052 | MAINLINE SCRUB SEAL | New Activity |
| October 1, 2017 | 2140 | JOINT & BUMP REPAIR | Silica Awareness |
| October 1, 2017 | 2331 | CULVERT REPLACEMENT - SMALL PIPE (<36") | Silica Awareness |
| October 1, 2017 | 2332 | CULVERT REPLACEMENT - LARGE PIPE (>36") | Silica Awareness |
| October 1, 2017 | 2336 | PIPE LINING - SMALL PIPE (<36") | Silica Awareness |
| October 1, 2017 | 2337 | PIPE LINING - LARGE PIPE (>36") | Silica Awareness |
| October 1, 2017 | 2451 | PERMANENT BRIDGE DECK PATCHING | Silica Awareness |
| October 1, 2017 | 2490 | OTHER BRIDGE MAINTENANCE | Silica Awareness |
| October 1, 2017 | 2530 | CABLE BARRIER REPAIR | Added additional guidance/information |
| October 1, 2017 | 2580 | GUARDRAIL MAINTENANCE | Added guidance on when to upgrade to current standards |
| October 1, 2017 | 2890 | Other Support Activities | Corrected category to Non-Road |
| October 1, 2017 | 8360 | SPECIAL MARKING MAINTENANCE | Silica Awareness |
| October 1, 2017 | 8541 | DETECTOR LOOP SPLICE REPAIR/INSTALL | Silica Awareness |
| January 1, 2018 | 2630 | SNOW AND ICE REMOVAL | Clarified reporting from "service miles" to "truck miles". |
| January 1, 2018 | 8920 | GATHER FIELD DATA | Added subactivity for small culvert and underdrain inventory collectors. |

## Work Performance Standards - List of Revisions (Cont'd)

| Revision Date | Code | Activity Name | Revision |
|---|---|---|---|
| February 15, 2019 | NA | TABLE OF CONTENTS | Updated Preface (Pages ahead of Activity 1000). Interactive Table of Contents added to enhance navigation of digital document. |
| February 15, 2019 | 2030 | SPOT PAVING | Word "premix" replaced by more common terminology |
| February 15, 2019 | 2230 | HERBICIDE SPOT TREATMENT | Herbicide Record Sheet added. Minor revisions to instructions. |
| February 15, 2019 | 2231 | HERBICIDE BROADCAST TREATMENT | Herbicide Record Sheet added. Minor revisions to instructions. |
| February 15, 2019 | 2450 | TEMPORARY BRIDGE DECK PATCHING | Added Cold Applied Concrete Patch to Materials List |
| February 15, 2019 | 2451 | PERMANENT BRIDGE DECK PATCHING | Added Polyester Polymer Concrete to Materials List and revised Work Method |
| February 15, 2019 | 2470 | BRIDGE DECK CRACK FILLING | Added Urethane to materials list. Scheduling & Coordination and Special Conditions revised. Additional work method guidance provided. |
| February 15, 2019 | 2471 | BRIDGE DECK BROADCAST SEALING | Clarification to Scheduling & Coordination and Special Considerations sections |
| February 15, 2019 | 2550 | IMPACT ATTENUATOR/GUARDRAIL END TREATMENT | Updates made to reflect updated safety standard known as "Manual for Assessing Safety Hardware" (MASH) |
| February 15, 2019 | 2580 | GUARDRAIL MAINTENANCE | Updates made to reflect updated safety standard known as "Manual for Assessing Safety Hardware" (MASH) |
| February 15, 2019 | 2610 | EMERGENCY MAINTENANCE | Note added under "Reporting" that work on bridges or large culverts should be reported to the specific asset |
| February 15, 2019 | 2630 | SNOW AND ICE REMOVAL | Correction made for how to report clearing of snow and ice from drains. Material use quantities corrected. |
| February 15, 2019 | 2770 | ROADWAY SWEEPING | Added subactivity 48 for Road Raking |
| February 15, 2019 | 2810 | EQUIPMENT SERVICING | Removed subactivity 147 |
| February 15, 2019 | 7000 | SUPPORT WORK ASSIGNMENTS | Added subactivity 147 |
| February 15, 2019 | NA | APPENDICES | Moved previous document revisions summary table to Appendix G. |
| May 1, 2019 | 2690 | OTHER WINTER MAINTENANCE | Added a reference to activity 2811 |
| May 1, 2019 | 2810 | EQUIPMENT SERVICING | Removed references to servicing related to snow removal related equipment |
| May 1, 2019 | 2811 | FLEET CLEANING, MAINTENANCE & INSPECTION PREPARATION | Added activity to track effort related to the care of snow removal related trucks and equipment |
| May 1, 2019 | 7000 | SUPPORT WORK ASSIGNMENTS | Added subactivity 180 to report time for maintenance contract inspection |

## Work Performance Standards - List of Revisions (Cont'd)

| | | | |
|---|---|---|---|
| July 1, 2019 | 2040 | FULL WIDTH SHOULDER SEAL COAT | Activity DELETED and combined with Activity 2050: Seal Coat |
| July 1, 2019 | 2041 | SHOULDER FOG SEAL | Activity DELETED and combined with Activity 2051: Fog Seal |
| July 1, 2019 | 2050 | MAINLINE SEAL COAT | Reporting Units and Average Daily Production changed from Lane Miles to Square Yards. Activity name changed to "Seal Coat" and will include shoulder only projects and not just mainline. |
| July 1, 2019 | 2051 | MAINLINE FOG SEAL | Reporting Units and Average Daily Production changed from Lane Miles to Square Yards. Activity name changed to "Fog Seal" and will include shoulder only projects and not just mainline. |
| July 1, 2019 | 2052 | MAINLINE SCRUB SEAL | Reporting Units and Average Daily Production changed from Lane Miles to Square Yards. Activity name changed to "Scrub Seal" and will include shoulder only projects and not just mainline. |
| July 1, 2019 | 2070 | MAINLINE CRACK SEALING | Activity name changed to "Crack Sealing" and will include shoulder only projects in addition to mainline projects. |
| July 1, 2019 | 2071 | SHOULDER CRACK SEALING | Activity DELETED and combined with 2070: Crack Sealing |
| July 1, 2019 | 2490 | OTHER BRIDGE MAINTENANCE | Added subactivity 841: Epoxy Injection |
| July 1, 2019 | 2811 | FLEET CLEANING, MAINTENANCE & INSPECTION PREPARATION | Note added to reporting section that equipment being washed must be reported to sub activity 173 - CLEAN SNOW EQUIPMENT. |
| July 1, 2019 | 8125 | PANEL SIGN INSPECTION/ MINOR MAINTENANCE | Note added to reporting section that inspection form must be attached to the Work Order |
| July 1, 2019 | NA | INTRODUCTION | Note added referencing website to request utility locates for INDOT owned utilities |
| November 15, 2019 | PREFACE | WORK ORDER NOTES | Note added regarding deadlines for completing work orders in Manager's WMS Completion view |
| November 15, 2019 | 2190 | OTHER ROADWAY & SHOULDER MAINTENANCE | Removed subactivities 2105, 2115, 2120, 2140, which can be reported to other Activities. Added subactivity 2106 for "Wide Crack Seal" and 2107 for "Crack Filling with Emulsion" |
| November 15, 2019 | 2220 | MANUAL BRUSH CUTTING | More detailed instruction added regarding scheduling, reporting, work method and proper use of chainsaw |
| November 15, 2019 | 2221 | MECHANICAL BRUSH CUTTING | More detailed instruction added regarding purpose, scheduling, work method and equipment options |
| November 15, 2019 | 2320 | SMALL CULVERT INSPECTION | Revised to include use of web application instead of manual tracking form |
| November 15, 2019 | 2331 | CULVERT REPLACEMENT (SMALL PIPE) | Added language for installation of pipe with flowable fill to address float concern when using plastic pipe |
| November 15, 2019 | 2332 | CULVERT REPLACEMENT (LARGE PIPE) | Added language for installation of pipe with flowable fill to address float concern when using plastic pipe |
| November 15, 2019 | 2530 | CABLE BARRIER REPAIR | Added links to manufacturer checklists and manuals |
| November 15, 2019 | 2680 | MAN-MADE SNOW FENCE | Added note to Purpose section that fence repairs are also included |
| November 15, 2019 | 8100 | SHEET SIGN MODERNIZATION | Updated 18-Year replacement cycle to 20-Year replacement cycle |
| November 15, 2019 | 8510 | SIGNAL PREVENTATIVE MAINTENANCE | Changed cycle from 1-2 times/year to 2 times/year |

## Work Performance Standards - List of Revisions (Cont'd)

| Revision Date | Code | Activity Name | Revision |
|---|---|---|---|
| July 1, 2020 | ALL | ALL ACTIVITIES | Added "Asset to Report to" field to indicate what Asset to report to in WMS |
| July 1, 2020 | N/A | PREFACE | Added "Asset to Report to" to Work Performance Standard Template |
| July 1, 2020 | N/A | INDEX | Activities 2670 and 2680 corrected |
| July 1, 2020 | 1000 | LOANED OUT | Added instructions for PeopleSoft product code to use for construction, testing, and shop activities |
| July 1, 2020 | 2010 | PERMANENT SHALLOW PATCHING | Clarified instructions on when to report patching work to Activity 2020 - Deep Patching; added instructions for HMA Recycling; added Mastic installation instructions |
| July 1, 2020 | 2011 | TEMPORARY SHALLOW PATCHING | Added instructions for HMA Recycling; added Mastic installation instructions |
| July 1, 2020 | 2095 | RESEALING CONCRETE PAVEMENT JOINTS | Changed activity for reporting sealing of concrete cracks to Activity 2070 - Crack Sealing |
| July 1, 2020 | 2120 | CLIPPING SHOULDERS | Removed recommendation to coordinate this activity with Activity 2040; added new equipment, materials, and crew items; added reference to INDOT Standard Specifications section 208.2; added detailed instructions to Work Methods section |
| July 1, 2020 | 2130 | RECONDITION SHOULDERS | Added reference to INDOT Standard Specifications section 208.2 |
| July 1, 2020 | 2210 | MOWING | Instructions in Scheduling and Coordination section clarified; Leaf Blower added to Job Specific Equipment section; instructions in Work Method section clarified; new Special Considerations added to address invasive species spread and plant borne allergens |
| July 1, 2020 | 2220 | MANUAL BRUSH CUTTING | Scheduling and Coordination section revised to add clarity and to address license and training requirements for chainsaws and herbicides; Reporting section revised to address required reporting forms; required PPE revised; new references added; Work Method instructions revised to provide more specific instructions for equipment use |
| July 1, 2020 | 2351 | MECHANICAL STRUCTURE CLEANING | Activity name revised from "Mechanical Small Structure Cleaning" to accommodate cleaning of large structures |
| July 1, 2020 | 2551 | IMPACT ATTENUATOR/GUARDRAIL END TREATMENT INSPECTION | Edited Reporting and Work Method sections to describe process of using Collector app to record inventory and inspection data |
| July 1, 2020 | 2560 | RPM CASTING INSPECTION AND REMOVAL | Revised to indicate that casting inspection should only occur when traffic control is in place |
| July 1, 2020 | 2690 | OTHER WINTER MAINTENANCE | Language about changing plow blades removed from Purpose and Scheduling and Coordination sections; Reporting section revised to improve clarity of instructions for reporting |
| July 1, 2020 | 2810 | EQUIPMENT SERVICING | Revised terminology to aid in clarification for reporting. Equipment moving reporting clarification; Sub activity 172 - "Brush Paint and Scrape Equipment" removed from this activity |
| July 1, 2020 | 2811 | FLEET CLEANING MAINTENANCE & INSPECTION PREPARATION | Washing Checklist added, revised terminology to aid in clarification for reporting, equipment moving reporting clarification |

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|---|---|---|---|
| July 1, 2020 | 8125 | PANEL SIGN INSPECTION/MINOR MAINTENANCE | Standard Drawings updated |
| July 1, 2020 | 8360 | SPECIAL MARKING MAINTENANCE | Added note requiring justification for markings not done in accordance with the Standard Specifications |
| July 1, 2020 | 8920 | GATHER FIELD DATA | Added language about underground utility locates and added new Sub activity 88 - Underground Utility Locates |
| July 1, 2020 | 2831<br>2832<br>2833<br>2834<br>2835<br>2836<br>2837 | BUILDINGS AND GROUNDS AIR COMPRESSOR PM<br>BUILDINGS AND GROUNDS BRINE MAKER PM<br>BUILDINGS AND GROUNDS CATWALK PM<br>BUILDINGS AND GROUNDS GENERATOR PM<br>BUILDINGS AND GROUNDS FACILITY OVERHEAD DOORS PM<br>BUILDINGS AND GROUNDS OIL WATER SEPARATOR PM<br>BUILDINGS AND GROUNDS FACILITY GARAGE FLOOR DRAIN SYSTEM PM | New activities to provide more detail for preventative maintenance of Buildings and Grounds |
| July 1, 2020 | 2010<br>2020<br>2030<br>2050<br>2070<br>2310<br>2451<br>8300<br>8320<br>8360<br>8510 | PERMANENT SHALLOW PATCHING<br>DEEP PATCHING<br>SPOT PAVING<br>SEAL COAT<br>CRACK SEALING<br>MAJOR CLEANING & RESHAPING DITCH<br>PERMANENT BRIDGE DECK PATCHING<br>PAINT CENTERLINE<br>PAINT EDGELINES<br>SPECIAL MARKING MAINTENANCE<br>SIGNAL PREVENTIVE MAINTENANCE | Updated/added Quality Assurance Evaluation forms |
| July 1, 2020 | 2140<br>2210<br>2221<br>2231<br>2311<br>2350<br>2351<br>2410<br>2450<br>2530<br>2550<br>2580<br>2611<br>2630<br>2660<br>2680<br>8120<br>8121<br>8400<br>8510<br>8511<br>8530<br>8535<br>8541<br>8550 | JOINT AND BUMP REPAIR<br>MOWING<br>MECHANICAL BRUSH CUTTING<br>HERBICIDE BROADCAST TREATMENT<br>SPOT DITCHING<br>MANUAL DRAIN CLEANING<br>MECHANICAL STRUCTURE CLEANING<br>BRIDGE TOP CLEANING AND FLUSHING<br>TEMPORARY BRIDGE DECK PATCHING<br>CABLE BARRIER REPAIR<br>IMPACT ATTENUATOR/GUARDRAIL END TREATMENT REPAIR<br>GUARDRAIL MAINTENANCE<br>STROM DEBRIS REMOVAL<br>SNOW AND ICE REMOVAL<br>PATROLING<br>MAN-MADE SNOW FENCE<br>PANEL SIGN MAINTENANCE<br>PANEL SIGN OVERLAY<br>NEW SPECIAL MARKING INSTALLATION<br>SIGNAL PREVENTATIVE MAINTENANCE<br>FLASHER PREVENTATIVE MAINTENANCE<br>SCHEDULED SIGNAL/FLASHER INDICATION REPLACEMENT<br>NON SCHEDULED SIGNAL/FLASHER INDICATION REPLACEMENT<br>DETECTOR LOOP SPLICE REPAIR OR INSTALL<br>NEW SIGNAL OR FLASHER INSPECTION OR TURN ON | Revised Average Daily Production values |

## Work Performance Standards - List of Revisions (Cont'd)

| Revision Date | Code | Activity Name | Revision |
|---|---|---|---|
| August 10, 2020 | 1020 | CEMP | Add list of reporting options to the "Reporting" box |
| August 10, 2020 | 1030 | CEMP EXERCISE | Add list of reporting options to the "Reporting" box |
| August 10, 2020 | 1120 | FIELD MAINTENANCE SUPERVISION | Add list of reporting options to the "Reporting" box |
| August 10, 2020 | 2020 | DEEP PATCHING | Revisions to the INDOT Specifications referenced in the "Materials" box |
| August 10, 2020 | 2052 | SCRUB SEAL | Revisions to the INDOT Specifications referenced in the "Materials" box |
| August 10, 2020 | 2100 | SPOT REPAIR OF UNPAVED SHOULDERS | Revisions to the INDOT Specifications referenced in the "Materials" box |
| August 10, 2020 | 2130 | RECONDITION SHOULDERS | Revisions to the INDOT Specifications referenced in the "Materials" box |
| August 10, 2020 | 2140 | JOINT AND BUMP REPAIR | Revisions to the INDOT Specifications referenced in the "Materials" box |
| August 10, 2020 | 2220 | MANUAL BRUSH CUTTING | Change "Asset to Report to" field to Various; add list of reporting options to the "Reporting" box; note added for when to report to specific assets |
| August 10, 2020 | 2221 | MECHANICAL BRUSH CUTTING | Change "Asset to Report to" field to Various; add list of reporting options to the "Reporting" box; note added for when to report to specific assets |
| August 10, 2020 | 2230 | HERBICIDE SPOT TREATMENT | Change "Asset to Report to" field to Various; add list of reporting options to the "Reporting" box; note added for when to report to specific assets |
| August 10, 2020 | 2231 | HERBICIDE BROADCAST TREATMENT | Add list of reporting options to the "Reporting" box |
| August 10, 2020 | 2320 | SMALL CULVERT INSPECTION | Change "Asset to Report to" field to Road Section; add note to reporting section to report this activity to Activity 8910 |
| August 10, 2020 | 2331 | CULVERT REPLACEMENT-SMALL PIPE | Change "Asset to Report to" field to Small Culverts and add note for reporting assets not in WMS inventory |
| August 10, 2020 | 2332 | CULVERT REPLACEMENT-LARGE PIPE | Change "Asset to Report to" field to Small or Large Culverts and add note for reporting assets not in WMS inventory |
| August 10, 2020 | 2336 | PIPE LINING - SMALL PIPE | Change "Asset to Report to" field to Small Culverts and add note for reporting assets not in WMS inventory; Revisions to the INDOT Specifications referenced in the "Materials" box |
| August 10, 2020 | 2337 | PIPE LINING - LARGE PIPE | Change "Asset to Report to" field to Small or Large Culverts and add note for reporting assets not in WMS inventory;Revisions to the INDOT Specifications referenced in the "Materials" box |
| August 10, 2020 | 2350 | MANUAL DRAIN CLEANING | Add notes about reporting emergency response work and when to report activity to road section; add list of reporting options to the "Reporting" box. |
| August 10, 2020 | 2351 | MECHANICAL STRUCTURE CLEANING | Add notes about reporting emergency response work and when to report activity to road section; add list of reporting options to the "Reporting" box. |
| August 10, 2020 | 2360 | UNDERDRAIN CLEANING | Change "Asset to Report to" field to Road Section |
| August 10, 2020 | 2390 | OTHER DRAINAGE MAINTENANCE | Add notes for assets to report to for each Sub Activity; add list of reporting options to "Reporting" box. |
| August 10, 2020 | 2550 | IMPACT ATTENUATOR/GUARDRAIL END TREATMENT REPAIR | Change "Asset to Report to" field to Attenuator and add note on reporting assets not in WMS inventory |

| Revision Date | Code | Activity Name | Revision |
|---|---|---|---|
| August 10, 2020 | 2551 | IMPACT ATTENUATOR/GUARDRAIL END TREATMENT INSPECTION | Change "Asset to Report to" field to Attenuator and add note on reporting assets not in WMS inventory |
| August 10, 2020 | 2580 | GUARDRAIL MAINTENANCE | Change "Asset to Report to" field to Guardrail and add note on reporting assets not in WMS inventory |
| August 10, 2020 | 2610 | EMERGENCY MAINTENANCE | Add list of reporting options to the "Reporting" box; note added for when to report to specific assets |
| August 10, 2020 | 2640 | WINTER MATERIAL - MIX BRINE | Change "Asset to Report to" field to Unit Code and add note on reporting to unit code |
| August 10, 2020 | 2650 | STOCK WINTER MATERIAL | Change "Asset to Report to" field to Unit Code and add note on reporting to unit code |
| August 10, 2020 | 2660 | PATROLLING | Add list of reporting options to the "Reporting" box |
| August 10, 2020 | 2690 | OTHER WINTER MAINTENANCE | Change "Asset to Report to" field to Unit Code and add note on reporting to unit code; add note about how to report changing plow blades |
| August 10, 2020 | 2720 | REST PARK AND WEIGH STATION MAINTENANCE | Change "Asset to Report to" field to Various, add note on reporting to road sections for rest parks and weigh stations |
| August 10, 2020 | 2790 | OTHER SERVICE ACTIVITIES | Change "Asset to Report to" field to Road Section |
| August 10, 2020 | 2791 | TRAFFIC CONTROL SUPPORT | Change "Asset to Report to" field to Road Section |
| August 10, 2020 | 2810 | EQUIPMENT SERVICING | Change "Asset to Report to" field to Unit Code and add note on reporting to unit code, road section, and signal office, remove sub-activity 171 and add sub-activity 163; add notes on what equipment is considered snow removal equipment |
| August 10, 2020 | 2811 | FLEET CLEANING MAINTENANCE & INSPECTION PREPARATION | Change "Asset to Report to" field to Unit Code and add note on reporting to unit code, added sub-activity 171, additional detail on which sub-activity to report to |
| August 10, 2020 | 2830 | BUILDING AND GROUND MAINTENANCE | Change "Asset to Report to" field to Various and add note on reporting to unit code, road section, and signal office; add list of reporting options to the "Reporting" box. |
| August 10, 2020 | 2837 | BUILDING AND GROUNDS GARAGE FLOOR DRAIN SYSTEMS PM | Changed name of activity; edited purpose and reporting sections to reflect change in activity name |
| August 10, 2020 | 2840 | MATERIALS HANDLING AND STORING | Change "Asset to Report to" field to Unit Code and add note on reporting to unit code, road section, and signal office |
| August 10, 2020 | 2890 | OTHER SUPPORT ACTIVITIES | Change "Asset to Report to" field to Various and add note on reporting to unit code, road section, signal office, and rest areas; add note about reporting to structures for facilities employees; add note about reporting transfer of equipment; add list of reporting options to the "reporting" box. |
| August 10, 2020 | 7000 | SUPPORT WORK ASSIGNMENTS | Add notes on asset to report to for each Sub Activity; add list of reporting options to Reporting" box. |
| August 10, 2020 | 8100 | SHEET SIGN MODERNIZATION | Change "Asset to Report to" field to Sign and add note on reporting for assets that are not in WMS inventory; added guidance on date sticker placement to Work Method section |

| Revision Date | Code | Activity Name | Revision |
|---|---|---|---|
| August 10, 2020 | 8110 | SHEET SIGN MAINTENANCE | Change "Asset to Report to" field to Sign and add note on reporting for assets that are not in WMS inventory; added guidance on date sticker placement to Work Method section |
| August 10, 2020 | 8120 | PANEL SIGN MAINTENANCE | Add note on reporting for assets that are not in WMS inventory; added guidance on date sticker placement to Work Method section |
| August 10, 2020 | 8121 | PANEL SIGN OVERLAY | Add note on reporting for assets that are not in WMS inventory; added guidance on date sticker placement to Work Method section |
| August 10, 2020 | 8125 | PANEL SIGN INSPECTION/MINOR MAINTENANCE | Add note on reporting for assets that are not in WMS inventory |
| August 10, 2020 | 8200 | TRAFFIC SIGN WORK ORDERS | Change "Asset to Report to" field to Sign and add note on reporting for assets that are not in WMS inventory |
| August 10, 2020 | 8360 | SPECIAL MARKING MAINTENANCE | Change "Asset to Report to" field to Special Markings and add note on reporting for assets that are not in WMS inventory |
| August 10, 2020 | 8390 | INSPECT/REPLACE REFLECTORS | Change "Asset to Report to" field to Road Section |
| August 10, 2020 | 8400 | NEW SPECIAL MARKING INSTALLATION | Change "Asset to Report to" field to Road Section |
| August 10, 2020 | 8500 | SIGNAL MAINTENANCE RESPONSE | Add note on reporting for assets that are not in WMS inventory |
| August 10, 2020 | 8510 | SIGNAL PREVENTIVE MAINTENANCE | Add note on reporting for assets that are not in WMS inventory |
| August 10, 2020 | 8511 | FLASHER PREVENTIVE MAINTENANCE | Add note on reporting for assets that are not in WMS inventory |
| August 10, 2020 | 8520 | SIGNAL SHOP ACTIVITIES | Change "Asset to Report to" field to Signal Office |
| August 10, 2020 | 8530 | SCHEDULED SIGNAL/FLASHER INDICATION REPLACEMENT | Add note on reporting for assets that are not in WMS inventory; Revisions to the INDOT Specifications referenced in the "Materials" box |
| August 10, 2020 | 8535 | NON SCHEDULED SIGNAL/FLASHER INDICATION REPLACEMENT | Add note on reporting for assets that are not in WMS inventory; Revisions to the INDOT Specifications referenced in the "Materials" box |
| August 10, 2020 | 8541 | DETECTOR LOOP SPLICE REPAIR OR INSTALL | Add note on reporting for assets that are not in WMS inventory; Revisions to the INDOT Specifications referenced in the "Materials" box |
| August 10, 2020 | 8550 | NEW SIGNAL OR FLASHER INSPECTION OR TURN ON | Add note on reporting for assets that are not in WMS inventory |
| August 10, 2020 | 8560 | SIGNAL/FLASHER EQUIPMENT REPLACEMENT/REPAIR | Add note on reporting for assets that are not in WMS inventory |
| August 10, 2020 | 8570 | SIGNAL AND FLASHER EQUIPMENT UPGRADE | Add note on reporting for assets that are not in WMS inventory |
| August 10, 2020 | 8590 | SIGNAL AND FLASHER INSTALLATION/REMOVAL | Add note on reporting for assets that are not in WMS inventory |
| August 10, 2020 | 8620 | LIGHTING REPAIRS / REPLACEMENTS | Revisions to the INDOT Specifications referenced in the "Materials" box |
| August 10, 2020 | 8621 | SCHEDULED LIGHTING BULB REPLACEMENT | Revisions to the INDOT Specifications referenced in the "Materials" box |
| August 10, 2020 | 8630 | UNDERGROUND LOCATION WORK | Changed "Asset to Report to" field to Signals. Add note on when to report to signals and when to report to road section |
| August 10, 2020 | 8920 | GATHER FIELD DATA | Change "Asset to Report to" field to Road Section |

## Work Performance Standards - List of Revisions (Cont'd)

| Revision Date | Code | Activity Name | Revision |
|---|---|---|---|
| September 1, 2020 | 2030 | SPOT PAVING | Minor editorial text changes |
| September 1, 2020 | 2050 | SEAL COAT | Edits to "Job Specific Equipment" section; other minor editorial changes |
| September 1, 2020 | 2051 | FOG SEAL | Edits to "Job Specific Equipment" section; other minor editorial changes |
| September 1, 2020 | 2052 | SCRUB SEAL | Revisions to the INDOT Specifications referenced in the "Materials" box |
| September 1, 2020 | 2070 | CRACK SEALING | Minor editorial text changes |
| September 1, 2020 | 2190 | OTHER ROADWAY AND SHOULDER MAINTENANCE | Edits to "Sub Activities" section to remove Sub Activities that are no longer in use |
| September 1, 2020 | 2210 | MOWING | Added Sub Activity 2205 - Maintenance Mowing of Native/Wildflower Planting |
| September 1, 2020 | 2220 | MANUAL BRUSH CUTTING | Revisions to text in "Work Method" section |
| September 1, 2020 | 2221 | MECHANICAL BRUSH CUTTING | Revisions to text in "Work Method" section |
| September 1, 2020 | 2231 | HERBICIDE BROADCAST TREATMENT | Minor editorial text changes |
| September 1, 2020 | 2240 | SEEDING AND FERTILIZING | Added Sub Activity 98 - Wildflower Planting |
| September 1, 2020 | 2241 | SPOT SEEDING AND/OR FERTILIZING | Added Sub Activity 98 - Wildflower Planting |
| September 1, 2020 | 2320 | SMALL CULVERT INSPECTION | Revisions to text in "Purpose", "Reporting", "Other References", and "Work Methods" sections; "Tablet" added to "Job Specific Equipment" section |
| September 1, 2020 | 2331 | CULVERT REPLACEMENT-SMALL PIPE | Editorial revision to "Silicosis Awareness" section |
| September 1, 2020 | 2332 | CULVERT REPLACEMENT-LARGE PIPE | Change "Asset to Report to" field to Small or Large Culverts and add note for reporting assets not in WMS inventory |
| September 1, 2020 | 2451 | PERMANENT BRIDGE DECK PATCHING | Minor editorial text changes to "Materials" and "Work Method" sections |
| September 1, 2020 | 2470 | BRIDGE DECK CRACK FILLING | "Urethane" added to "Materials" section; text edits to "Specifications" and "Work Method" sections |
| September 1, 2020 | 2471 | BRIDGE DECK BROADCAST SEALING | Text edits to the "Scheduling and Coordination" section |
| September 1, 2020 | 2490 | OTHER BRIDGE MAINTENANCE | "Silica Exposure Plan" added to "Other References" section |
| September 1, 2020 | 2530 | CABLE BARRIER REPAIR | Editorial revisions to "Work Method" section |
| September 1, 2020 | 2550 | IMPACT ATTENUATOR/GUARDRAIL END TREATMENT REPAIR | Revisions to numbering of Sub Activities |
| September 1, 2020 | 2580 | GUARDRAIL MAINTENANCE | Editorial revisions to "Work Method" section |
| September 1, 2020 | 2680 | MAN-MADE SNOW FENCE | Editorial revisions to "Purpose" section |
| September 1, 2020 | 2832 | BUILDING AND GROUNDS BRINE MAKER PM | Removed "Quarterly" from name of Sub Activity 1016 |
| September 1, 2020 | 8100 | SHEET SIGN MODERNIZATION | Change sign replacement schedule mentioned in "Scheduling and Coordination" section from 18 years to 20 years |
| September 1, 2020 | 8125 | PANEL SIGN INSPECTION/MINOR MAINTENANCE | Procedure for inspection forms revised in "Reporting" and "Work Method" sections |
| September 1, 2020 | 8510 | SIGNAL PREVENTIVE MAINTENANCE | Change number of scheduled visits per year of each signal from 1 to 2 in the "Scheduling and Coordination" section |

## Work Performance Standards - List of Revisions (Cont'd)

| Revision Date | Code | Activity Name | Revision |
|---|---|---|---|
| July 1, 2021 | n/a | All activities with "Road Sections" in the "Asset to Report to Field"; other activities with references to Road Sections | Changed "Road Sections" to "Pavement Keys" in "Asset to Report To" fields; also changed all instances of Road Sections to Pavement Keys in reference to reporting activities. |
| July 1, 2021 | n/a | All activities referencing the "Signal Office" asset | Removed references to Signal Office as it is no longer an active asset in WMS and added clarification on how to report these activities based on the WMS module used |
| July 1, 2021 | 8500<br>8510<br>8511<br>8530<br>8535<br>8541<br>8550<br>8560<br>8570<br>8590 | Signal Activities | Removed guidance to report activity to Road Sections when signals are not in WMS inventory and revised to state that WMS Analysts should be contacted when a signal is not in the WMS inventory |
| July 1, 2021 | 1020 | CEMP Plan | Activity Category changed to "Non-Road" |
| July 1, 2021 | 2050 | Seal Coat | Guidance for planning work based on weather and wheel path rutting added |
| July 1, 2021 | 2070 | Crack Sealing | Reference to Activity 2071 removed from drawings in Work Method section |
| July 1, 2021 | 2190 | Other Roadway/Shoulder Maint. | Add clarification on reporting of clipping done under sections of guardrail with a clipping length equal to or less than 60 feet in length. |
| July 1, 2021 | 2251 | Tree Removal | Update diameter measurement from 4' to 4.5'. |
| July 1, 2021 | 2332 | Culvert Replacement - Large Pipe (>36") | Added clarification on classification of large culverts based on size (48" span and greater is considered a large culvert) |
| July 1, 2021 | 2530 | Cable Barrier Repair | Added information on new cable barrier repair equipment |
| July 1, 2021 | 2551 | Impact Attenuator/Guardrail End Treatment Inspection | Changed "Asset to Report To" field from "Attenuator" to "Pavement Key" |
| July 1, 2021 | 2630 | Snow and Ice Removal | Add further instruction on reporting of activity; add notes on what to write in Comments section when reporting activity |
| July 1, 2021 | 2680 | Man Made Snow Fence | Included repairing of snow fence to be reported to this activity |
| July 1, 2021 | 2811 | Fleet Cleaning, Maintenance and Inspection Preparation | Add clarification to report one shift only on each work order for the activity |
| July 1, 2021 | 2831 | Building and Grounds Air Compressor PM | Edited to reflect new reporting methods for Facilities activities; added link to facilities general preventative maintenance schedule |
| July 1, 2021 | 2832 | Building and Grounds Brine Maker PM | Edited to reflect new reporting methods for Facilities activities; added link to facilities general preventative maintenance schedule |
| July 1, 2021 | 2833 | Building and Grounds Catwalk PM | Edited to reflect new reporting methods for Facilities activities; added link to facilities general preventative maintenance schedule |
| July 1, 2021 | 2834 | Building and Grounds Generator PM | Edited to reflect new reporting methods for Facilities activities; added link to facilities general preventative maintenance schedule |

| Revision Date | Code | Activity Name | Revision |
|---|---|---|---|
| July 1, 2021 | 2835 | Building and Grounds Facility Overhead Door PM | Edited to reflect new reporting methods for Facilities activities; added link to facilities general preventative maintenance schedule |
| July 1, 2021 | 2836 | Building and Grounds Water Separator PM | Edited to reflect new reporting methods for Facilities activities; added link to facilities general preventative maintenance schedule |
| July 1, 2021 | 2837 | Building and Grounds Floor Drain Systems PM | Edited to reflect new reporting methods for Facilities activities; added link to facilities general preventative maintenance schedule |
| July 1, 2021 | 2890 | Other Support Activities | Changed Activity Category to "Non-Road. |
| July 1, 2021 | 2991 | Major Surface/Shoulder Improvements | Added notes that Central Office approval may be required to perform activity; changed position of reviewer of submittal to Pavement Asset Management Director |
| July 1, 2021 | 8110 | Sheet Sign Maintenance | Added direction on inspection and repair of sheet signs with blinking LED light installations |
| July 1, 2021 | 8300 | Paint Centerlines | Added instructions on selecting appropriate centerlines and lane lines to restripe |
| July 1, 2021 | 8320 | Paint Edgelines | Added instructions on selecting appropriate edgelines to restripe |

## Work Performance Standards - List of Revisions (Cont'd)

| Revision Date | Code | Activity Name | Revision |
|---|---|---|---|
| November 19, 2021 | n/a | Preface | Revised "Category" and "Work Order" sections to reflect new activity categories; removed references to Unit Cost goals |
| November 19, 2021 | n/a | All Activities | Removed Unit Cost from checklist in Categories section of the WPS |
| November 19, 2021 | n/a | Various | Revised Category of most activities to reflect reorganization of activity Categories in WMS. |
| November 19, 2021 | 2020<br>2030<br>2050<br>2070<br>2310<br>2331<br>2337<br>2410<br>2440<br>2451<br>8100<br>8300<br>8320<br>8360<br>8510 | Various | Updated Quality Assurance form. |
| November 19, 2021 | 2210<br>2311<br>2332 | Various | Removed Quality Assurance form for these activities. |
| November 19, 2021 | 1120 | Field Maintenance Supervision | Changed Asset to Report To field from "Various" to "None" |
| November 19, 2021 | 2010 | Permanent Shallow Patching | Add requirement to cut rectangular patch for mastic applications in Work Method section |
| November 19, 2021 | 2020 | Deep Patching | Fixed broken link for HMA cooling time calculator in Best Practices document |
| November 19, 2021 | 2050 | Seal Coat | Revised Work Method section to add details on RPM placement and surface sweeping; revised Special Considerations section to add details on multiple applications of chip seal, pavement markings, and work zone signage. |
| November 19, 2021 | 2051 | Fog Seal | Revised Work Method section to add details on RPM placement; added note that fog seal should be allowed to cure for a minimum of 5 days before painting edge and centerlines to the Special Considerations section; added details on multiple applications of chip seal, pavement markings, and work zone signage to the Special Considerations section |
| November 19, 2021 | 2070 | Crack Sealing | Added note to Purpose and Special Considerations sections that only longitudinal joints that are cracked and open need to be sealed. |
| November 19, 2021 | 2260 | Stump Removal | Change "Stump Cutter" to "Stump Cutter/Grinder" in Job Specific Equipment section; added "Straw or Straw Erosion Control Blanket" to Materials section. |
| November 19, 2021 | 2310 | Major Clean/Reshape Ditch | Add 'Straw/Straw Mat" to the Materials section; added instructions on calling Indiana 811 for locates to the Work Method section. |

| Revision Date | Code | Activity Name | Revision |
|---|---|---|---|
| November 19, 2021 | 2336 | Pipe Lining - Small Pipe (<36") | Added Quality Assurance form for this activity. |
| November 19, 2021 | 2560 | RPM Casting Inspection and Removal | Changed activity name to "Raised Pavement Marker Maintenance"; added guidance to provide report of RPM inspections to district Technical Services |
| November 19, 2021 | 2660 | Patrolling | Added instructions to report Snow and Ice patrolling and Other general patrolling work to different assets and project/categories in WMS. |
| November 19, 2021 | 2830 | Buildings and Grounds Maintenance | Removed "Pavement Key" from reporting options. |
| November 19, 2021 | 2890 | Other Support Activities | Removed "Pavement Key" from reporting options. |
| November 19, 2021 | 7000 | Support Work Assignments | Changed Asset to Report To field from "Various" to "None" |
| November 19, 2021 | 8140 | Delineation Maintenance Program | Changed activity name to "Delineator Maintenance" |
| November 19, 2021 | 8300<br>8320 | Paint Centerlines<br>Paint Edgelines | Revised Scheduling and Consideration section to add guidance on planning the replacement cycle of durable markings based on the expected service life of the type of marking. |
| November 19, 2021 | 8360 | Special Marking Maintenance | Change Asset to Report To field from "Special Markings" to "Pavement Keys" |
| November 19, 2021 | 8930 | Underground Location Work | Added instructions to report signal and lighting location work to different assets and project/categories in WMS; changed Asset to Report To field from "Signals" to "Various" |

| Revision Date | Code | Activity Name | Revision |
|---|---|---|---|
| December 22, 2022 | Preface | WPS Preface | Add instructions to include comission number in the comments of work orders for equipment reported under a Cost Day Card |
| December 22, 2022 | 1000 | Loaned Out | Remove reference to product codes because they no longer exist in new Peoplesoft |
| December 22, 2022 | 2010 | Permanent Shallow Patching | Language added to indicate that pavement markings should be re-established wihtin 30 days of completion of seal coat work for seal coat areas > 100 ft. in length and indicated that temporary tape is acceptable for reestablishing pavement markings after seal coat |
| December 22, 2022 | 2030 | Spot Paving | Language added to indicate that pavement markings should be re-established wihtin 30 days of completion of seal coat work for seal coat areas > 100 ft. in length and indicated that temporary tape is acceptable for reestablishing pavement markings after seal coat |
| December 22, 2022 | 2050 | Seal Coat | Revise instructions on Work Method #5 for when to consider RPM's for removal and replacement. Add instructions for sealing auxiliary and turn lanes. |
| December 22, 2022 | 2051 | Fog Seal | Language added to indicate that pavement markings should be re-established wihtin 30 days of completion of seal coat work for seal coat areas > 100 ft. in length and indicated that temporary tape is acceptable for reestablishing pavement markings after seal coat. Add instructions for sealing auxiliary and turn lanes |
| December 22, 2022 | 2052 | Scrub Seal | Remove reference to fine aggregate for this activity; Language added to indicate that pavement markings should be re-established wihtin 30 days of completion of seal coat work for seal coat areas > 100 ft. in length and indicated that temporary tape is acceptable for reestablishing pavement markings after seal coat; Add sections for guidance on Work Zone Signage and Pavement Markings; Add instructions for sealing auxiliary and turn lanes |
| December 22, 2022 | 2150 (New) | Expansion Foam Injection | Add new activity for expansion foam injection |
| December 22, 2022 | 2231 | Herbicide Broadcast Treatment | Remove Subactivity 131 (Facilities) |
| December 22, 2022 | 2320 | Small Culvert Inspection | This activity has been deleted. |
| December 22, 2022 | 2331 | Small Culvert Replacement | Change reporting statement to "If the asset is not in the WMS inventory, leave the asset field blank and note in the comments the CLV number from the Bridge and Drainage Assets viewer" |
| December 22, 2022 | 2332 | Large Culvert Replacement | Change reporting statement to "If the asset is not in the WMS inventory, leave the asset field blank and note in the comments the CLV number from the Bridge and Drainage Assets viewer" |
| December 22, 2022 | 2336 | Pipe Lining - Small | Change reporting statement to "If the asset is not in the WMS inventory, leave the asset field blank and note in the comments the CLV number from the Bridge and Drainage Assets viewer" |

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| December 22, 2022 | 2337 | Pipe Lining - Large | Change reporting statement to "If the asset is not in the WMS inventory, leave the asset field blank and note in the comments the CLV number from the Bridge and Drainage Assets viewer" |
| December 22, 2022 | 2360 | Underdrain Cleaning and Inspection | Update the work method to eliminate item 6 and 8, substitute with record deficiencies to be addressed on deficiency app. Mark activity as QA and Add QA form. Underdrain field inspection form removed. |
| December 22, 2022 | 2530 | Cable Barrier Repair | Update links to manufacturer's websites; Update references to Trinity Highway to reflect their name change to Valtir |
| December 22, 2022 | 2550 | Impact Attenuator/Guadrail End Treatment/Gravel Barrel Repair | Add reference to specifications for materials used to fill gravel barrels; change "INDOT Spec 601" to "INDOT Standard Specification Section 601" in "Other References"; add "Gravel Barrels" to activity title; add links to product information for approved gravel barrel systems; add updated version of Guardrail Asset Identification file |
| December 22, 2022 | 2551 | Impact Attenuator/Guadrail End Treatment/Gravel Barrel Inspection | Add "Gravel Barrels" to activity title; change "Collector App" reference to "Guardrail & Countermeasure Assets ArcGIS Map" |
| December 22, 2022 | 2630 | Snow and Ice Removal | Expand upon example on how to report this work |
| December 22, 2022 | 2720 | Rest Park and Weigh Station Maintenance | Update WMS asset name of rest area and weigh station in reporting example. |
| December 22, 2022 | 2810 | Equipment Servicing | Add examples for reporting. Update WMS asset name of rest area in reporting example. |
| December 22, 2022 | 2830 | Buildings and Grounds Maintenance | Update WMS asset name of rest area in reporting example. |
| December 22, 2022 | 2831 | Buildings and Grounds Air Compressor PM | Revise directions on filling crankcase with oil |
| December 22, 2022 | 2835 | Buildings and Grounds Facility Overhead Door PM | Removed "Shovel or Hand Tool" from Job Specific Equipment section |
| December 22, 2022 | 2836 | Buildings and Grounds Oil Water Separator PM | Removed inspection items 5, 6, and 7. |
| December 22, 2022 | 2837 | Buildings and Grounds Garage Floor Drain Systems PM | Revise verbiage on inspection of drains and instructions on submiting a service request for drains that are filled with liquid and no longer draining |
| December 22, 2022 | 2991 | Major Surface/Shoulder Improvements | Add directions for re-establishing pavement markings after completion of work |
| December 22, 2022 | 7000 | Support Work Assignments | Revised reporting instructions; removed Signal Office asset from reporting assignments for sub activities |
| December 22, 2022 | 8100 | Sheet Sign Modernization | Modify reporting requirements to include: If putting up re-used signs, please create a second work order for 1-2 hours on Activity 8110 to account for the reused signs. |
| December 22, 2022 | 8110 | Sheet Sign Maintenance | Add instructions to check sign sight distance as part of inspection and to report signt distance deficiencies to the Deficiency App. Add diagram/chart of sight distance |
| December 22, 2022 | 8125 | Panel Sign Inspection/Minor Maintenance | Add instructions to check sign sight distance as part of inspection and to report signt distance deficiencies to the Deficiency App. Add diagram/chart of sight distance requirements for different posted speeds. |

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| December 22, 2022 | 8300 | Paint Centerlines | Change retroreflectivity minimums referenced for durable centerlines to match new Ops Memo (White 140, Yellow 120) |
| December 22, 2022 | 8320 | Paint Edgelines | Change retroreflectivity minimums referenced for edgeliness to match new Ops Memo (Paint changed to 140; durables - White 140, Yellow 120) |
| December 22, 2022 | 8920 | Gather Field Data | Change "Collector App" reference to "ESRI Application"; Delete Subactity 79 - Small Culvert and Underdrain Asset Inventory; remove references to small culvert and underdrain inspection and inventory |

| Revision Date | Code | Activity Name | Revision |
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| July 12, 2023 | All | All Activities | Added note to Reporting section indicating that additional work order reporting guidelines can be found in the Work Orders section of the Preface |
| July 12, 2023 | Preface | WPS Preface | Added notes about reporting of dead animal removal, equipment hours, accomplishment portions, and unused materials. Added note about attaching Work Requests to Work Orders. Added note about recreating Work Orders that include an employee who no longer works for INDOT. |
| July 12, 2023 | 1120 | Field Maintenance Supervision | Added Subactivity 220 - Route Assessment, and a note that the purpose of the subactivity is to inspect road system noting deficits that require corrective action. |
| July 12, 2023 | 1360 | Holidays | Added note about reporting new parental leave and family medical leave. Remove FMLA related subactivity. |
| July 12, 2023 | 1370 | Military Leave | Added note about reporting new parental leave and family medical leave. |
| July 12, 2023 | 1380 | Jury Duty | Added note about reporting new parental leave and family medical leave. |
| July 12, 2023 | 1390 | Community Service Leave | Added note about reporting new parental leave and family medical leave. |
| July 12, 2023 | 1490 | Funeral Leave | Added note about reporting new parental leave and family medical leave. |
| July 12, 2023 | 1740 | Leave Without Pay | Added note about reporting new parental leave and family medical leave. Remove FMLA related subactivity. |
| July 12, 2023 | 1800 | Special Sick Leave | Added note about reporting new parental leave and family medical leave. Remove FMLA related subactivity. |
| July 12, 2023 | 1810 | Other Paid Leave | Added note about reporting new parental leave and family medical leave. |
| July 12, 2023 | 1930 | Sick Leave | Added note about reporting new parental leave and family medical leave. Remove FMLA related subactivity. |
| July 12, 2023 | 1940 | Vacation Leave | Added note about reporting new parental leave and family medical leave. Remove FMLA related subactivity. |
| July 12, 2023 | 1950 | Personal Leave | Added note about reporting new parental leave and family medical leave. Remove FMLA related subactivity. |
| July 12, 2023 | 2410 | Bridge Top Cleaning and Flushing | Revised Quality Assurance form |
| July 12, 2023 | 2480 | Bridge Deck Epoxy Injection | Activity added to Work Performance Standards |
| July 12, 2023 | 2490 | Other Bridge Maintenance | Removed Subactivity 841 - Epoxy Injection due to addition of Activity 2480 for Epoxt Injection |
| July 12, 2023 | 2630 | Snow and Ice Removal | Added note to Reporting section about winter material and plow reporting |
| July 12, 2023 | 2660 | Patrolling | Added note to Reporting section about winter material and plow reporting |
| July 12, 2023 | 2750 | Full Width Litter Pick Up | Added instructions on reporting litter removal performed by DOC crews to Reporting section. Added link to WMS FAQs site to Reporting section. |

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| July 12, 2023 | 2760 | Spot Litter Pick Up | Added instructions on reporting trash bags picked up from Adopt a Highway program to Reporting section. Added link to WMS FAQs site to Reporting section. |
| July 12, 2023 | 2810 | Equipment Servicing | Added note on equipment reporting procedures to the Reporting section |
| July 12, 2023 | 8300 | Paint Centerlines | Revised Purpose section to include black contrast markings. Editorial revisions to the Work Method section. Revise the Special Considerations section to update restriping procedures to match new INDOT restriping program and to add information about black contrast markings. Revise Application Rate Guidance to update values for painting of 6 inch lines. Add retroreflectivity measurement instructions to Special Considerations section. Revise Yellow Paint Daily Form to update values for painting of 6 inch lines. Add diagram for striping of black contrast markings. |
| July 12, 2023 | 8320 | Paint Edgelines | Editorial revisions to the Work Method section. Revise the Special Considerations section to update restriping procedures to match new INDOT restriping program. Revise Application Rate Guidance to update values for painting of 6 inch lines. Add retroreflectivity measurement instructions to Special Considerations section. Revise White Paint Daily Form to update values for painting of 6 inch lines. |
| July 12, 2023 | 9000 | Disability/Workman's Compensation Leave | Added note about reporting new parental leave and family medical leave. |

| Revision Date | Code | Activity Name | Revision |
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| February 12, 2024 | n/a | WPS Preface | Added note to see Work Order Reporting FAQs page for further information on reporting dead animal removal and added link to reporting FAQs page. |
| February 12, 2024 | 1120 | Field Maintenance Supervision | Added note to report subactivity 220 to the pavement key |
| February 12, 2024 | 1170 | Training | Added note to Purpose section that activity includes training on snow and ice equipment when a snow and ice event is not occurring. |
| February 12, 2024 | 2010<br>2011 | Permanent Shallow Patching<br>Temporary Shallow Patching | Added Specialty Patching Material to Materials section and added instructions to follow manufacturer's recommendations for specialty patching materials to the Work Method section |
| February 12, 2024 | 2070 | Crack Sealing | Added note to seal joints between concrete pavement and concrete curbs, and between concrete pavement and asphalt pavement to the Purpose section |
| February 12, 2024 | 2331<br>2332<br>2336<br>2337 | Culvert Replacement - Small Pipe<br>Culvert Replacement - Large Pipe<br>Pipe Lining - Small Pipe<br>Pipe Lining - Large Pipe | Added Small Structure Inventory Update form. |
| February 12, 2024 | 2630 | Snow and Ice Removal | Added notes to the Reporting section that two drivers can be reported on one single work order during a snow and ice event if one of the drivers is in training, and that the name of the trainee should be written in the Comments section of the Work Order |
| February 12, 2024 | 2750<br>2760 | Full Width Litter Pickup<br>Spot Litter Pickup | Moved cubic yard estimating table to the Reporting section; added note to see Work Order Reporting FAQs page for further information on reporting these activities. |
| February 12, 2024 | 7000 | Support Work Assignments | Changed asset to report to for Subactivity 180 to "None"; add note to include contract number(s) for contract inspection in the Comments section of the work order. |
| February 12, 2024 | 8300 | Paint Centerlines | Add note to avoid painting over raised pavement markers; add striping best practices document; revise Yellow Paint Daily Application Form to add space to enter gun height and pressure; Operations Memo 10-05 "Longitudinal Paint Marking Replacement Cycle" has been incorporated into the work method; Operations Memo 96-04 "Waterborne Paint Sampling Procedure Update" has been incorporated to the best practices document |
| February 12, 2024 | 8320 | Paint Edgelines | Revise White Paint Daily Application Form to add space to enter gun height and pressure; Operations Memo 10-05 "Longitudinal Paint Marking Replacement Cycle" has been incorporated into the work method |
| February 12, 2024 | 8360 | Special Marking Maintenance | Added Thermoplastic Markings Guide |
| February 12, 2024 | 8500 | Signal Maintenance Response | Add signal maintenance response plan information to the Scheduling and Coordination section |

# INDOT WORK PERFORMANCE STANDARDS

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DIVISION OF MAINTENANCE

July 1, 2013 • Revised February 12, 2024