

WEST VIRGINIA DIVISION OF HIGHWAYS
ADMINISTRATIVE OPERATING PROCEDURES
SECTION V, CHAPTER 5

SECTION TITLE: HIGHWAY OPERATIONS
CHAPTER TITLE: MAINTENANCE PERFORMANCE STANDARDS

Republished: 11/1/2000

Effective: 7/1/89

- I. [INTRODUCTION](#)
 - II. [PURPOSE](#)
 - III. [MAINTENANCE PERFORMANCE STANDARDS](#)
 - IV. [DETAILED EXPLANATION OF EACH SECTION OF THE MAINTENANCE PERFORMANCE STANDARDS](#)
 - V. [EXHIBIT](#)
- I. **INTRODUCTION**

Republished: 11/1/2000

Effective: 7/1/89

Highway maintenance tasks are complex and diversified. Highway Operations/maintenance personnel are required daily to make decisions that ultimately influence the level and effectiveness of maintenance service and the associated cost of that service. While the management of highway maintenance is not an exact science, most maintenance tasks can be categorized and completed in a standardized manner.

- II. **PURPOSE**

Republished: 11/1/2000

Effective: 8/1/97

The Maintenance Management System (MMS) was designed to ensure a standardization of maintenance work methods, as well as to achieve a uniform degree of quality maintenance service at the least cost, statewide. The Division's MMS is a true managerial system, as it makes available the necessary tools to perform the management functions of:

- Planning
- Organizing
- Directing
- Controlling

- III. **MAINTENANCE PERFORMANCE STANDARDS**

Republished: 11/1/2000

Effective: 7/1/89

The Maintenance Performance Standards are a collection of the recognized tasks or activities as associated with the maintenance of highways. All true management systems must have a "standard" by which the actual is compared. The Performance Standards are those "standards" for maintenance tasks.

For ease of reference, the Maintenance Performance Standards are generally grouped into categories. Generally, these categories are composed of similar work types such as:

- Bituminous Pavement Maintenance
- Portland Cement Concrete Pavement Maintenance
- Unpaved Surface Maintenance
- Drainage Maintenance
- Roadside Maintenance
- Snow Removal and Ice Control
- Traffic Services
- Bridge Maintenance
- Other Maintenance
- Service Functions

The Maintenance Performance Standards are contained in the Maintenance Performance Standards Manual. Each maintenance activity or task, has one or more pages devoted to that specific activity in the Performance Standards Manual. The three digit code assigned to each Performance Standard is the same corresponding code assigned to the Activity Codes utilized by the REMIS Accounting System. These three digit codes are in fact the coding utilized as REMIS input when reporting labor, equipment and materials expenditures by work type.

The Maintenance Performance Standards are a very detailed version of explaining each maintenance task. They give such vital information as:

- What is the task?
- Why perform the task?
- When do you perform the task?
- How do you perform the task?
- What resources (labor, equipment and materials) are needed to perform the task?
- What is the daily production to be expected?
- How many man-hours to produce one unit (productivity)?
- How to report the task when completed?

- Where can one find Technical References regarding the task?
- What are the recommended work methods?

The Maintenance Management System utilized the Performance Standards data in the form of a computer file. Whenever actual work reported data is input into the MMS via the REMIS Reporting System, the actual data is "bumped" or compared against the Standard data for each maintenance activity. The Management Control Reports (Refer to Chapter 8) then allow the Maintenance Supervisor to see how efficient (productivity wise) the work crews actually are in relationship to the pre-set standard.

Similarly, the Standards are priced via the Basic Expense Standard (BES) File (Refer to Chapter 6) which allows the maintenance manager to compare the actual costs to the standard costs of the maintenance operation via the Management Control Reports. The Maintenance Performance Standards are also most beneficial to the Maintenance Supervisor when preparing the organizational Maintenance Plan. The Maintenance Plan (Refer to Chapter 6) is actually the organization supervisor's maintenance goals as approved by both District and Central Headquarters' managers, developed as work units of each activity or Maintenance Standard.

IV. DETAILED EXPLANATION OF EACH SECTION OF THE MAINTENANCE PERFORMANCE STANDARDS

Republished: 11/1/2000

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The following provides a detailed explanation of each section of the Maintenance Performance Standard.

<u>Activity Name:</u>	Describes the applicable work type/activity or task the Performance Standard has been established for.
<u>Activity No:</u>	The three-digit numeral assigned to the particular work type or task. This number is always the same as the REMIS Accounting Activity Code Numbers for all transaction types.
<u>Description and Purpose:</u>	A brief narrative which describes the specific maintenance task and also provides an explanation of why the work is necessary.
<u>Performance Criteria:</u>	Details the best timing for performance of the specific maintenance task. This can be in the form of: specified seasons; before or after other maintenance tasks are completed; at the direction of District management; under certain weather conditions; at certain temperature ranges, etc. Within the Performance Criteria section is the Performance Schedule, which is a calendar by month, denoting the month(s) to perform the specific tasks, and the month(s) of possible performance.
<u>Crew Size:</u>	This portion of the Performance Schedule lists by employee classification, the type and quantity of work force deemed necessary to complete the daily production as noted on the standard.
<u>Equipment:</u>	Lists the types (by class number and description) as well as the quantity of each type of equipment required to complete the task. Occasionally equipment will be listed as optional. The Performance Standard attempts to list every possible equipment type that might be needed to complete the task.
<u>Materials:</u>	Lists the various materials that will be needed to perform the specific maintenance task.
<u>Accomplishment:</u>	This particular section of the Performance Standard is divided into

three (3) very important segments:

Unit - Lists the method by which the accomplishment is to be reported; tons of pre-mix, tons of aggregate, linear feet, etc.

Daily Production - This illustrates the expected amount (standard quantity) that should be accomplished with the standard crew size and standard equipment compliment. Each Performance Standard lists a range for this data; that range is always 75% to 110% of the Standard Daily Production. To calculate the Standard Daily Production figure you can divide the smaller number by .75 or divide the larger number by 1.10. Refer to Exhibit I for Activity 201, the range is 9 - 13.2 accomplishments or tons of pre-mix. To calculate the Standard Daily Number:

$$9 \div .75 = 12$$

or

$$13.2 \div 1.10 = 12$$

Productivity (Man-Hours/Unit) - This is very important data for the Maintenance Supervisor. This is the data utilized by the supervisor to measure the organizational crews' efficiency against the standard. This number represents how many man-hours must be expended to accomplish one unit. In the example of Activity 201 (Exhibit I) the Standard Productivity Number is 4.0. That number is achieved by dividing the man-hours required by the Performance Standard to meet the Standard Daily Production. Refer to Exhibit I for Activity 201, you will note the standard lists a total crew size of 6 which equates to 48 man-hours (6 x 8 = 48). Remember the Standard Daily Production Number is 12. Thus Standard Productivity is calculated as:

$$48 \text{ Man-Hours} \div 12 \text{ Accomplishments} = 4 \text{ Man-Hours/Unit}$$

The MMS Management Control Reports lists each organization's actual productivity as compared with the Standard Productivity for all activities. This comparison is a vital management tool that the organizational supervisor can gauge the organizational crew's efficiency with the Standard.

The following, (See Exhibit II.) represents the reverse side or page 2 of the Performance Standard:

Work Methods and Technical Reference

Technical references where applicable are listed for additional reference. Generally these technical references list the appropriate Maintenance Manual Chapter and any other reference guides. Also step by step recommended work methods are listed.

Exhibit III represents page 3 of the Performance Standard and addresses the following:

General Notes

This portion serves as a reminder of certain facts regarding each maintenance task. Usually safety, personnel qualifications and the need for hand tools or other auxiliary tools are listed below.

Reporting Notes

Most Performance Standards utilize this area to remind that flaggers for all activities are reported under a separate activity.

Planning Notes

Some Performance Standards use this segment to advise the ideal or standard material quantity per accomplishment unit, for each of the material types listed under the Materials Section.

All Highway Operations/maintenance personnel, whether managers or non-managers involved in planning, scheduling, reporting or controlling maintenance tasks, must uniformly understand and become familiar with the Maintenance Performance Standards. These Maintenance Performance Standards are utilized by Central Office managers for budgeting and controlling the Maintenance Operation. District Management utilize the Performance Standards for planning and controlling the Maintenance Operation. Supervisors and Maintenance Crew Leaders will find the Performance Standards most beneficial in scheduling and controlling the Maintenance Operation and of course, the REMIS entry clerks utilize the Performance Standards to report the Maintenance Operation.

Each level of management that utilized the Maintenance Performance Standards will create a more systematic, more plan-able, more consistent working environment within the Maintenance Operation. This results in greater crew efficiency and a standardized Maintenance Program with the least consumption of available resources; that is the ultimate goal of the Maintenance Performance Standards and the Maintenance Management System.

V. **EXHIBIT**

Republished: 11/1/2000

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HIGHWAY OPERATIONS DIVISION - PERFORMANCE STANDARDS

(FORM SM-30) - ACTIVITY 201 - PAGE 1 OF 3

PERFORMANCE STANDARDS

ACTIVITY NAME: Patching of Bituminous Pavements Page 1 of 3
ACTIVITY NO. 201

DESCRIPTION & PURPOSE: Repair of bituminous pavements, shoulders and approaches with pre-mix to correct potholes, edge failures, upheavals, settlements, cracking, ravelling and base failures to prevent further deterioration, eliminate safety hazard, improve riding quality and restore proper drainage. The repair and construction of asphaltic paved gutters to provide adequate drainage and erosion control.

PERFORMANCE CRITERIA: All permanent repairs should be scheduled and performed as soon as possible when weather conditions permit. The type of maintenance performed will be dictated by the condition of pavement, shoulder and approaches when hot-mix is used. Base temperature should be above 40°F and the surface dry.

Performance Schedule	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	----	----	----	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	----	----

LEGEND: XXXX Performance ---- Possible Performance

CREW SIZE		EQUIPMENT	
Classification	Quantity	Description/Class	Quantity
Maintenance Crew Leader	1	D40-Sweeper (Opt.)	1
Operator	3	203-Crew Cab Pickup Truck	1
Laborers/Craftsworkers	2	253-Lift Trailer (Opt.)	1
TOTAL:	6	371/375-Dump Truck	1
Flaggers not included		410-Grader (Opt.)	1
		502-Asphalt Storage Tr. (Opt.)	1
		512-Distributor	1
		546-Paver (Opt.)	1
		592-Roller	1
		612-Air Compressor	1
		620-Pavement Breaker	M/C 1

MATERIALS

- 110 - Perforated Pipe
- 200 - Premix
- 210 Bituminous Material
- 220 - Base Aggregate
- 222 - Fine Aggregate
- 244 - Filter Fabric
- 260 - Sand

ACCOMPLISHMENT		
Unit	Daily Production	Productivity Man-Hours/Unit
Tons of Pre-mix	9 - 13.2	4.0

OVER ACTIVITY NO. 201

WORK METHODS

POTHOLE REPAIR

TECHNICAL REFERENCE: Chapter 08 WVDOT Maintenance Manual

- 1) Place proper traffic control devices and station flaggers in accordance with "Traffic Control for Street and Highway Construction and Maintenance Operations", current edition.
- 2) Square potholes with hand tools or compressor.
- 3) Remove and load old material while awaiting hot mix.
- 4) Clean and sweep potholes or other areas.
- 5) Make sure area is dry.
- 6) Apply tack coat.
- 7) Place premix in layers not to exceed 1 1/2" compacted.
- 8) Place top layer 1/4" above existing surface to allow for compaction.
- 9) Compact with roller.
- 10) Remove traffic control devices.

MAINTENANCE AND REPAIR OF BITUMINOUS SHOULDERS AND APPROACHES

TECHNICAL REFERENCE: Chapter 06 WVDOT Maintenance Manual

- 1) Place proper traffic control devices and station flaggers in accordance with "Traffic Control for Street and Highway Construction and Maintenance Operations", current edition.
- 2) Mark areas to be repaired with keel or paint.
- 3) Use hand tools or pavement breaker to cut out repair areas as necessary. Remove old materials and clean and sweep area to remove debris. Make sure area is dry.

BASE REPAIR

- A) Use gradall or backhoe to remove all unsuitable base material.
- B) If necessary, cut trench for subsurface drain from base to outside of shoulder.
- C) Place aggregate in French drain or around perforated pipe or in filter fabric.
- D) Backfill with suitable material and compact.
- E) Place premix in repair area in layers not to exceed 1 1/2" compacted.
- F) Roll and compact surface to proper template. (Allow top layer to be 1/4" above surface and compaction.)

HIGHWAY OPERATIONS DIVISION - PERFORMANCE STANDARDS

(FORM SM-30) - ACTIVITY 201 - PAGE 3 OF 3

WORK METHODS

6) Remove and properly dispose of waste material.

GENERAL NOTES:

- All maintenance crew leaders and operators are working crew members.
- Hand tools to include rakes, brooms, shovels, lutes, hand tampers, multi purpose saw, etc.
- Number of trucks and operators required will vary depending on haul distance.
- Number of personnel will depend on type of repairs being performed.

REPORTING NOTES:

- Report flaggers under Activity Code B13.

PLANNING NOTES:

- 0.5 linear feet of perforated pipe per ton of premix programmed (base repair).
- Two (2) tons of base aggregate per ton of premix programmed (base repair).

Recommended By: _____ Date _____

Approved By: _____ Date _____