



Highway Maintenance Manual
Chapter 02 Administration
Section 10 Definitions
Subject 15 Maintenance Definitions

Bureau of Highway Maintenance
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1.0 Authority

1. Under s. 84.07 (1), Wisconsin Statutes, the state trunk highway system shall be maintained by the state at state expense. The department shall prescribe by rule specifications for such maintenance and may contract with any county highway committee or municipality to have all or certain parts of the work of maintaining the state trunk highways within or beyond the limits of the county or municipality, including interstate bridges, performed by the county or municipality, and any county or municipality may enter into such contract.
2. Maintenance activities include the application of protective coatings, the removal and control of snow, the removal, treatment and sanding of ice, interim repair of highway surfaces and adjacent structures, and all other operations, activities and processes required on a regular, continuing basis for the preservation of the highways on the state trunk system, and including the care and protection of trees and other roadside vegetation and suitable planting to prevent soil erosion or to beautify highways pursuant to s. 66.1037, Wisconsin Statutes, and all routine measures deemed necessary to provide adequate traffic service.
3. Maintenance activities also include the installation, replacement, rehabilitation, or maintenance of highway signs, highway lighting, and pavement markings, and the maintenance of traffic control signals and intelligent transportation systems.

2.0 Statement of Scope

The goal of maintenance is to preserve the asset, not to upgrade it. It is recognized as an on-going investment and insurance against costly repairs and premature failures. At a minimum, maintenance sustains the lifespan of the transportation facility through a continuous program of treating wear and deterioration caused by traffic and the environment. It sometimes includes minor repairs and corrections to eliminate the cause of defects, thereby avoiding excessive repetition of maintenance efforts. It is also aimed at keeping all highway facilities in full service with minimum expense and the least inconvenience to the traveling public.

Policy 02-10-01 (Scope of Work) defines and establishes highway maintenance as the program of activities to preserve, repair, and operate the existing state trunk highway system of roadways to its designed or accepted configuration. State highway maintenance program elements shall be developed to offset the effects of weather, vegetation growth, deterioration, traffic wear, damage, and vandalism. Deterioration includes the effects of aging, material failures, and design and/or construction faults.

3.0 Routine Maintenance Funds

All routine maintenance projects performed by county highway departments or others are funded from a single, separate appropriation.

4.0 Highway Maintenance Definitions

Maintenance is comprised of a wide range of activities to keep pavement, shoulders, slopes, drainage facilities, bridges, ferries, and all other structures and property within the existing state trunk highway system of roadways as near as possible to its as-constructed or renewed condition. These extensive maintenance work activities are further categorized below into four broad areas: (1) routine, (2) corrective, (3) preventative and (4) restorative.

1. Routine Maintenance

This category consists of work that is planned, scheduled, and performed on a regular, often annual, basis to maintain and preserve the condition of the highway system or to respond to specific conditions and events that restore the highway system to an adequate level of service. It consists of day-to-day activities typically scheduled on a short time horizon, up to a month in advance; by maintenance personnel to maintain not

enhance the current condition or level of service of the highway system. If an immediate repair is involved, they are small-scale or isolated distresses where the remedy retards further deterioration or restores a safe condition.

More specifically, the general nature of routine maintenance is to address conditions of distress that are very limited both in terms of cost and extent (e.g., density or frequency). For example, routine maintenance activities on the highway system's traveled way would most often be random or isolated, spot repairs rather than continual or stretches of traveled way repair. Common roadway repairs include crack sealing and routing, joint repair, patching, and lane-shoulder drop-off repair.

County forces are the preferred routine maintenance service providers for work needed on the state trunk highway system.

2. Corrective Maintenance

These maintenance activities cannot be anticipated with any certainty in advance. It is in response to unplanned or unforeseen events or conditions of accelerated deterioration. Corrective maintenance actions are only performed on an as-needed basis. County forces may perform corrective maintenance operations if the repair costs are not prohibitively high and the nature of the necessary repair work allows.

Almost always, it requires timely attention and are performed to quickly restore the roadways, roadsides, structures or facilities to an acceptable level of service due to unforeseen conditions necessitated by accidents, storms and other weather related conditions, premature failures, malfunctions, or other unusual or unexpected damage. For example, situations requiring corrective maintenance activities include bridge hits, pavement buckles, and road washouts. Pavement treatments such as pothole repair, patching, edge failures, grade separations along shoulders, joint replacement, and isolated full width and depth slab replacements are some examples of corrective maintenance activities.

Since the performance of this corrective maintenance work is always time sensitive and sometimes specialized, it may involve both an immediate action and a subsequent permanent repair. The immediate action might be a reactive treatment to restore an adequate or minimal level of service by repairing isolated problems that are compromising safe and efficient operations of the state facility.

A permanent restoration can then be simultaneously planned, designed, and scheduled to subsequently supplement the corrective treatment. A more permanent, long-term restoration or replacement of a pavement, shoulder, bridge, culvert, drainage system or other ancillary structure is considered to significantly extend service life. In these instances, the permanent work is typically executed under emergency contract or expedited letting procedures and funded through the improvement program, but not exclusively.

3. Preventive Maintenance

These are planned asset management strategies that add system service life by retarding future deterioration and are delivered as programmed or scheduled projects. Because the work is scheduled and eligible for federal funding, it is primarily let to private contractors.

Pavement preventative maintenance efforts are typically lower in cost than full-fledged improvements. They are intended to: (a) slow a highway's deterioration, (b) maintain its functional condition, and (c) extend pavement life up to 10 years. To be eligible for federal funding, preventative maintenance pavement preservation strategies typically must occur while the pavement is in good to very good condition.

Preventative maintenance treatments focus largely on pavements and bridges including concrete patching, resurfacing, profiling and milling, under drains and drainage system restorations, bridge painting, and deck overlays or rehabilitation. In addition to being essential to achieving the lowest lifecycle cost for long-term system service, these treatments extend system service life because the amount of distress addressed is such that treatment lowers distress severity and increases overall system condition enough that system service life is added.

4. Restorative Maintenance

These maintenance activities restore a pavement section to an acceptable service level by removing or repairing existing distresses with 100% state funding from either the improvement program under a let contract or from the maintenance program.

Restorative maintenance work is not considered preventative because it is performed on pavements already in a degraded condition, often much less than good condition. Degraded pavements have significant distress manifestations already present, so it is too late to “prevent” them; hence, the maintenance action simply restores serviceability.

Candidates that provide four or more years of life extension are either eligible to be let as restorative maintenance improvement projects or addressed through maintenance program agreements.

5.0 Corrective Maintenance, Preventative Maintenance and Restorative Maintenance Funding

Corrective maintenance needs can be funded from either the routine maintenance appropriation or the improvement program. Corrective maintenance work funded by the routine maintenance appropriation is typically limited to small-scale projects. Small-scale can be defined by total contract amount, project length, absence of specialized expertise or equipment needs, or a combination of these factors. Generally, county forces should be employed to provide small-scale corrective maintenance projects but there can be instances when small-scale corrective projects may be awarded to private contractors.

Corrective maintenance projects funded under the improvement program will be larger in scale and are more likely to be provided by private contractors either under emergency or expedited let contracts.

Preventative maintenance work using federal funds from the improvement program will be under a let contract unless being done as a Local Force Account (LFA) where (a) the projects are small (e.g. < \$100,000), (b) a contractor is unavailable, or (c) the project is an emergency requiring timely response.

Restorative maintenance can be state funded from either the routine maintenance appropriation or the improvement program.

6.0 Illustrative Examples of Maintenance Treatment Types

The attached table ([Attachment A](#)) further assigns specific maintenance treatments to the category of maintenance (routine, corrective, or preventative and restorative) under which it is most commonly performed. In practice, however, specific maintenance treatments (for example, concrete joint repair, etc.) should not be exclusively assigned to any particular category of maintenance and may be viable responses in several instances, like routine maintenance and corrective maintenance.

Furthermore, preventative maintenance is eligible for federal funding and the department must conform to the requirements established by the federal highway administration (FHWA) for project funding.

Attachment A

Traveled Way

The table below defines travel way maintenance activities by category.

Traveled Way

Routine Maintenance	Corrective Maintenance	Preventative and Restorative Maintenance
<p><u>Traveled Way related work to include:</u></p> <p>Crack-sealing and routing</p> <p>Patching alligator cracking and high severity cracks</p> <p>Rut filling/wedging for safety</p> <p>Overlays to restore rideability (overlays not to exceed total average depth of 2”), and not to exceed 500’ on length</p> <p>Seal coats</p> <p>Concrete joint repair limited to less than 10 locations (for instance) per lane mile</p> <p>Concrete crack repair limited to less than 10 locations (for instance) per lane mile</p> <p>Repair of pavement buckles, potholes and punchouts</p> <p>Minor milling</p> <p>Sweeping pavement</p> <p>Traffic control (routine & emergency)</p> <p>Hazardous debris removal</p> <p>Surveillance</p> <p>Installation and replacement of long line and special pavement markings</p> <p>Routine sign replacements</p> <p><i>*Note: 500’ does not include transitions</i></p>	<p><u>Traveled Way related work to include:</u></p> <p>Overlays not to exceed an average depth of 2” to extend service life to the next improvement project</p> <p>Concrete joint repair</p> <p>Concrete patching and slab replacement</p> <p>Milling</p> <p>Diamond grinding</p> <p>Urgent repair of pavement buckles, potholes and punchouts</p> <p>Asphaltic patching – full depth</p> <p>Patching alligator cracking and high severe cracking</p>	<p><u>Traveled Way related work to include:</u></p> <p>Resurfacing</p> <p>PCC dowel bar retrofitting w/diamond grinding</p> <p>Asphaltic patching - partial and full depth</p> <p>Concrete joint repair</p> <p>Concrete patching - partial and full depth</p> <p>Concrete joint repair</p> <p>Milling</p> <p>Diamond grinding</p> <p>Crack Sealing</p> <p>Seal Coating</p> <p>Rut filling</p>

Shoulder

The table below defines maintenance activities by category for shoulders.

Shoulder

Routine Maintenance	Corrective Maintenance	Preventative and Restorative Maintenance
<p><u>Shoulder related work to include:</u></p> <p>Maintaining gravel shoulders by re-grading the existing shoulder material to correct grade and cross slope</p> <p>Adding material as needed to correct gravel shoulder grade and/or cross slope</p> <p>Repair washouts to gravel shoulders</p> <p>Patching potholes and high severity cracks in asphalt shoulders</p> <p>Filling cracks in asphalt shoulders</p> <p>Seal coating asphaltic shoulders</p> <p>Spot repair removal and repaving of asphalt shoulders limited to 500' in length</p> <p>Spot repair of concrete shoulder joints limited to less than 10 locations per mile</p> <p>Minor milling</p>	<p><u>Shoulder related work to include:</u></p> <p>Maintaining gravel shoulders by re-grading the existing shoulder material to correct grade and cross slope</p> <p>Adding material as needed to correct gravel shoulder grade and/or cross slope</p> <p>Repaving of asphalt shoulders to serve adequately until permanent improvement made</p> <p>Milling and repaving of asphalt shoulders</p> <p>Patching asphalt shoulders</p> <p>Slab replacement</p> <p>Grinding and asphalt overlay of concrete shoulders</p> <p>Spot repair of concrete shoulder joints</p> <p>Concrete patching – partial and full depth</p>	<p><u>Shoulder related work to include:</u></p> <p>Resurfacing of asphalt shoulders</p> <p>Removal and replacement of concrete shoulders</p> <p>Milling and repaving of asphalt shoulders</p> <p>Grinding and asphalt overlay of concrete shoulders</p> <p>Concrete patching – partial and full depth</p> <p>Slab replacement</p> <p>Patching asphalt shoulders</p> <p>Crack sealing</p> <p>Seal coating</p> <p>Rut filling</p>

Roadside and Roadside Facilities

The table below defines roadside and roadside facilities maintenance activities by category.

Roadside and Roadside Facilities

<i>Routine Maintenance</i>	<i>Corrective Maintenance</i>	<i>Preventative and Restorative Maintenance</i>
<p><u><i>Roadside and Roadside Facilities related work to include:</i></u></p> <p><i>Maintenance and operation of rest areas, waysides, park and ride lots, picnic areas, historical markers, scenic overlooks and parking turnouts</i></p> <p><i>Painting and cleaning of buildings</i></p> <p><i>Cleaning restrooms</i></p> <p><i>Litter removal</i></p> <p><i>Mowing and control of unwanted vegetation</i></p> <p><i>Repair of guard rails and end terminals</i></p> <p><i>Removal and treatment of roadside hazards</i></p> <p><i>Crack sealing ramps and parking areas</i></p> <p><i>Patching ramps and parking areas</i></p> <p><i>Patching potholes</i></p> <p><i>Minor milling</i></p>	<p><u><i>Roadside and Roadside Facilities related work to include:</i></u></p> <p><i>Overlays of ramps and parking areas not to exceed an average depth of 2" to extend service life to the next improvement project</i></p> <p><i>Patching ramps and parking areas</i></p> <p><i>Concrete joint repair of ramps and parking areas</i></p> <p><i>Milling and repaving of ramps and parking areas</i></p> <p><i>Grinding and asphalt overlay of ramps and parking areas</i></p>	<p><u><i>Roadside and Roadside Facilities related work to include:</i></u></p> <p><i>Milling and repaving</i></p> <p><i>Resurfacing</i></p> <p><i>Concrete joint repair of ramps and parking areas</i></p> <p><i>Concrete slab replacement of parking areas</i></p> <p><i>Patching ramps and parking areas</i></p> <p><i>Crack sealing</i></p> <p><i>Seal coating</i></p> <p><i>Rut filling</i></p>

Drainage

The table below defines maintenance activities by category for drainage.

Drainage

Routine Maintenance	Corrective Maintenance	Preventative and Restorative Maintenance
<p><u>Drainage related work to include:</u></p> <p>Spot replacement and repair of curb, gutter limited to 500' in length</p> <p>Riprap</p> <p>Cleaning, lining, repairing, of culverts</p> <p>Repair or replacement of culverts/drainage structures</p> <p>Clean and minor repair to storm sewers</p> <p>Erosion repair or establishment of erosion controls</p> <p>Reshaping drainage ditches and channels</p> <p>Clean or repair of catch basin or inlets</p> <p>Debris removal</p> <p>Repair of washouts</p> <p>Repair and restoration of slope and embankment failure</p> <p>Small culvert repair or replacement (under 5 ft. diameter)</p>	<p><u>Drainage related work to include:</u></p> <p>Constructing new drainage channels or modification of drainage structures to increase drainage capacity</p> <p>Concrete box culvert replacement</p> <p>Concrete box culvert extensions</p> <p>Culvert lining</p> <p>Urgent culvert repair and/or replacement</p>	<p><u>Drainage related work to include:</u></p> <p>Large culvert pipe replacement (5 ft. diameter or larger)</p>

Structures

The table below defines maintenance activity by category for structures.

Structures		
Routine Maintenance	Corrective Maintenance	Preventative and Restorative Maintenance
<p><u>Bridge deck work to include:</u></p> <p>Repair of epoxy overlays</p> <p>Spot deck repair</p> <p>Approach slab foam jacking or mud jacking</p> <p>Crack sealing</p> <p>Concrete deck sealing</p> <p>Minor joint repair or replacement</p> <p>Approach slabs repair</p> <p>Railing repair</p> <p>Deck sweeping and power washing of decks</p> <p>Curb or sidewalk repair</p> <p>Clean expansion joints</p> <p><u>Superstructure and substructure work to include:</u></p> <p>Minor repair of substructures and superstructures, including spot painting</p> <p>Power washing of superstructure and substructure units</p> <p>Bearing repair or replacement</p> <p>Removal of loose/falling concrete</p> <p>Concrete surface repair, with or without cathodic protection</p>	<p><u>Bridge deck work to include:</u></p> <p>Approach slab replacement</p> <p>Thin deck overlays and membrane installation</p> <p>Asphalt overlays without membrane installation</p> <p>Major joint replacement</p> <p>Epoxy overlays</p> <p><u>Superstructure and substructure work to include:</u></p> <p>Wing wall replacement</p> <p>Urgent bridge repair</p> <p>Bearing repair or replacement</p> <p>Removal of loose/falling concrete</p> <p>Concrete surface repair with cathodic protection</p> <p><u>Channel, waterway and other structure related work to include:</u></p> <p>Slope protection installation and repair</p> <p>Slope paving repair</p> <p>Repair deck drains/downspouts</p> <p>Repair inlets off of bridge</p> <p>Construct drainage flumes</p>	<p><u>Bridge deck work to include:</u></p> <p>Concrete deck repair, patching and concrete overlays</p> <p>Asphalt overlays with membrane installation</p> <p>Epoxy and polymer overlays</p> <p>Expansion joint replacement when done in conjunction with an overlay or expansion joint elimination</p> <p>Chloride extraction</p> <p>Installation of a cathodic protection system</p> <p><u>Superstructure and substructure work to include:</u></p> <p>Steel structure cleaning and repainting, including complete repainting, zone painting, and spot painting with overcoat</p> <p>Structural repairs (except vehicle damage)</p> <p>Bearing repair or replacement</p> <p><u>Channel, waterway, and other structure related work to include:</u></p> <p>Rip placement (large quantity or deep channel)</p> <p>Concrete deck sealing</p>
		(Table Continued)

<i>Routine Maintenance</i>	<i>Corrective Maintenance</i>	<i>Preventative and Restorative Maintenance</i>
<p><u><i>Channel, waterway, and other structure related work to include:</i></u></p> <p><i>Operation and maintenance of movable bridges</i></p> <p><i>Ferry operations and maintenance including approaches</i></p> <p><i>Traffic control for structure/bridge inspection</i></p> <p><i>Clearing brush and unwanted vegetation around structures</i></p> <p><i>Debris removal from waterway</i></p> <p><i>Placing riprap (small quantity or shallow channel)</i></p> <p><i>Slope paving repair</i></p> <p><i>Clean deck drains/downspouts</i></p> <p><i>Clean/repair inlets off of bridge</i></p> <p><i>Repair/replace utilities or signs</i></p>		

Winter

The table below defines maintenance activities by category for winter.

Winter

<i>Routine Maintenance</i>	<i>Corrective Maintenance</i>	<i>Preventative and Restorative Maintenance</i>
<p><u><i>Winter related work to include:</i></u></p> <p><i>All activities, equipment and materials related to snow and ice control</i></p> <p><i>Plowing</i></p> <p><i>Applying deicers</i></p> <p><i>Cleaning up after storms and benching</i></p> <p><i>Erecting snow fences</i></p> <p><i>Equipment preparation and calibration</i></p> <p><i>Thawing culverts and inlets</i></p> <p><i>Loading, cleaning, maintenance, and inspection of salt sheds</i></p> <p><i>Clearing drainage ways</i></p> <p><i>Clearing snow covered signs</i></p> <p><i>Emergency assistance</i></p> <p><i>Training personnel</i></p>		