

**LOCAL AGENCY PROGRAMS
GUIDANCE ON ROADWAY
PREVENTIVE MAINTENANCE PROJECTS**

Preventive maintenance projects are defined as cost-effective projects designed to preserve the existing pavement and base, and give extended life to a roadway without undertaking reconstruction or major rehabilitation. The intent of a preventive maintenance program is to implement a planned strategy of cost effective treatments to an existing roadway system and its appurtenances that preserves the system, retards future deterioration, and maintains or improves the functional condition of the system without increasing structural capacity.

Preventive maintenance projects have the following characteristics:

- Do NOT increase lane widths.
- Do extend pavement life (Typically 1- 7 years).
- Do NOT exceed an application thickness of more than 1.5 inches of hot mix asphalt (HMA) material, however; in certain cases the use of 2 inch overlays may be approved.
- Have base courses in good condition. If base or sub-grade rutting appears to be present, then preventive maintenance projects should not be applied until the structural deficiency is corrected.

Approved Preventive Maintenance Treatments

There are many acceptable ways to effectively extend the service life of a roadway, and a list of the currently approved treatments is included as Appendix A. Distress guidelines are provided for the application of each approved treatment utilizing the Pavement Surface Evaluation and Rating (PASER) system. In order to qualify as an approved preventive maintenance treatment the majority of the pavement which the treatment is applied to shall be within the PASER guidelines outlined in Appendix A or as an alternative preventative maintenance treatment outlined below.

PASER ratings that are acceptable for the evaluation of guidelines include ratings from the Transportation Asset Management Council's annual statewide data collection effort or from a PASER data collection effort by the local agency, at the discretion of the agency who has jurisdictional ownership of the pavement in question.

Brief descriptions of the approved preventive maintenance treatments are included in Appendix B.

Complimentary Treatments

The use of two or more preventative maintenance treatments is acceptable when they server a complimentary purpose. For example crack filling or repair of a pavement prior to applying a chip seal is an acceptable practice and will extend the life of the chip seal. Where complimentary treatments are planned to be utilized, the less restrictive PASER range of the two treatments as shown in Appendix A shall apply.

Approval of Alternate Preventive Maintenance Treatments

A local agency can request to use an alternate treatment not included in Appendix A. The local agency will need to provide information to demonstrate that the alternate treatment will extend the service life of the roadway in a cost effective manner, and has benefits (financial, operational or otherwise) exceeding existing approved treatments. Proposed treatments may not be accepted by the Michigan Department of Transportation (MDOT) if adequate information is not supplied on the proposed treatment. The information provided to MDOT must indicate why the alternate treatment is desired and the expected results of the treatment. The information must include supporting documentation to substantiate the anticipated benefit of the treatment and the anticipated life extending benefit to the pavement. If the alternated treatment has not been widely used in Michigan, information must also be submitted that demonstrates it is a suitable treatment when Michigan's climate is considered.

Design Exceptions

Design exceptions are not required for preventive maintenance projects.

Safety Review

A 3 year safety review is required for preventive maintenance projects. At a minimum, the safety review should contain the most recent 3 years of crash data, and a letter signed by a licensed engineer that describes the crash history and determines if there is a correctable crash pattern in areas that the project could reasonably address.

Where the safety review indicates an existing problem area the project shall be modified in accordance with 3R, AASHTO, or applicable MDOT guidelines, however geometric changes will not be required on preventive maintenance projects. At a minimum, pavement markings shall be applied to the roadway as part of the preventive maintenance project, existing guardrail conditions along the route shall meet the criteria detailed in section C (3R) of this guide; signs that are damaged or are without reflectivity must be replaced with new signs with reflective sheeting. Signs required by the Michigan Manual of Uniform Traffic Control Devices that are not currently installed must be installed as part of a preventive maintenance project.

All preventive maintenance projects should consider appropriate ways to maintain or enhance the current level of safety and accessibility. Isolated or obvious deficiencies should always be addressed. Safety enhancements such as the removal or shielding of roadside obstacles, mitigation of edge drop offs, the addition of paved or stabilization of unpaved shoulders, or installation of milled rumble strips should be encouraged and included in projects where they are determined to be a cost effective way to improve safety. MDOT may require these safety features to be added to a project at the time of the grade inspection meeting. To maintain preservation program flexibility, and in accordance with 23 U.S.C. 109(q), safety enhancements can be deferred and included within an operative safety management system or included in a future project in the STIP. In no way shall preventive maintenance type projects adversely impact the safety of the traveled way or its users.

Pavement Warranties

Pavement warranties may not be used on preventive maintenance projects.

Testing and Material Certification

Quality control provisions, quality assurance provisions, material certifications, material testing requirements, and construction engineering requirements cannot be waived or lowered on preventive maintenance projects. This requirement applies on projects that are competitively bid or constructed. For projects completed under a force account authorization, standard force account requirements apply. The Federal Highway Administration and/or MDOT will review all preventive maintenance projects to ensure such measures are in place.

ADA Compliance

All “mill and fill” projects and projects adding a pavement thickness greater than 0.75 inches must address areas within the project limits that are deficient per the Americans with Disabilities Act.

Transportation Improvement Plan Listing

Preventive maintenance projects must be individually listed on the TIP. The TIP description must indicate that the project is a preventive maintenance project. Metropolitan Planning Organizations (MPO), the MPO’s Federal Aid Committees, and Rural Task Forces (RTF) are encouraged to develop programmatic guidelines for their member agencies to follow in order to have preventive maintenance projects selected by the agency’s respective committees.

Federal funds can be used on preventive maintenance projects unless the funding source would prohibit maintenance type work.

Routine Maintenance

Operations such as filling of potholes, mowing operations, plowing, etc., are considered reactive or routine maintenance and are not eligible for federal or state aid.

Appendix A:
Approved Preventive Maintenance Treatments

Approved Preventive Maintenance Treatments

Fix Type	Life Extension (in years) *	Life Extension (in years)	Life Extension (in years)	PASER Rating
	Flexible	Composite	Rigid	
HMA Crack Treatment	1-3	1-3	N/A	6-7
Overband Crack Filling	1-2	1-2	N/A	6-7
One Course Non-Structural HMA Overlay	5-7	4-7	N/A	4-5****
Mill and One Course Non-Structural HMA Overlay	5-7	4-7	N/A	3-5
Single Course Chip Seal	3-6	N/A	N/A	5-6
Double Chip Seal	4-7	3-6	N/A	5-6
Single Course Micro-Surface	3-5	**	N/A	5-6
Multiple Course Micro-Surface	4-6	**	N/A	4-6****
Ultra-Thin HMA Overlay	3-6	3-6	N/A	4-6****
Paver Placed Surface Seal	4-6	**	N/A	5-7
Full Depth Concrete Repair	N/A	N/A	3-10	4-5 ***
Concrete Joint Resealing	N/A	N/A	1-3	5-8
Concrete Spall Repair	N/A	N/A	1-3	5-7
Concrete Crack Sealing	N/A	N/A	1-3	4-7
Diamond Grinding	N/A	N/A	3-5	4-6
Dowel Bar Retrofit	N/A	N/A	2-3	3-5 ***
Longitudinal HMA Wedge / Scratch Coat with Surface Treatment	3-7	N/A	N/A	3-5****

*The time range is the expected life extending benefit given to the pavement, not the anticipated longevity of the treatment.

** Data is not available to quantify the life extension.

*** The concrete slabs must be in fair to good condition

**** Can be used on a pavement rated a 3 when the sole reason for rating is rutting or severe raveling of the surface asphalt layer

Standard Capital Preventive Maintenance Treatments

The following table lists all standard Preventive Maintenance treatments and indicates whether the treatment is a pavement seal or a functional enhancement.

Standard Capital Preventive Maintenance Treatments	
Pavement Seal	Functional Enhancement
<ul style="list-style-type: none"> ●HMA Crack Treatment ●Concrete Crack Treatment ●Concrete Joint Resealing With Minor Spall Repair ●Overband Crack Fill- Pretreatment ●Chip Seals ●Micro-surfacing ●Ultra-Thin HMA Overlay-Low Volume (<1" thick) ●Paver Placed Surface Seal 	<ul style="list-style-type: none"> ●Non-Structural HMA Overlay (1.5") ●Surface Milling with Non-Structural HMA Overlay (1.5") ●HMA Shoulder Ribbons ●Full Depth Concrete Pavement Repairs ●Diamond Grinding ●Dowel Bar Retrofit ●Concrete Pavement Restoration *# ●Underdrain Outlet Clean Out and Repair

*# Includes Joint Spall Repair, Surface Spall Repair, Joint/Crack Sealing, Full Depth Repairs and Diamond Grinding.

Appendix B:
Definitions of Preventive Maintenance Treatments

Definitions of Preventive Maintenance Treatments

HMA Crack Treatment and Overband Crack Filling

This is a generalized treatment category including crack sealing, crack filling and crack repair. This crack seal treatment is used on all types of cracks. It involves using a hot air lance or compressed air to blow out the debris in the crack, then filling with a sealant. This class of treatments are intended to seal the cracks from water infiltration and incompressible material entering the pavement system.

Non Structural HMA Overlays:

Non-structural overlays are considered having an application thickness of 1.5 inches or less of hot mix asphalt (HMA) material; however, in certain cases the use of 2 inch overlays may be approved. Pre-approved cases include: the use of 2 inch overlays for crown correction, the use of superpave mixes that require 2 inch lifts, the use of a scratch course prior to a 1.5 inch overlay in areas where there is a concern with crack sealing materials, and where it is necessary to mill 2 inches to address distress (such as rutting). The use of 2 inch overlays are still the exception to the rule and the use of 2 inch of HMA in the preventive maintenance program for any reason other than the pre-approved reasons listed above will require approval from the MDOT Local Agency Staff Engineer, the MDOT Local Agency Engineer, and the MDOT Engineer of Design. Approval will be on a case by case basis. Preventive maintenance projects should not be applied to a roadway that has significant level of distress that should be addressed by a 3R or reconstruction type project.

Longitudinal HMA Wedge / Scratch Coat with Surface Treatment:

Longitudinal HMA Wedge / scratch coat with surface treatment consists of a paver placed HMA material to correct the cross section of the roadway often done on lower volume roads in combination with a chip seal but can also be used in combination with a micro-surface, ultra thin overlay, and conventional overlay. This is not to be used in small isolated areas as a pothole repair. This is to be used for the majority of the length of the project (using engineering judgment) so that the proper increase in ride quality can be achieved.

Chip Seal

A chip seal is the application of an asphalt emulsion with a cover aggregate. A chip seal will seal and or retard the oxidation of an existing pavement surface, improve skid resistance of the pavement surface, seal fine surface cracks in the pavement thus reducing the intrusion of water into the pavement structure, and will retard the raveling of aggregate from a weathered pavement surface. Chip seals may be constructed using a single or multiple layers of asphalt emulsion and aggregate cover. Chip seals may be applied in conjunction with crack sealing.

Micro-Surface

Micro-Surfacing is a mixture of polymer modified asphalt emulsion, mineral aggregate, mineral filler, water, and other additives placed on a paved surface. A single course micro-surfacing will retard oxidation and improve skid resistance in the pavement surface. A multiple course micro-surfacing is used to correct certain pavement surface deficiencies including severe rutting, minor surface profile irregularities, polished aggregate or low skid resistance and light to moderate raveling. Micro-surfacing is typically used on flexible or composite pavements and can perform under all traffic volumes

Ultra Thin HMA Overlay

Ultra Thin HMA Overlay is a dense graded bituminous mixture limited to a 72lbs/syd application rate and a maximum average thickness of 0.75 inches which is applied to retard oxidation and improve skid resistance in the pavement surface.

Full Depth Concrete Repair

The work consists of complete removal and replacement of the concrete pavement at the deteriorated joint or open crack. The new concrete repair should include load transfer (dowel bars), pavement reinforcement if the pavement is a joint reinforce concrete pavement, contraction and /or expansion joints with joint seals. .

Concrete Joint Resealing

The purpose of resealing the concrete pavement joints is to prevent water and incompressible from entering the pavement structure, thus slowing the rate of deterioration of the concrete pavement. Concrete Joint Resealing includes the removal of the existing joint seals, and resealing the transverse and longitudinal joint with either preformed neoprene, silicones, or low-modulus hot-poured rubber.

Concrete Spall Repair

Spall repair is done to remove distress from the pavement and to increase the life of the repair versus typical reactive methods that use temporary asphaltic filler or cover materials. The work is to repair spalled concrete by removing all unsound concrete, cleaning the area, and placing a filler material consisting of a fast-set mortar or a rapid setting polymer concrete. Spalling may occur along transverse or longitudinal joints, cracks, or be located somewhere on the pavement surface. Filler materials are typically pre-packaged and are placed according to recommendations from the supplier.

Concrete Crack Sealing

The purpose of sealing the cracks in the concrete pavement is to reduce the water and incompressible from entering the pavement structure and thus slowing the deterioration rate of the pavement. This treatment is can be used in conjunction with other treatments of rigid pavements such as joint resealing and minor spall repair and /or full depth concrete joint repair.

Diamond Grinding

Diamond grinding is used to restore the surface longitudinal profile and crown of a concrete pavement that provides an improved ride quality. Benefits from diamond grinding include: the removal of joint and crack faults, the removal of wheel ruts caused by tire wear, the restoration of transverse drainage, and the improvement of skid resistance.. Often other repairs should be performed prior to diamond grinding.

Dowel Bar Retrofit

A dowel bar retrofit treatment restores the effective load transfer at faulted joints and cracks, significantly reduces the recurrence of faulting and increases the structural capacity of the pavement. Dowel bar retrofit is an operation in which slots are cut into the concrete pavement across faulted joints and cracks, and dowel bars are placed in the slots to restore the load transfer. The work consists of five operations: cutting the slots, preparing the slots, placing the dowel bars, backfilling the slots and opening the pavement to traffic.

Paver Placed Surface Seal

A special paver places a polymer modified asphalt emulsion followed immediately by a gap-graded ultra-thin HMA surface course. A paver placed surface seal is a non-structural HMA overlay in combination with a bonding/sealing polymer modified asphalt emulsion. It will help seal the existing pavement surface to reduce the intrusion of water into the pavement structure, improve friction, slow the rate of pavement deterioration, correct minor pavement surface deficiencies and improve the ride, noise and skid qualities of the pavement.