

## **Concrete Pavement (Thickness) Warranted, Item SPV.0180.01**

### **A Description**

This special provision describes construction of warranted concrete pavement in conformance with the lines and grades shown on the plans as directed by the engineer and as hereinafter provided.

The contractor will be responsible for the pavement performance, and shall warranty the work for the finished roadway for a period of five (5) years following completion of the concrete pavement and opening to public traffic.

The provisions of the warranty work will apply to all concrete mixtures placed as mainline pavement including integrally placed shoulders, curb and curb and gutter.

Sections 415 and 501 of the Standard Specifications are deleted in entirety, except for the following Subsections: 415.2, Materials; 415.3.2, Foundation; 415.3.11.6, Final Surface Finish; 415.3.11.8.3, Pavement Grinding and Removal; 415.3.18, Tolerance in Pavement Thickness; and 501.2 Material (except 501.2.5.3.4 and 501.2.5.4.4 are deleted).

### **B Warranty and Insurance**

The necessary warranty bond for the concrete pavement items will be in effect for the entire five-year warranty period beginning when the warranted pavement is completed and open to public traffic. The bonding company must have an A.M. Best rating of "A-" or better and the contractor will provide proof of a five-year bond commitment before execution of the contract.

The warranty bond will be \$\_\_\_\_\_ for the warranted concrete pavement. The bond will insure the proper and prompt completion of required warranty work following completion of the pavement, including payments for all labor, equipment, and materials used according to this specification.

The contract bond, which remains in effect for one year beyond the completion of the project, will also include warranty work, as described in Section G. For the remaining four-year warranty period, the contractor shall provide documentation that the warranty bond will be provided in one of the following manners:

1. A single-term four-year warranty bond.
2. A two-year renewable, non-cumulative warranty bond for two consecutive terms.

If a subcontractor rather than the contractor places the warranted pavement, the subcontractor performing the warranted work may provide the warranty bond for the remaining four-year warranty period. If a subcontractor does provide the bond, it shall be a dual obligee bond, naming the contractor and the Wisconsin Department of Transportation as obligees. The subcontractor warranty bond will be one of the following:

1. A single-term, four-year warranty bond.
2. A two-year renewable, non-cumulative warranty bond for two consecutive terms.

Failure of the contractor, subcontractor or its surety to issue or renew the warranty bond will be considered a default and will result in forfeiture of 20% of the face amount of the bond to the department.

All warranty work will be as prescribed in Section G. At the end of the warranty period, the contractor will be relieved of the responsibility to perform further warranty work, provided all previous warranty work has been completed.

The contractor shall maintain insurance, in the course of performing warranty work, as specified in Section 107.26 of the Standard Specifications throughout the five-year warranty period.

### **C Quality Control and Documentation**

Prior to construction, the contractor will provide the engineer with a Quality Control Plan. The Quality Control Plan shall outline the contractor's material and construction control processes. At a minimum the plan shall include each of the following:

1. A list of the quality control tests that will be used to control the material and construction quality.
2. The quality control sampling, testing and documentation frequencies.
3. The concrete mix design and the method used to develop it.
4. A list of types and sources of materials associated with the warranty work.

Project quality control tests will be provided to the engineer at the end of each week. At the completion of the project, the contractor shall provide documentation of the project quality control to the engineer. This documentation shall consist of all quality control test results used to control materials and construction. The contractor shall supply certification that all concrete produced and placed was in accordance with the mix design as submitted to the engineer.

### **D Conflict Resolution Team (CRT)**

The Conflict Resolution Team will have the final authority to make decisions if a conflict occurs. The team will resolve disputes by a majority vote. The team will consist of two contractor representatives, two department (District & Central Office) representatives, and a third party mutually agreed upon by both the department and the contractor. The cost of the third party will be equally shared between the department and the contractor. The team will receive the department Pavement Surface Distress Survey Training, when it is determined necessary to make a distress survey of the pavement to resolve a dispute. The team members will be appointed at the time of conflict.

### **E Pavement Distress Surveys and Contractor Monitoring**

#### **E.1 Pavement Distress Surveys**

The department's Bureau of Highway Construction will conduct distress surveys of the mainline pavement according to the normal surveying cycle of the bureau; or if requested by the contractor or district. The bureau's surveying cycle is dependent on the location of the highway and the highway classification. The department's Pavement Surface Distress Survey Manual will be used to determine and measure the different types of distress.

For details regarding implementation, contact Irene LaBarca [irene.labarca@dot.state.wi.us](mailto:irene.labarca@dot.state.wi.us) at (608) 246-3855.

The pavement distress surveys will be conducted by dividing the highway system into nominal one-mile sections. Two one-tenth mile segments in each mile will be evaluated for pavement distress. One of the segments evaluated will be between 0.3 and 0.4 miles from the start of the section. The department will randomly select the second one-tenth mile segment. If areas other than the surveyed segments are suspected of meeting or exceeding a threshold level, the department will divide the entire mainline project pavement into 0.1-mile segments and conduct a distress survey in any, or all, segment(s). The distress survey results will be made available to the district, central office, contractor and FHWA. Pavement distress threshold criteria are listed in Section F.

The random one-tenth mile segments will be determined by the department the first year and surveyed through the warranty period. The first survey will identify the segment locations, which will not change thereafter.

If any of the threshold level criteria are met and the contractor does not agree to the validity of the pavement distress survey results, written notification of the dispute will be made to the engineer. The Conflict Resolution Team will resolve the dispute.

## **E.2 Contractor Monitoring**

During the warranty period, the contractor may monitor the pavement using nondestructive procedures. Coring, milling, grinding or other destructive procedures may not be performed by the contractor, without approval of the engineer in accordance with the permit requirements of Section G.

## **F Table of Distress Types, Threshold Levels, and Remedial Action**

The department will include each of the distress types listed below in the mainline pavement survey. The table lists the remedial action required for each distress type when the corresponding threshold level criterion is met.

<u>DISTRESS TYPE</u>	<u>THRESHOLD LEVELS</u>	<u>REMEDIAL ACTION</u>
Slab Breakup *	<p>Transverse cracks or slabs broken into two pieces.                      More than four cracked slabs per segment (0.1 mile) at three years of age and more than eight slabs per segment at five years of age. A slab is defined as a section of pavement bounded on the ends by joints and on the sides by a centerline joint and/or the edge of pavement.</p> <p>One or more slabs broken into three or more pieces.</p>	<p>Evaluate per the Department's Construction and Materials Manual or alternative method as approved by the engineer or CRT.</p> <p>Remove entire slab and replace.</p>
Distressed Transverse Joints and Cracks**	<p>Distress 2 inches or more in width in the wheel paths on 5 joints or cracks in any one 0.1 mile segment.</p>	<p>If distress is between 2 and 4 inches in width, clean and remove all debris and patch distress with epoxy concrete or alternative method as approved by the CRT.</p> <p>If distress is greater than four inches, repair pavement with a six-foot full-lane width full depth repair or partial depth repair of affected area, or alternative method as approved by the CRT. If distress is less than 2 feet in length and is adjacent to a joint or crack a full depth repair can be performed on the affected area only.</p>



Surface Distress****	<p>Distress is present on greater than 0.5% but less than 10% of the surface area on any one 0.1-mile segment.</p> <p>If distress is less than 1 inch and greater than 10% of the surface area is affected, or distress is greater than 1 inch in depth, regardless of the percentage of surface area affected.</p>	<p>If surface distress is less than 1 inch in depth, distressed area should be milled partial depth repaired partial depth with concrete.</p> <p>Repair full depth or partial depth repair method as approved by the engineer.</p>
Patching	No distressed patches. Any patch present must be in good condition and performing satisfactorily.	Full depth repair and replacement of all patches not in good condition. All remedial action under this item is contingent upon the repair originally being performed by the contractor as part of a remedial action to another distress.

All terms, thresholds, dimensions, survey methods, etc., outlined in the above table are consistent with those set forth in the Wisconsin Department of Transportation's Pavement Surface Distress Survey Manual, 1993 version.

\*The contractor will be relieved of the responsibility for remedial action for slab breakup if it is determined the cracking was the result of factors beyond the contractor's control.

\*\*The contractor will be relieved of the responsibility for remedial action for distressed joints and cracks when the distress is D-cracking, provided the contractor uses an approved WisDOT aggregate source that meets the soundness, wear testing and freeze-thaw testing of the coarse aggregate requirements outlined in subsection 501.2.5.4.3 of the standard specifications.

\*\*\*The contractor will be relieved of the responsibility for remedial action for transverse joint faulting if the following is true: dowel bars have been installed in accordance with the plan and specifications; and the concrete strengths are at acceptable levels for compressive strength.

\*\*\*\*The contractor will be relieved of the responsibility for remedial action for surface distress if the cause is by chemical or fuel spills, vehicle fires, snow plows and other equipment, or mechanical damage.

## **G Warranty Work**

### **G.1. General**

The contractor shall perform warranty work, during the five-year warranty period, at no additional cost to the department. Warranty work consists of remedial work and elective/preventive maintenance.

During warranty work operations, traffic control will be as specified in section 643 of the standard specifications and will conform to Part 6 of the Wisconsin Manual on Uniform Traffic Control Devices.

The contractor will document all warranty work performed and annually provide this information to the Pavement Performance Section of the department's Bureau of Highway Construction.

If warranty work necessitates a corrective action to the pavement markings, raised pavement markers, adjacent lane(s), or shoulders, that additional corrective action will be the responsibility of the contractor.

All warranty work including, but not limited to, remedial work and elective/preventive maintenance shall require a permit from the department by contacting the District Pavement Engineer.

### **G.2 Remedial Work**

Remedial work will be based on the results of the mainline pavement distress surveys.

If any of the conditions described in the footnotes of the table in Section F are met, the contractor will be relieved of performing the remedial action for the described pavement distress. The contractor will not be responsible for damages that result from coring, milling, grinding, or other destructive procedures conducted by the department.

If any of the threshold level criteria of the table in Section F are met on the mainline pavement, and the contractor agrees to the validity of the pavement distress survey results, the contractor shall perform the remedial work prescribed in the remedial action column of the table. Remedial work to be performed and materials to be used will be the joint decision of the contractor and the engineer. The remedial work shall be performed in all segments of the project where a threshold level is met unless otherwise noted under the remedial action. The remedial work shall be applied to the entire segment(s).

Remedial action work required on the mainline roadway will also be performed on the integral concrete shoulders, curb and gutter. Auxiliary lanes impacted by the distress in the mainline warranted concrete pavement will also be repaired as part of the remedial action. If an impasse develops, the Conflict Resolution Team will make a final determination.

Remedial work shall be performed in the same calendar year that the pavement distresses were recorded.

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The contractor, with the engineer's approval, may elect to delay the remedial actions in order to minimize the impacts of delay and inconvenience to the traveling public.

If, at anytime during the warranty period, 30 percent or more of the project segments require or have received remedial action, then the entire project will receive remedial action as mutually determined by the contractor and the engineer.

The contractor will have the first option to perform the remedial work. If, in the opinion of the engineer, the problem requires immediate attention for the safety of the traveling public, and the contractor cannot perform the remedial work within eight hours, the engineer may have the remedial work done by other forces and at the contractor's expense. Remedial work performed by other forces will not alter the requirements, responsibilities, or obligations of the warranty.

If remedial action work or elective/preventive action work performed by the contractor necessitates a corrective action to the pavement marking(s), raised pavement markers, adjacent lane(s) or shoulders then such corrective action to the pavement markings, raised pavement markers, adjacent lanes or shoulders will be the responsibility of the contractor.

The contractor will not be held responsible for distresses that are caused by factors beyond the control of the contractor (see the asterisked items in the table in Section F). However, due to the fact that the pavement is under the warranty, the contractor will be given the option to make these repairs at a cost to be negotiated with the engineer. Costs for these repairs will be based upon time, materials, labor, equipment costs and traffic control costs and will be consistent with the normal cost of maintenance traditionally performed by county highway forces.

### **G.3 Elective/Preventive Maintenance**

Elective/preventive maintenance will be a contractor option. The contractor and the engineer will jointly coordinate elective/preventive maintenance to be performed and materials to be used.

## **H Concrete Mix Design**

### **H.1 Concrete Mix Design**

The maximum limit for the percentage of material passing the 200 sieve is deleted from Subsections 501.2.5.3.1 and 501.2.5.4.2 of the standard specifications.

### **H.2 Submittal**

At least fifteen (15) working days prior to the start of concrete production, the contractor shall provide the engineer two copies of a Concrete Pavement Mix Design. The mix design shall meet all necessary criteria and be developed by the contractor and/or their agent of a recognized laboratory as defined in Subsection H.5, herein.

### **H.3 Documentation**

The mix design documentation shall ensure the materials used are in accordance with all the requirements described in subsection 501.2 of the standard specifications unless modified herein, or waived by the engineer. The documentation shall include test dates, the name and location of the laboratory used to develop the mix design, material proportions, compressive strength obtained from the concrete at 28 days, concrete air content, and material information including:

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type; brand; source; batch masses; aggregate air correction factor; and aggregate gradations, absorption, and specific gravities. In lieu of a laboratory mix design, the contractor may elect to use a mix design previously used on other highway projects that meet the mix design requirements of this specification. In either case, the documentation and data submitted shall demonstrate that the mix design meets all the necessary requirements of subsection 501.2 of the standard specifications unless modified herein.

#### **H.4 Mix Design Physical Requirements**

The compressive strength for the concrete pavement mix design shall be qualified by the average compressive strength of a minimum of five pairs of test cylinders cured for 28 days, either by laboratory testing or by previous field test data which utilized the same mix design.

The minimum cement content shall be 565 lb/cubic yard. Class C fly ash may be used as a partial replacement for Portland cement at a replacement ratio of 1.0 of fly ash per 1.0 pound of cement up to a maximum cement replacement of 30%. Alternatively, Grade 100 or 120 slag may be used as a partial replacement for cement at a replacement ratio of 1.0 pound of slag per 1.0 pound of cement up to a maximum cement replacement of 50% for mainline slip form pavement and a maximum cement replacement of 30 % for handwork.

#### **H.5 Development Facility**

The department shall qualify the laboratory used to develop the mix design.

#### **H.6 Mix Changes**

The contractor will submit a modified mix design, for informational purposes, prior to incorporation into the work. Modified mix designs are required for all changes in: 1) the source of any material, 2) the amounts of cementitious materials, 3) adjustment of fine to total aggregate greater than  $\pm 3$  percent by mass, or 4) the addition or deletion of admixtures.

### **I Measurement**

Concrete Pavement (Thickness) Warranted will be measured by area in square yards and the quantity to be paid for shall be the number of square yards of concrete pavement completed, accepted, measured complete in place. The width for measurement will be the width from outside to outside of completed pavement, but not to exceed the width as shown on the plans. The length will be the actual length measured along the riding surface.

Fillets for widened sections or at drain basins and similar locations, placed monolithic with the pavement, will be measured as pavement.

No deduction will be made for any fixture located within the limits of the pavement when such fixture has a surface area, in the plane of the pavement surface, of one square yard or less.

### **J Payment**

Concrete Pavement (Thickness) Warranted, measured as provided above, will be paid for at the contract unit price per square yard of pavement, which price will be full compensation for furnishing, preparing, hauling, mixing, and placing all materials, unless other wise provided; for

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the warranty; warranty bond(s); for performing warranty work; for the Quality Control Plan; for testing; for record keeping; for sampling; for traffic control; and for all labor, tools, equipment and incidentals necessary to complete the work.