1. Material and Workmanship Warranty

What is it?

Under a materials and workmanship warranty the contractor is responsible for correcting defects in work elements that are within the contractor’s control during the warranty period including defective material and workmanship *(1)*.

Why use it?

The main advantage of materials and workmanship warranties is that they reduce the State Transportation Agency’s (STA) exposure to risks by providing assurance that the contractor will correct early failures due to materials and workmanship that may have passed unnoticed during construction *(2)*. However, this is not the only advantage as this type of warranty also provides opportunities for enhanced performance, as a result of improved materials and workmanship, and for reduction of agency personnel time required for testing and inspection during construction *(3)*.

What does it do?

This type of provisions are generally implemented along with the standard specifications. They require the contractor to correct early defects caused by elements within the contractor’s control, usually the materials and the workmanship, at no cost to the STA. Under this provision the contractor assumes minimal performance risk in comparison to Performance Warranties. These warranties have relatively short-terms, typically three years or less *(4)*.

How to use it?

The following are some of the main elements to consider when using a materials and workmanship warranty.

* **Project selection –** Some of the criteria to consider on this category are project size, existing conditions within the project limits, project traffic volume, type of construction (new or rehabilitation), and industry input *(4)*. Several STAs have developed project selection guidelines, although the great majority are directed to pavement elements given that it carries a greater level of investment and risk. Some of the STAs with these guidelines are Wisconsin, California, Michigan, Colorado, Ohio, and Minnesota.
* **Selection of Performance Indicators -** These factors are indicators of distress, properties, and characteristics of the warranted component. These should be easily obtained, allow for repetitive measurements over time, and provide reliable information about the performance of the chosen element. STAs generally use historical information to identity typical criteria *(4)*. The Indiana Department of Transportation for instance uses rut depth, transverse cracking, longitudinal cracking, international roughness index, and friction numbers as performance indicators for asphalt pavement *(4)*.
* **Setting Distress Threshold Values –** Threshold values are measurable tolerances of the performance indicators. Warranty provisions define maximum allowable tolerances for thresholds. When exceed, these thresholds trigger the warranty provision and require remedial action. The values are usually based on historical data and are dependent of the reliability of the initial data. STAs specify threshold values as a single value or as ranges with different remedial procedures to be followed according the different threshold levels *(4)*. In materials and workmanship warranty provision the STA must be careful to define these threshold values to account for materials and workmanship failure only, and not for design issues.
* **Warranty Period –** The warranty periods are usually defined based on cost/benefit analysis and type of project. Materials and workmanship warranty are shorter than other types of warranties and generally last up to three years *(4)*.
* **Bonding Requirements –** The costs of the warranty is generally included into the unit price of the warranted component; therefore, the contractor receives full payment of the item including warranty costs upon completion of construction. As a result, STAs require a bond to cover contractor warranty obligations during the warranty period. Bonds are secured through a surety, which becomes the responsible for the costs of remedial work in case the contractor fails to perform *(4)*. Different factors considering when calculating the bond values are:
	+ Total dollar value of the warranted item,
	+ Percentage of the total dollar value of the warranted item
	+ Lower value between a percentage of the contract value and a set dollar amount, or
	+ Estimated costs to perform a full repair or preservation technique.
* **Risk Allocation –** Materials and workmanship warranties usually require the contractor to conform to the standard specifications. The contractor can make some decisions over mix design or material selection, but it is generally restricted to the materials from a state approved list *(4)*. This should be taken into account when developing this type of warranty provisions as other types of warranty shift responsibility to the contractor and therefore provide more room for contractor decisions.

When to use it?

According to the Federal Highway Administration *(5)*, on National Highway System (NHS) projects, warranty provisions should be used for:

* A specific construction product or feature as it is unacceptable for the entire project.
* Warranties may not cover items of maintenance not eligible for Federal participation
* Contrators are not to be required to warrant items over which they have no control. There are no regulations about warranty durations
* Approval the FHWA Division Administrator of a warranty provision and its subsequent revisions are required.
* Use of warranty provisions for non-NHS is governed by the individual State written procedures

Good project element candidates are *(6)*:

* Asphalt pavement,
* Concrete pavement,
* Pavement marking,
* Bridge deck waterproofing membrane,
* Crack treatment,
* Microsurfacing,
* Bridge painting,
* Bridge deck joints,
* Chip sealing,
* Roofs,
* Intelligent transportation system components,
* Landscaping,
* Irrigation systems,
* Bridge components, and
* Reflective sheeting for signs

Limitations?

The following are some aspects to consider when considering and developing warranty provisions.

* The STA must ensure that warranty guidelines are reasonable and enforceable *(7)*
* Warranty may not be collectable if guidelines are too restrictive or place undue burden on contractor *(7)*
* Success of warranty depends on contractor and surety company involved. Sureties face higher risks under this type of provision *(2)*
* Warranties discourage participation of small contractors due to financial requirements *(2)*
* The use of warranty provisions may increase the bid cost by up to 15% *(8)*.
* Prescriptive warranty provisions are likely to be challenged and are un-enforceable *(9)*.

### Who uses it?

Almost all STA use a form of the materials and workmanship warranty provision. In pavement warranties, one of the most frequently used type of warranty, Michigan, Florida, Ohio, Wisconsin, Illinois, California, Minnesota, Colorado, Mississippi and Indiana have the most experience *(4)*.

### Example

The following are the Materials and Workmanship provisions for pavement used by the Michigan Department of Transportation (MDOT) *(10)*.

MICHIGAN

DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION

FOR

**MATERIALS AND WORKMANSHIP PAVEMENT WARRANTY**

1. **Description**. The materials and workmanship pavement warranty consists of the warranty bond, the terms of this special provision, and the Special Provision for Warranty Work included in the contract. This special provision establishes the common terms and definitions applied to pavement projects requiring a warranty. The Materials and Workmanship Pavement Warranty warrants the Department against defects in materials and workmanship.
2. **Definitions.**

**Materials and Workmanship Warranty.** The Contractor is responsible for correcting defects in the pavement caused by elements within the Contractor’s control (i.e., the materials supplied and the workmanship), during the warranty period. Since the Department is responsible for the pavement design, the Contractor assumes no responsibility for defects that are design related. If a defect is attributable to both, the materials and/or workmanship, and the design, responsibility for correcting the defect will be shared by the Department and the Contractor; the Contractor is responsible for the percentage of fault attributable to the workmanship and/or materials, and the Department is responsible for the percentage of fault attributable to the design.

**Acceptance Date of Construction.** The date when the warranted work is complete and confirmed in writing on the initial acceptance document, by the Department, to be in compliance with the contract specifications and is open to traffic. This is the date of initial acceptance and constitutes the start date for the warranty period. There may be more than one acceptance date of construction for a project.

**Warranty Bond.** A bond issued by a surety which guarantees that the warranty requirements will be met.

**Conflict Resolution Team (CRT).** The five-person team responsible for resolving disputes between the Department and the Contractor regarding any claim of non-compliance with the warranty requirements.

**Driving Lane(s).** The delineated pavement surface used by traffic and the portion of the pavement considered warranted work. Each of the following is considered a separate driving lane.

* Each individual main lane.
* The sum of all ramp lanes and the associated acceleration/deceleration lanes is considered a separate driving lane
* The sum of all auxiliary lanes, such as passing lanes and turn lanes, is considered a separate driving lane.

Approaches, driveways, shoulders, and adjoining transitions tapers between various types of pavement are not considered driving lanes for the purpose of this provision.

**Warranty Work.** Corrective action taken to bring the warranted work into contract compliance.

**Longitudinal Crack Open/Joint.** A crack or open joint, at least 5 feet in length that is oriented primarily in the longitudinal direction versus the transverse direction. That is, the angle between the overall crack line and the centerline is less than 45 degrees. It can exist anywhere in the warranty lane; i.e., at the pavement centerline joint, wheel path, center of lane, lane/shoulder joint, or lane/approach joint. This does not include reflective cracking from underlying pavement

**De-bonding.** A physical separation of two HMA layers. De-bonding will be visually identified as shoving, or the loss of the new surface course. Surface potholes, regardless of depth, will be classified as de-bonding.

**Raveling.** Surface disintegration, due to the loss of coarse or fine aggregate material, that occurs over an area or in a continuous longitudinal strip.

**Flushing.** The accumulation of excess asphalt binder on the pavement surface that creates a shiny, reflective condition and becomes tacky to the touch at high temperatures.

**Rutting.** A longitudinal surface depression in the wheel path. It may have associated transverse displacement or humping.

**Transverse Crack.** A crack, at least 5 feet in length, that is oriented primarily in the transverse direction versus the longitudinal direction. That is, the angle between the overall crack line and the transverse line is less than 45 degrees. It can be either straight or irregular in direction.

**Alligator Cracking.** Parallel longitudinal cracks with transverse tears between them exhibiting a pattern similar to an alligator hide. An alligator crack typically starts in a wheel path and may extend to other lane locations.

**Block Cracking.** Transverse and longitudinal cracking that has progressed to a pattern that the pavement is broken into blocks of size less than 12 foot by 12 foot. The shape of each block may be irregular.

1. **Initial Acceptance.** The Department and the Contractor must jointly review all completed warranted work, or a portion thereof, as determined by the Department. If the work does not meet contract requirements, the Contractor must make all necessary corrections, at their expense, prior to initial acceptance. Initial acceptance will occur as soon as the Department confirms in writing, on the initial acceptance form, that contract requirements have been met for the warranted work. The date on which initial acceptance occurs is termed the Acceptance Date of Construction.

Initial acceptance will be documented and executed jointly by the Department and the Contractor on a form furnished by the Department. A copy of the form will be sent to the Contractor’s warranty bond surety agent by the Department. Neither the initial acceptance nor any prior inspection, acceptance or approval by the Department diminishes the Contractor’s responsibility under this warranty.

The Department may accept the work and begin the warranty period, excluding any area needing corrective work, to accommodate seasonal limitations or staged construction.

Acceptance of material, in penalty, under the Department’s quality assurance program will not relieve the Contractor from meeting the material and workmanship warranty requirements for the accepted material.

1. **Warranty Bond.** The Contractor must furnish a single term warranty bond, in an amount stipulated in the Special Provision for Warranted Work Requirements, prior to contract award. The effective starting date of the warranty bond will be the Acceptance Date of Construction. The warranty bond will be released at the end of the warranty period or after all warranty work has been satisfactorily completed, whichever is latest.
2. **Rights and Responsibilities of the Department.** The Department:
	1. Reserves the right to approve the schedule proposed by the Contractor to perform warranty work.
	2. Reserves the right to approve all materials and specifications used in warranty work.
	3. Reserves the right to determine if warranty work performed by the Contractor meets the contract specifications.

* 1. Reserves the right to perform, or have performed, routine maintenance during the warranty period, which routine maintenance will not diminish the Contractor’s responsibility under the warranty.
	2. Reserves the right, if the Contractor is unable, to make immediate emergency repairs to the pavement to prevent an unsafe road condition as determined by the Department. The Department will attempt to notify the Contractor that action is required to address an unsafe condition. However, should the Contractor be unable to comply with this requirement, to the Department’s satisfaction and within the time frame required by the Department, the Department will perform, or have performed any emergency repairs deemed necessary. Any such emergency repairs undertaken will not relieve the Contractor from meeting the warranty requirements of this special provision. Any costs associated with the emergency repairs will be paid by the Contractor if it is determined the cause was from defective materials and/or workmanship.
	3. Is responsible for monitoring the pavement throughout the warranty period and will provide the Contractor all written reports of the surface treatment’s condition related to the warranty requirements. The Contractor will not be relieved of any responsibility based upon a claim that the Department failed to adequately monitor the pavement or to report its findings to the Contractor.
	4. Is responsible for notifying the Contractor, in writing, of any corrective action required to meet the warranty requirements.
1. **Rights and Responsibilities of the Contractor.** The contractor
	1. Must warrant to the Department that the warranted work will be free of defects in materials and workmanship. The warranty bond must be described on a form furnished by the Department. The completed form must be submitted to the Department prior to award of contract.
	2. Is responsible for performing all warranty work including, but not limited to, maintaining traffic and restoring all associated pavement features, at the Contractor’s expense.
	3. Is responsible for performing all temporary or emergency repairs, resulting from being in non-compliance with the warranty requirements, using Department approved materials and methods.
	4. Must notify the Department and submit a written course of action for performing the needed warranty work a minimum of 10 calendar days prior to commencement of warranty work, except in the case of emergency repairs as detailed in this special provision. The submittal must propose a schedule for performing the warranty work and the materials and methods to be used.
	5. Must follow a Department approved maintaining traffic plan when performing warranty work. All warranty work must be performed under permit issued by the Region Utilities and Permits Engineer. The permit fee and an individual permit performance bond will not be required. The permit insurance requirements, however, will apply.
	6. May be responsible for reimbursing the Department a portion of any incentive payments paid to the Contractor for early completion of the original work. Reimbursements will be required if the proposed maintaining traffic plan for corrective action requires lane closures during peak hour traffic. Peak hours will be determined by the Region Traffic and Safety Engineer. The daily reimbursement amount must not exceed 25 percent of the original daily earned incentive payment. The Department will determine the actual percentage on a project by project basis.
	7. Must furnish to the Department, in addition to the regular performance and lien bond for the contract, supplemental performance and lien bonds covering any warranty work being performed. These supplemental bonds must be furnished prior to beginning any warranty work, using Department approved forms. These supplemental bonds must be in the amount required by the Department to cover the costs of warranty work.
	8. Must complete all warranty work prior to conclusion of the warranty period, or as otherwise agreed to by the Department.
	9. Will be liable during the warranty period in the same manner as Contractors currently are liable for their construction related activities with the Department pursuant to the standard specifications, including, but not limited to subsections 104.07.C, 107.10 and 107.11. This liability will arise and continue only during the period when the Contractor is performing warranty work. This liability is in addition to the Contractor performing and/or paying for any required warranty work, and will include liability for injuries and/or damages and any expenses resulting therefrom which are not attributable to normal wear and tear of traffic and weather, but are due to non-compliant materials, faulty workmanship, and to the operations of the Contractor as set forth more fully in subsections 104.07.C, 107.10 and 107.11 of the Standard Specification for Construction.
2. **Evaluation Method.** The Department will conduct pavement evaluations by dividing the project into segments. Each individual driving lane will be divided into segments of 528 feet (1/10 mile) in length for measuring and quantifying the condition parameters. Evaluation will include use of both the Department’s Pavement Management System and/or field pavement condition reviews. This evaluation may be waived in emergency situations.

The beginning point for laying out segments will be the Point of Beginning (POB) of the project. Segments will be laid out consecutively to the Point of Ending (POE) of the project. The original segmentation of the project will be used for all successive reviews throughout the warranty period.

1. **Condition Parameters.** Condition parameters are used to measure the performance of the warranted pavement during the warranty term. Each condition parameter has a threshold level applied to each segment and a maximum number of defective segments allowed before corrective action (warranty work) is required.
2. **Warranty Requirements.** Warranty work will be required when the following two criteria are met as a result of a defect in materials and/or workmanship.

Criterion 1 - The threshold limit for a condition parameter is exceeded, and

Criterion 2 - The maximum allowable number of defective segments is exceeded for one or more condition parameters for a driving lane.

Specific threshold limits and segment limits are covered in the Special Provision for Warranted Work.

To determine whether the failure to meet the warranty criteria is a result of defects in materials and/or workmanship, a joint field investigation by the Department and the Contractor will be conducted. The Department and Contractor may elect to have a forensic investigation conducted. The decision to undertake a forensic investigation, the scope of it, and the selection of the party to conduct it will be agreed to by the Department and the Contractor. The forensic investigation will be conducted following the “Material and Workmanship Forensic Investigation Procedure”. If agreement cannot be reached a Conflict Resolution Team (CRT) may be convened in accordance with this special provision. The CRT will then decide the need for a forensic investigation, its scope and the party to conduct the investigation. All costs related to the forensic investigation will be shared proportionately between the Contractor and the Department based on the determined cause of the condition.

During the warranty period, the Contractor will not be held responsible for pavement distresses that are caused by factors unrelated to materials and workmanship. These include, but are not limited to: chemical and fuel spills, vehicle fires, snow plowing, and quality assurance testing such as coring. Other factors considered to be beyond the control of the Contractor which may contribute to pavement distress will be considered by the Engineer on a case by case basis upon receipt of a written request from the Contractor.

1. **Conflict Resolution Team.** The sole responsibility of the Conflict Resolution Team (CRT) is to provide a decision on disputes between the Department and the Contractor regarding application or fulfillment of the warranty requirements. The CRT will consist of five members:
* Two members selected, and compensated by the Department.
* Two members selected and compensated by the Contractor.
* One member mutually selected by the Department and the Contractor. Compensation for the third party member will be equally shared by the Department and the Contractor.

If a dispute arises on the application or fulfillment of the terms of this warranty, either party may serve written notice that appointment of a CRT is required.

At least three members of the CRT must vote in favor of a motion to make a decision. The CRT may decide to conduct a forensic investigation, will determine the scope of work and select the party to conduct the investigation. All costs related to the forensic investigation will be shared proportionately between the Contractor and the Department based on the determined cause of the condition.

1. **Emergency Repairs.** If the Department determines that emergency repairs are necessary for public safety, the Department or it’s agent may take repair action. Emergency repairs must be authorized by the Region Engineer. Prior to emergency repairs, the Department will document the basis for the emergency action. In addition, the Department will preserve evidence of the defective condition.
2. **Non-extension of Contract.** This special provision must not be construed as extending or otherwise affecting the claim process and statute of limitation applicable to this Contract.
3. **Measurement and Payment.** All costs, including engineering and maintaining traffic costs, associated with meeting the requirements of this special provision are considered to be included in the Contract unit prices for the warranted work items regardless of when such costs are incurred throughout the warranty period. These costs include but are not limited to, all materials, labor and equipment necessary to complete required warranty work.

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