1. Performance Warranty

What is it?

Performance warranty provisions require the contractor to guarantee some parts of a project for overall performance. This includes the design, construction, and some part of the maintenance. In comparison to a materials and workmanship warranty, performance warranty assign more responsibility to the contractors and are usually longer *(1)*.

Why use it?

Warranty provisions carry the following potential benefits to highway projects *(1)*:

* Enhanced performance through improved materials and workmanship,
* Redistribution of responsibility for product performance to the contractor, who has more control of it,
* Reduction of agency personnel time required for testing and inspection,
* Encouragement of contractor innovation,
* Reduced maintenance exposure when desired performance is not achieved,
* Fewer cycles of rehabilitation by practicing preventive maintenance and delaying the need for rehabilitation.

What does it do?

Performance warranties shift responsibility to the contractor for design, construction oversight, and quality management. These warranties are usually divided in two forms: short-term performance warranties and long-term performance warranties. Short-term performance warranties include the performance criteria to be achieved and the minimum materials and construction requirement acceptable to the State Transportation Agency (STA). In pavement warranties for example, the STA is responsible for the structural design of the pavement while the contractor is responsible for the mix design and the overall performance of such mix for the duration of the warranty *(2)*. Long-term performance warranties, increase the contractor’s responsibility for performance but provide more room for contractor made decisions.

How to use it?

The following are some of the main elements to consider when using a performance 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 *(11)*. 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 *(11)*. 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 *(11)*.
* **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 *(11)*. In performance warranties the STA has more room to define more restrictive threshold values than those used in a materials and workmanship warranty; however, the STA must be careful that the threshold values are still enforceable and achievable.
* **Warranty Period –** The warranty periods are usually defined based on cost/benefit analysis and type of project. Short term performance warranties usually range from five to ten years *(2)* while long-term performance warranties range from 10 to 20 years *(2)*. However, warranty durations are susceptible to the warranted element and its life cycle.
* **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 *(11)*. 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 –** Short term performance 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 *(11)*. In long-term performance warranties some responsibility shifts to the contractor and therefore provides more room for contractor decisions.

When to use it?

According to the Federal Highway Administration *(7)*, 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
* Contractors 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

The Ohio Department of Transportation (ODOT) *Innovative Contracting Manual (8)* presents the following project criteria selection for warranty contracting:

* Warranted work element is entirely within the Contractor's control and is measurable
* Material and workmanship attributes can be explicitly defined and measured in the field
* Aspects not under contractor's control will have minimal impacts on the warranted work during the warranty period or can be distinguished from the warranted work.
* Project provides opportunities to develop and incorporate innovative technologies
* Existing project conditions are well defined

Good project element candidates are *(8)*:

* 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 *(3)*
* Warranty may not be collectable if guidelines are too restrictive or place undue burden on contractor *(3)*
* Success of warranty depends on contractor and surety company involved. Sureties face higher risks under this type of provision *(4)*
* Warranties discourage participation of small contractors due to financial requirements *(4)*
* The use of warranty provisions may increase the bid cost by up to 15% *(5)*.

Who uses it?

13 STAs have experience with warranty contracting: Michigan, Ohio, Florida, South Carolina, California, Wisconsin, Minnesota, West Virginia, Colorado, Mississippi, Indiana, Oregon, and Pennsylvania *(5)*.

Example

The Michigan Department of Transportation (MIDOT) used asphalt warranty provisions on the M-115 rehabilitation project in 2008. The project was a part of the Highways for Life program from the Federal Highway Administration and its main innovation was the use of performance contracting for construction. The project took place in the M-115 from the Osceola-Clare County line to Lake Station Avenue in Clare County. This portion of the highway was a rural two-lane roadway of 5.56 mi with two small bridges. The project consisted on the rehabilitation of the pavement and both bridges which were in poor condition at the beginning of the project and included profile cold-milling, substructure repair, HMA resurfacing, joint repair, intersection improvements, bridge approach work, bridge superstructure replacement, drainage installation, and upgrading of all guardrails. The pavement warranty provision was used as a component of the several performance contracting strategies used by MDOT.

The pavement performance warranty consisted of a warranty bond and required the contractor to warrant the HMA pavement for performance deficiencies for the duration of the warranty period. The minimum warranty period was 5 years, which were to begin on the construction acceptance date. The contractor’s maximum liability for warranty work was 80% of the project pavement costs, and it would be reduced over the warranty period if no previous performance deficiencies had occurred for which the contractor was responsible. The length of the warranty period would be used as a criterion to determine the best-value bid for the project.

To assess the pavement, MDOT divided the project into 0.1 mi lane segments used for measuring and quantifying the condition parameters. Warranty work was required when the threshold limits for a condition parameter was exceeded and the maximum allowable number of defective was exceeded for one or more condition parameters of a driving lane. The criteria and the recommended warranty corrective actions are shown in tables 1 and 2 below. Following construction of the entire length of the project, ride quality measurements would be calculated and reported as ride quality index (RQI) in accordance with the Michigan Test Method 726. The warranty provisions required the ride quality values shown in table 3.

**Table 1. Warranty thresholds and requirements** *(9)*

|  |  |  |
| --- | --- | --- |
| Condition Parameter | Threshold Limits Per Segment (Length = 528 feet) | Max. Defective Segment Per Driving Lane – Mile |
| Longitudinal Crack | 30% of segment length  | 1 |
| Longitudinal Joint Crack | 10% of segment length | 1 |
| De-bonding | 5% of segment length | 1 |
| Raveling | 8% of segment length | 1 |
| Flushing | 4% of segment length | 1 |
| Rutting | Average rut depth = 0.25 inch | 1 |
| Condition Parameter | **Threshold Limits Per Segment (Length = 1 mile)** | **Max. Defective Segment Per Driving Lane-Mile** |
| Transverse Crack | 15 Cracks | 1 |

**Table 2. Recommended corrective actions** *(9)*

|  |  |
| --- | --- |
| Condition Parameter | Recommended Action |
| Longitudinal Crack | Cut and Seal |
| Longitudinal Joint Crack | Cut and Seal |
| De-bonding | Mill and Resurface  |
| Raveling | Mill and Resurface |
| Flushing | Mill and Resurface |
| Rutting | Mill and Resurface |
| Transverse Crack | Mill and Resurface |

**Table 3: Ride Quality Requirements** *(9)*

|  |  |  |
| --- | --- | --- |
| **For Total of Lane** | **For Each Half-Mile Segment** | **Surface Irregularities Subject to Correction** |
|  | **Acceptable Range (RQI)** | **Correction Limit (RQI)** | **Acceptable Range (RQI)** | **Correction Limit (RQI)** |  |
| HMA-Surface | 0-30 | >30 | 0-30 | >30 | 0.3 inch to 25 feet |

The CalTrans *Alternative Procurement Guide (1)* provides the following example of performance warranty provisions:

**Caltrans Asphalt Concrete Warranty Payment Provision**

"Warranty will be paid for on a lump sum basis. The contract lump sum price paid for warranty shall include full compensation for providing a warranty for asphalt concrete and for furnishing labor, materials, tools, equipment, and incidentals, and doing the work involved in repairing defective areas in the asphalt concrete, including job site inspection, placement and removal of temporary patches, cold planning, repair of defective areas, sealing cracks and replacement of traffic stripes, pavement markings and pavement markers obliterated by patches and repairs, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer. Payment for the warranty item will be made in 10 equal payments. The first payment will be made on the third progress payment date after the warranty period begins, and subsequent payments will be made monthly thereafter."

### References

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