MTO Performance Specifications
Concepts and Development

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OHMPA Road Tour 2013
Why Performance Specifications

• Increases potential for contractor innovation and initiative

• A mature industry with well developed quality control programs

• Next phase of specification development
Types of Specifications

Performance Specifications
Contractor must meet performance requirements at end of warranty period.

End Result Specifications
Contractor must meet material requirements of the finished product i.e.; air voids in hot mix. Material specifications in place. Construction methods and equipment requirements avoided.

Method Specifications
Contractor told what materials to use, where to get materials, how to construct, and what equipment to use.

Method/Manufacturing Specifications
Contractor told what materials to use, where to get materials, how to construct, what equipment to use and how to manufacture products i.e.: hot mix plants.
What is a Performance Specification?

• A description of what the contractor is to construct

• Contractor determines the materials, methods and workmanship; may require contractor design

• Acceptance during or at end of the contract, on an item by item basis for payment

• Measure performance:
  • during or at the end of a warranty period to ensure the condition gives assurance of its future performance
Performance Specification - Concepts

• Performance Requirements at:
  • milestones, and  
  • during the warranty period

• Review of work and if there are no concerns then intensive testing and assessments may not take place

• Assessments and testing that are objective, measureable, repeatable and achievable

• Warranty period depends on item, up to 10 years

• Consequences for non-conformance with requirements to remedy
Setting Performance Requirements

• Requirements must be reasonable and achievable

• Achieve historical quality – not raising the bar
Transition to Performance Specifications

- Approaches to be used as appropriate for the work item and until full performance specifications are in-place:
  - Some traditional specifications
  - Enhancements to some traditional specifications to make them more performance based
  - Perhaps limited use of DSM
  - Trial contracts, as appropriate
  - Stakeholder consultation
## Pavement Performance Specifications

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<tr>
<th>Design and Construction Specification</th>
<th>Proposed Warranty Period</th>
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<td>New and Reconstructed Concrete Pavement Structure</td>
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<tr>
<td>Concrete Pavement Structure Rehabilitation</td>
<td>TBD</td>
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<tr>
<td>Flexible Pavement Structure Rehabilitation</td>
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<tr>
<td>New and Reconstructed Flexible Pavement Structure</td>
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<td>Composite Pavement Structure Rehabilitation</td>
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<tr>
<td>Hot Mix Resurfacing</td>
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<td>Thin Surfacing</td>
<td>3</td>
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<td>Crack Sealing</td>
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</table>
## Proposed Performance Requirements

<table>
<thead>
<tr>
<th>Flexible</th>
<th>Composite</th>
<th>Concrete</th>
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<tbody>
<tr>
<td>Coarse Aggregate Loss</td>
<td>Spalling and Coarse Aggregate Loss</td>
<td>Spalling and Coarse Aggregate Loss</td>
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<td>Flushing</td>
<td>Flushing</td>
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<td>Alligator Cracking</td>
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<td>Joint Failure</td>
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<tr>
<td>Single and Multiple Cracking</td>
<td>Single and Multiple Cracking</td>
<td>Single and Multiple Cracking</td>
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<tr>
<td>Wheel Track Rutting</td>
<td>Wheel Track Rutting</td>
<td>Faulting</td>
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<tr>
<td>Roughness (IRI)</td>
<td>Roughness (IRI)</td>
<td>Roughness (IRI)</td>
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<tr>
<td>Joint Separation</td>
<td>Joint Separation</td>
<td>Longitudinal Joint Separation</td>
</tr>
<tr>
<td>Winter Roughness</td>
<td>Winter Roughness</td>
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</tr>
</tbody>
</table>
Establishing Warranty Requirements

• Performance Data
  • 10,322 PMS2 records 2005-2011
  • 5,052 ARAN records 2007-2010
  • 7-Year Pavement with Warranty Assessments
  • MinO Paving Assessments
  • Detailed Review 3,5, & 7 Yr Old Contracts 2012

• Acceptance limits based on mean + X standard deviations of a normalized data set
  • Historical practice
Establishing Warranty Requirements

Wheel Track Rutting Depth Distribution, Ontario Traffic Category D&E @ 7 Yrs
64 Contracts, 1003-500 lane-m Sections, 2007-2010 ARAN Data

Average Wheel Track Rutting Depth (mm)

Count

Skew = 1.501
Kurtosis = 3.014
Establishing Warranty Requirements

Normalized Wheel Track Rutting Depth Distribution, Ontario Traffic Category D&E @ 7 Yrs
64 Contracts, 1003-500 lane-m Sections, 2007-2010 ARAN Data

- Normalized Average Wheel Track Rutting Depth (mm)
- Count

λ = -0.71601
Skew = -3.4E-08
Kurtosis = -0.378
Pavement Performance Evaluation

- 500 lane-m segments
- Automatic Road Analyzer
- ASTM Skid Trailer
- Inertia Profilograph
- Manual Survey/Measurement

- Subjective evaluation minimized
  - Transition to fully objective evaluation over time
Consequences for Non-Conformance Proposed

- Standard repair methods, eg.:
  - Mill/pave
  - Crack sealing
  - Crack repair
  - Reconstruction

- Engineer’s repair proposal
Timeline

- Some specifications expected to be completed by end of 2013
- Remainder in early 2014
- Implementation TBD