

Producing Uniform and Consistent Mixes

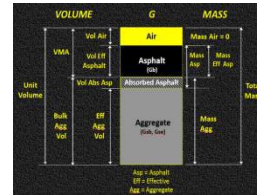
Doubra C. Ambaiwei, Ph.D.
Technical Director

Ontario Road Builders' Association (ORBA)



Presentation Outline

- **Recap: OAPC Top 10 List – Ways to Get More Durable HMA Pavements**
- **Uniformity & Consistency – What Does This Imply?**
JMF Influencing Factors
- **Considerations – Material, Production & Placement CONTROL**
- **Importance of Sampling & Testing**
- **Role of Specifications**
- **Acknowledgement**
- **Q & A**



Recap – OAPC Top 10 Lists

□ Ways to Get More Durable HMA Pavements

1 DO YOUR HOMEWORK

Evaluate the existing pavement condition and perform a proper pavement design to determine the appropriate thickness. Select the right mix and PGAC for the project.

4 DON'T OVER HEAT THE MIX

Overheating the mix will result in premature oxidation and cracking. Specifying WMA asphalt may help alleviate these concerns during late season paving.

7 PROVIDE PROPER PAVEMENT DENSITY

Compacting the mat to the required specification limits will ensure long term durability, lower oxidation (ageing) and reduced permeability.

2 ENCOURAGE MIXES THAT HAVE HIGHER AC CONTENT

Studies have shown that mixes with higher AC out-perform those with lower AC contents. How to best do this in Ontario needs further evaluation.

5 INCLUDE ADEQUATE SURFACE PREPARATION IN THE PLANS

Suitable surface preparation should be allowed for in the contract documents to ensure the construction of smooth roads.

8 PRODUCE MIX THAT IS UNIFORM AND CONSISTENT

HMA that is produced to consistently meet the JMF and the specification requirements will perform better.

10 COMPLETE QUALITY ASSURANCE (QA) TESTING AND INSPECTION

Proper QA and inspection conducted by qualified technicians and inspectors should be part of any HMA paving project to ensure long term performance.

3 SPECIFY A FINER GRADATION FOR YOUR MIX TYPE

Finer Superpave mixes will typically have higher AC content and are more durable and less prone to segregation.

6 ENSURE ADEQUATE BOND

Proper tack coat application ensures that the pavement will perform as designed and mitigate premature cracking. Good tack coating will also improve compaction.

9 USE RAP RESPONSIBLY

RAP should be utilized in accordance with the contract requirements. For higher percentages of RAP i.e. greater than 15-20 % a softer PGAC should be incorporated in the mix.

Uniformity and Consistency

□ What Does This Imply?

- **Uniformity – Lack of Variation in Overall Quality**
- **Consistency – Dependent on Material, Process and Operational Uniformity**

“If the asphalt mix produced by the plant is consistent and uniform in binder content and aggregate mix throughout, then the resulting roadway made from this material will also be consistent and uniform assuming that the paving material has been properly handled and laid down” – Dr. David Newcomb (TTI)

Uniformity and Consistency

❑ JMF Influencing Factors - Aggregates

- Excessive or Variable Stockpile Moisture
- Different/Variable Gravities from Design
- Difference in Design Blend Water and/or Binder Absorption
- Inconsistent Gradation
- Stockpile and Loading Segregation
- Cold Bin Feed Issues

❑ Impact of Aggregate Inconsistency

- Gradation Control and Mix Volumetrics
- In-place Density
- Payment
- Performance

Uniformity and Consistency

❑ JMF Influencing Factors – Asphalt Cement/Binder

- PG Differences
- Variable Binder Addition

❑ Impact of Binder Inconsistency

- Plant Operational Error
- Mix Volumetrics
- In-place Density
- Payment
- Performance

Considerations

- ❑ Understand the **GOAL** of Mix Design
- ❑ Proper Coordination to Ensure Production is within Set Tolerances and Specified Temperatures
 - **Material Control**
 - **Production Control**
 - **Placement Control**



Considerations – Material Control

- ❑ Proper Material Control Measures Ensures that Variability is Minimized/Eliminated
 - Source Acceptance and Quality Control Testing
- ❑ Selecting/Controlling Aggregates and Gradation Deviations
 - Influencing Factors on G_s
- ❑ Selecting Correct PGAC
- ❑ Optimum Asphalt Cement/Binder requirements
- ❑ Mix Compactability Concerns



Considerations – Material Control

- ❑ Influencing Factors on G_{mb}
- ❑ Influencing Factors on G_{mm}
- ❑ Influencing Factors on the Asphalt Cement/Binder Content



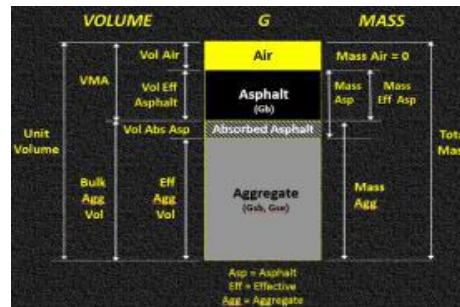
Considerations – Material Control

- Aggregate Handling/Stockpiling Techniques**
- Use of More Cold Feed Bins**
- Adequate Drying of Aggregates**
- Dust Metering and Calibration**
- Document Problems and Corrective Actions**



Considerations – Production Control

- ❑ Proper and Routine Plant Maintenance
- ❑ JMF – Remember Areas that Can Go Wrong?
 - Influencing Factors on the VMA
- ❑ Why and What Adjustments are Necessary – Base All Adjustments on QC Testing and Inspection Data



Considerations – Placement Control

- ❑ **Operational Variables that Can Complicate the Compaction Process.**
 - **Mix Characteristics**
 - **Pavement Geometry**
 - **Weather Conditions**
 - **Rolling Equipment(s)**
 - **Rolling Patterns**
 - **Other Paving Logistics**

- ❑ **Proper Planning, **Time** and Mix Quantity is Key.**



Importance of Sampling & Testing

❑ Sample, Process and Test

- Quality Evaluation
- Product Control at Supply Source
- Operational Control
- Material Acceptance/Rejection

❑ Proper Sampling is **CRITICAL** for any Product Testing

❑ Quality of Sample = Quality of Test Result

❑ Test in Accordance with Appropriate and Applicable Governing Standards



Role of Specifications

□ Ensure and Enforce Good Specifications

- Encourage Appropriate and Accurate Testing Procedures
- Establish Reasonable Incentive/Disincentives



ONTARIO
PROVINCIAL
STANDARD
SPECIFICATION

METRIC
OPSS MUNI 1151
NOVEMBER 2016

MATERIAL SPECIFICATION FOR PERFORMANCE GRADED ASPHALT CEMENT

TABLE C		ONTARIO PROVINCIAL STANDARD SPECIFICATION	OPSS MUNI 1151 April 2018
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1101.02	REFERENCES		
1101.03	DEFINITIONS		
1101.04	DESIGN AND SUBMISSIO		
1101.05	MATERIALS		
1101.06	EQUIPMENT – Not Used		
1101.07	PRODUCTION		
1101.08	QUALITY ASSURANCE		
1101.09	OWNER PURCHASE OF		
APPENDICES			
1101-A	Commentary		
1101-B	Additional Requirements Graded for Traffic Loadin		
1101.01	SCOPE		
This specification covers the requirements for the prop			
1101.01.01	Specification Significance		
This specification is written as a municipal-orient developed to reflect the administration, testing, an municipalities in Ontario.			
Use of this specification or any other specification sha			
APPENDICES			
1151-A	Commentary		
1151-B	Use of over 15% RAP by		
1151.01	SCOPE		
This specification covers the requirements for the and mixing hot mix asphalt (HMA) including warm m work according to the Superpave and SMA mix des			
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MATERIAL SPECIFICATION FOR SUPERPAVE AND STONE MASTIC ASPHALT MIXTURES



ONTARIO
PROVINCIAL
STANDARD
SPECIFICATION

METRIC
OPSS 1150
NOVEMBER 2008

TABLE D		ONTARIO PROVINCIAL STANDARD SPECIFICATION	OPSS MUNI 310 November 2017
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APPENDICES			
1150-A	Commentary		
1150-B	Marshall Stability Design Criteria for Lower Traffic		
1150-C	Marshall Stability Design Criteria When 100% Cru Aggregates Used in HL SHS Do Not Apply		
1150.01	SCOPE		
This specification covers the requirements for the materials, equipment, and proportioning and mixing hot mix asphalt, including recycled mixes and mixes			
1150.01.01	Specification Significance and Use		
This specification has been developed for use in provincial- and municipi administration, testing, and payment policies, procedures, and practices it correspond to those used by many municipalities and the Ontario Ministry of T			
Use of this specification or any other specification shall be according to the Cc			

MATERIAL SPECIFICATION FOR HOT MIX ASPHALT



ONTARIO
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SPECIFICATION

OPSS MUNI 310
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310-B	Supplemental Requirements for Using the MTO Performance Graded Asphalt Cement (PGAC) Price Index in Municipal Contracts	
310-C	Supplemental Requirements for Using Warm Mix Asphalt in Municipal Contracts	
310.01	SCOPE	
This specification covers the requirements for the placement and compaction of hot mix asphalt designed using the Marshall or Superpave methods.		
310.01.01	Specification Significance and Use	
This specification is written as a municipal-oriented specification. Municipal-oriented specifications are developed to reflect the administration, testing, and payment policies, procedures, and practices of many municipalities in Ontario.		
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CONSTRUCTION SPECIFICATION FOR HOT MIX ASPHALT

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Acknowledgements

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THANK YOU FOR LISTENING

