

2025 MN Asphalt Conference & Trade Show



Bituminous Update

December 10, 2025

John Garrity

Update Items

- 2025 Season Review
 - Warm Mix Asphalt (WMA)
 - High RAM/RAP
- Environmental Product Declarations (EPDs)
- Ratio of Add AC/Total AC
 - Specification Change
- Balanced Mix Design

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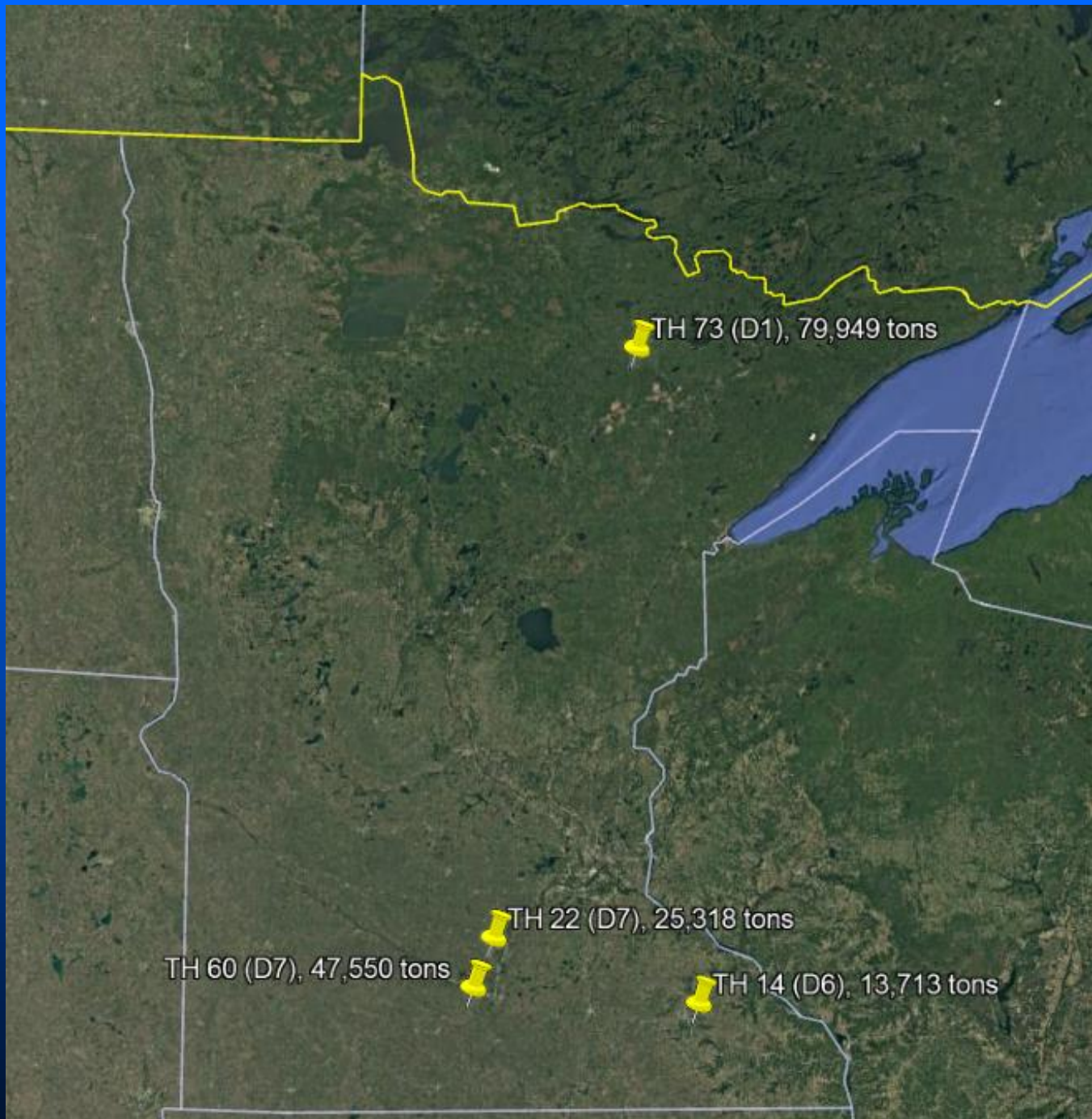
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Trial Mix Lab



2025 WMA Recap

- Four projects
 - District 1
 - SP 6930-41 (TH 73)
 - District 6
 - SP 5502-196 (TH 14)
 - District 7
 - SP 0708-47 (TH 60)
 - SP 5205-113 (TH 22)





Warm Mix Asphalt Option with Incentive

- WMA: Mix produced with an additive and temperature less than 275°F exiting the drum.
- Incentive based on mix temperature
- No WMA Incentive if greater than 25 percent of all density lots fail

Table 2360.2-1A

Warm Mix Asphalt Incentive Payment

Plant Mixing Temperature	Incentive Payment, percent
<u>$\geq 275^{\circ}\text{F}$</u>	0
$250^{\circ}\text{F} - 275^{\circ}\text{F}$	2
$< 250^{\circ}\text{F}$	4

Warm Mix Incentive Summary

TH	Percent of Max. Possible Incentive Earned	Mix Type	Avg. Daily Plant Temp. (°F)	Avg. Density	
				Mat Density	LJD
73	52%	SPWEB340C	254	93.1	91.1
60	65%	SPNWB530B	262	92.7	91.9
		SPWEB540F		92.9	91.2
14	70%	SPWEB450E	255	93.4	90.2
22	90%	SPWEB340E	239	94.5	94.6

Table 2360.2-1A

Warm Mix Asphalt Incentive Payment*

Plant Mixing Temperature	Incentive Payment, percent
> <u>275°F</u>	0
250°F - 275°F	2
< 250°F	4

* Excluding the first 100 tons of daily production, there will be no incentive payment for each mix type if more than 10 percent of the daily discharge mix temperature readings are above 275°F.

WMA Lessons Learned

- TH 14

- Overall satisfied with project outcome
 - Would be interested in producing WMA again on future projects
- Production at a permanent plant along with urban paving posed a challenge during construction
 - Producing WMA along with additional hot mixes introduced fluctuating plant temperatures during production

- TH 22

- Plant ran well with average plant production temps around 240°F
 - Good densities were achieved
- Areas requiring handwork were a challenge
- No major struggles.

WMA Lessons Learned

- TH 73
 - Overall project went well
 - Were able to get better densities when producing mix < 250°F
 - Better on baghouse and lab equipment was cleaner
- TH 60
 - Good finished product
 - Higher traffic level mix with high amounts of quartzite made compaction a challenge
 - Production at plant went well

2026 Projects Including WMA Option

- District 1
 - SP 6908-68, TH 2
- District 2
 - SP 0410-51, US 71
 - SP 6806-31, TH 89
- District 3
- District 4
 - SP 8402-24, TH 9
- Metro
 - SP 1923-48, TH 50
- District 6
 - SP 8580-175, I90 EB&WB
 - SP 8580-178, I90 WB
 - SP 6603-30, TH 19
- District 7
- District 8
 - SP 6502-17, TH 4 (TBD)





High RAP

2025 High RAP Project

- District 1 – SP 6930-41
 - TH 73, High RAP allowed in all mixes
 - SPWEB340C – 40% RAP
 - WMA too!



Provision for High RAM/RAP Option

S-1 **(2360) PLANT MIXED ASPHALT PAVEMENT – HIGH RECYCLED ASPHALT MATERIAL (RAM) WITH RECYCLING AGENT CONTRACTOR OPTION**

Use on Project, if needed.

SP2020-XXX

S-1.1 Modify 2360.2 C, Additives, to include 2360.2 C.5, Recycling Agent (RA) as follows:

2360.2 C.5 Recycling Agent (Contractor Added)

High Recycled Asphalt Material (RAM) is an approved alternative to the Standard 2360, Plant Mixed Asphalt, Specification for the following mixes: **INSERT MIXES HERE**. Examples are: 1) All shoulder mix, 2) All non-wear mix, 3) non-final mainline lifts 4) Final lift and all other mainline lifts and shoulder mix.

High RAM Design Requirements

- Hamburg Wheel Track Test
 - Evaluate rutting and stripping potential of the mix
- Disc Shaped Compact Tension Test (DCT)
 - Evaluate fracture energy of the mix. Susceptibility to cracking.
 - IDEAL-CT will be used during production.
- Recycling Agent Properties (RA)
 - Must meet RA 0 Category of ASTM D4552-20

TH 73 Photos



2026 High RAP Project



- District 1
 - SP 6908-68 (TH 2)
Shoulders Only

What Is an EPD?

Type III Environmental Product Declarations (EPDs):

- Based on Life Cycle Assessments (LCAs)
- Third-party **verified**
- **Standardized, transparent, and comparable**
- Focus on Global Warming Potential (GWP) as the key metric

Use **product-specific supply chain data**

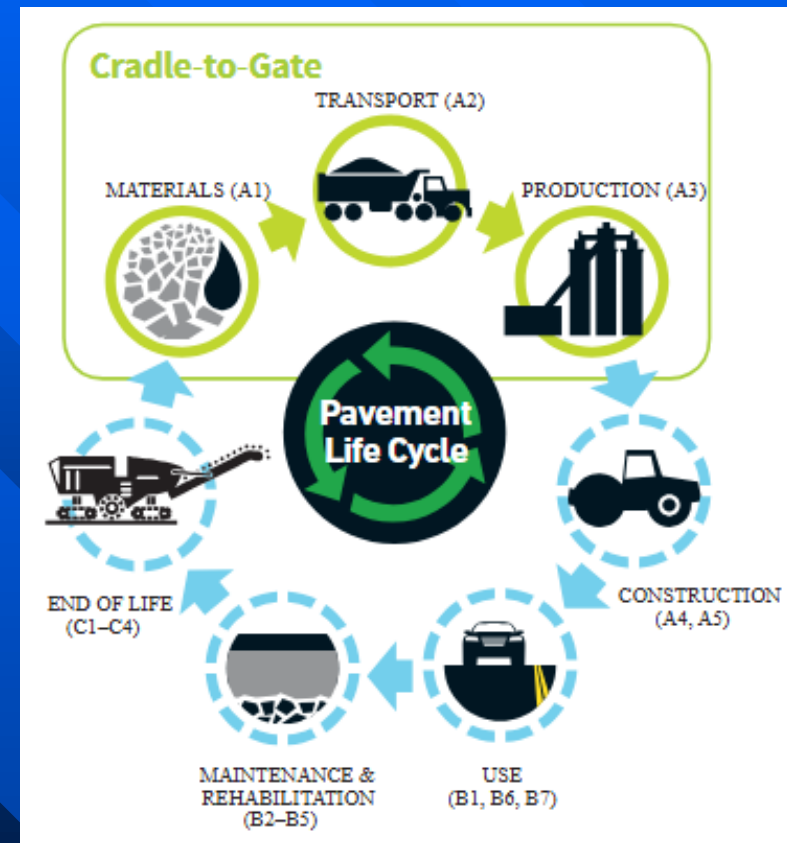
- Include upstream EPDs (e.g., cement, asphalt cement)

• EPD Training This Afternoon!!!

Product Impacts	
Product Name: State DOT Mix Type 4	
Manufacturer: AAA Asphalt	
Facility: Best Asphalt Plant, Anytown, USA	
Declared Unit: 1 metric ton	
Resource Consumption	
Nonrenewable Primary Energy - Energy (MJ)	160
Renewable Primary Energy - Energy (MJ)	35
Nonrenewable Primary Energy - Materials (MJ)	250
Renewable Primary Energy - Materials (MJ)	2
Environmental Impacts	
Global Warming Potential (kg CO ₂ eq)	85.6
Ozone Depletion Potential (kg CFC-11 eq)	1.5
Acidification Potential (kg SO ₂ eq)	40.3
Eutrophication Potential (kg N eq)	125.4
Photochemical Oxidant Creation Potential (kg O ₃ eq)	45.3
Ingredients	
Crushed stone	
Reclaimed Asphalt Pavement	
Asphalt Binder, PG 58-34	
Liquid Antistrip, Tall Oil Based	

Cradle-to-gate EPD Stages

- **A1 – Raw Material Supply** covers the **extraction and processing** of raw materials used in the production of asphalt or concrete mixes.
- **A2 – Transportation** involves the transportation of raw materials from their **source to the manufacturing site**.
- **A3 – Manufacturing** includes the actual **production process of mixing**, encompassing all activities within the plant.



Where are we now?

- Change orders on 9 projects
- Looking at Mar to Oct lettings for potential projects - ~ 60 projects
- Working with industry to provide training. Later today.
- Special Provision boiler plate

S-1 [1603] MATERIALS; SPECIFICATIONS, SAMPLES, TESTS, AND ACCEPTANCE (EPD)
NEW 06/10/25 ◀DO NOT REMOVE THIS DATE. IT NEEDS TO STAY IN FOR THE CONTRACTORS.
 Always use this write-up when using SP2025-XX [2062] Environmental Product Declaration (EPD).
 SP2025-XX
 S-1.1 Add the following to 1603, "Materials: specifications, Samples, Tests, and Acceptance":
1603.5 Development of Global Warming Impact Standards
 The Contractor shall submit supply chain-specific Type III Environmental Product Declarations (EPDs) for material in accordance with S-2 [2062] Environmental Product Declaration. The provisions of the Buy Clean and Buy Fair Minnesota Act (Sec. 16B.312 MN Statutes) require incorporating global warming impact standards into the state's procurement process for construction materials used in public infrastructure projects. To achieve this the Department is requesting the Contractor to submit supply chain-specific Type III Environmental Product Declarations (EPDs) for all eligible materials as defined by State Statute. The reporting of environmental impacts will account for embodied carbon of construction materials in accordance with the Buy Clean and Buy Fair Minnesota Act, ISO 21930, ISO 14025 and ISO 14040/44.

S-2 [2062] ENVIRONMENTAL PRODUCT DECLARATION (EPD)
NEW 7/11/2025 ◀DO NOT REMOVE THIS DATE. IT NEEDS TO STAY IN FOR THE CONTRACTORS.
 Use this special provision when the project meets any of the following criteria:
 (a) New construction, rehabilitation, mill and overlay, or reconstruction of two or more lane-miles of a trunk highway pavement.
 (b) New construction or re-decking with a total bridge deck quantity of 6000 square feet or more.
 (c) ADA projects with a minimum of more than 1 intersection in the project
 • Contact Emil Bautista, Office of Materials and Road Research, to determine the number of EPDs that will be required for this project.
 SP2025-XX
 S-2.1 DESCRIPTION
 This Work consists of submitting Type III Environmental Product Declarations (EPDs) in accordance with S-1 (16 Materials: Specifications, Samples, Tests, and Acceptance (EPD)). These EPDs are Cradle-to-Gate, including life cycle stages A1, A3: raw material supply, transport to the manufacturing site, and manufacturing.
 S-2.2 MATERIALS - BLANK
 S-2.3 CONSTRUCTION REQUIREMENTS
 Provide EPDs for the following materials:
 Insert "X" in the EPD Required column and a number of estimated EPDs in the No. of EPDs column to indicate the deliverable in the Project scope.
 Do not delete rows from table.

**Table SP2062-1
 Materials Requiring EPDs**

Item	EPD Required	No. of EPDs
2301, "Concrete Pavement"		
2301.502 Dowel Bar		
2301.507 Structural Concrete		
2301.508 Supplemental Pavement Reinforcement		
2360, "Plant Mixed Asphalt Pavement"		
2630.509 Type SP 9.5 Wearing Course Mixture (3,C)		
2630.509 Type SP 12.5 Wearing Course Mixture (5,B)		
2630.509 Type SP 12.5 Wearing Course Mixture (5,F)		
2521, "Walks"		
2521.518 3" Concrete Walk		
2531, "Concrete Curbing"		
2531.518 Concrete Curb and Gutter Design		
2533, "Concrete Median Barrier"		
2533.503 Concrete Median Barrier Des 8308 Type AA		
2533.503 Concrete Med Bar Des Set Slope Type S4Tran		

Provide Type III Cradle-to-Gate EPDs meeting ISO standards ISO 21930, ISO 14025 and ISO 14040/44. Use product specific supply chain data, including an EPD for upstream cement or asphalt cement production for concrete and bituminous mixtures mix-design specific EPDs. Use industry average values when product specific supply chain data does not exist. Cradle-to-gate EPDs report on the production stage of the life cycle, encompassing A1 to A3 modules: raw material extraction, transportation to the plant, and manufacturing processes.
 Notify the Engineer, prior to the preconstruction meeting, when a source does not have 12 months of data to support development of the EPD.
 Produce EPDs files in Portable Document Format (PDF) or OpenEPA JavaScript Object Notation (JSON) Format using the following naming convention SP_Number_Pay Item Name_Mix No_EPDPdf. (e.g., SP1234-568_Bridge Slab Concrete_3YHPC-S_EPDPdf or SP1234-568_Reinforcement Bars_EPDPdf.)
 Submit Type III EPDs per source and location as shown in Table SP2062-1, with the associated delivered quantities, in twelve weeks or less of completion of final installation of the Contract item to the Engineer and to epd.mn.dot@state.mn.us. Include the SP Project number, and when applicable, the MnDOT Mix ID for the concrete and asphalt mixtures in the subject line.
 S-2.4 METHOD OF MEASUREMENT
 The Engineer will measure Environmental Product Declaration by the number of Environmental Product Declarations, as shown in Table SP2062-1, submitted for each unique material and mix design.
 S-2.5 BASIS OF PAYMENT
 The Contract Unit Price for Environmental Product Declaration is compensation in full for developing and supplying the EPDs for the Materials required to complete the Work. The Engineer will pay for that EPD once per Contract when the same EPD is used for more than one pay item. The Engineer may pay for additional EPDs needed to complete the Work.
 The Department will pay for Environmental Product Declaration shown in Table SP2062-1 on the basis of the following schedule:

Item No.	Item	Unit
2062.602	Environmental Product Declaration	each

The Commissioner must establish and publish a maximum acceptable global warming potential by January 15, 2028

Ratio of Added AC to Total AC Actual Data

Actual Project Test Summary Sheet

		3.9	3.6	3.6	3.6	3.6	3.6
Required Min.	66	67	61	60	73	65	63
Required Min.	70	71	68	64	65	65	65
Quality Control Actions	Increase AC	%					
	Decrease AC	%		0.2			
	RAP/Millings Adjustment	Blank or Yes					
	Coarse aggregate adjustment	Blank or Yes	Yes		Yes		Yes
	Fine aggregate adjustment	Blank or Yes	Yes		Yes		Yes
	WMA Additive or Process	Blank or Yes					
	WMA Dosage	%					
	Other						

Ratio of New Added Asphalt Binder to Total Asphalt Binder – Acceptance Criteria

Specification Change

Specification Change

Table 2360.2-12
Ratio of New Added Asphalt Binder to Total Asphalt Binder Acceptance Criteria

Specified Asphalt Grade	Recycled Material		
	RAS Only	RAS + RAP	RAP Only
PG 58*-28, PG 52S-34, PG 49-34, PG 64S-22			
Wear (moving average)	70	70	70
Non Wear (moving average)	70	70	65
PG 58*-34			
Wear & Non Wear (moving average)	80	80	80
*= S, H, V, or E			

Table 2360.5-3
Monetary Deductions Schedule for Moving Average Test Results

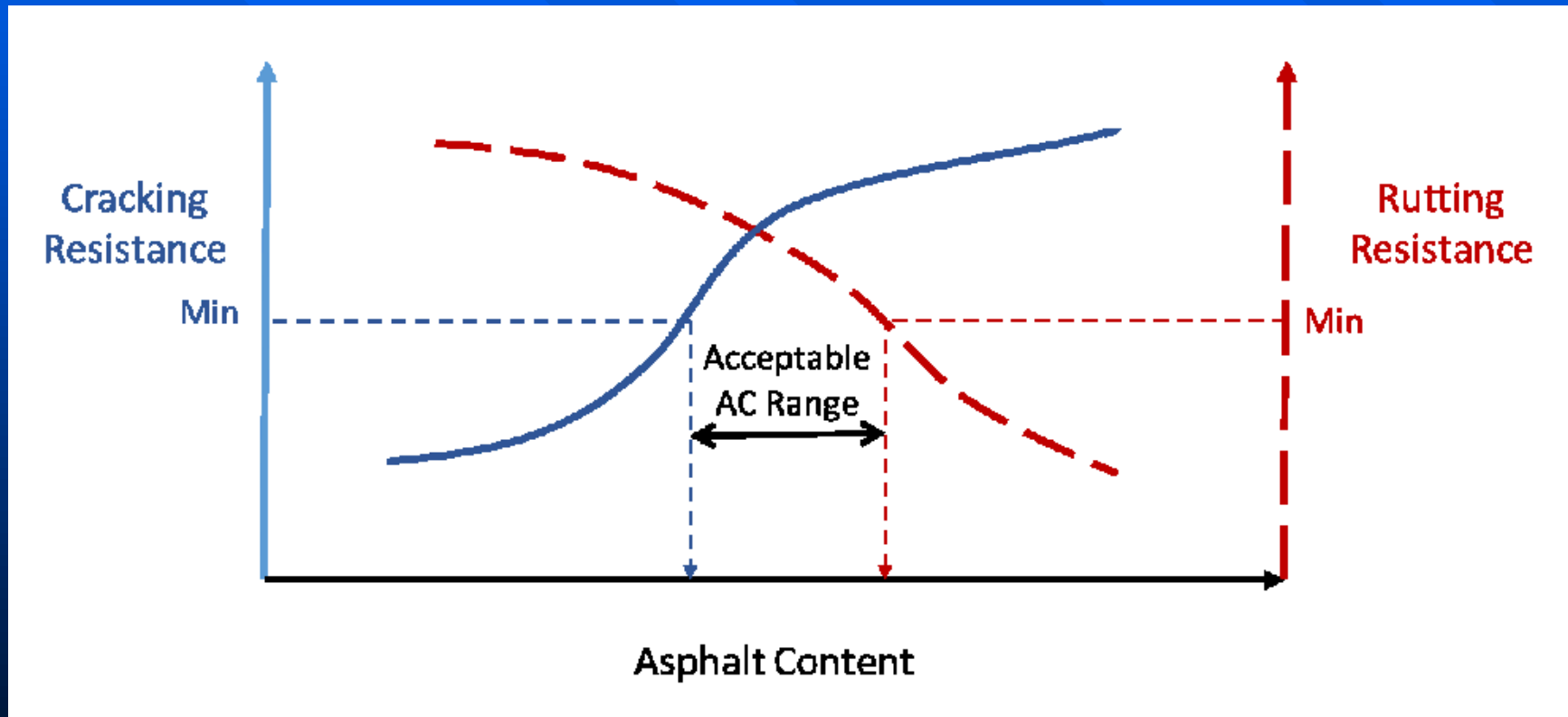
Item	Monetary Deduction, Percent *
Gradation	10
Coarse and fine Aggregate crushing	NA (individual failures only)
Adjusted AFT	20
Asphalt binder content	20
Production air voids	30
Ratio of New Added Asphalt Binder to Total Asphalt Binder	10
* Lowest Pay Factor applies when there are multiple reductions on a single test.	

Balanced Mix Design (BMD)

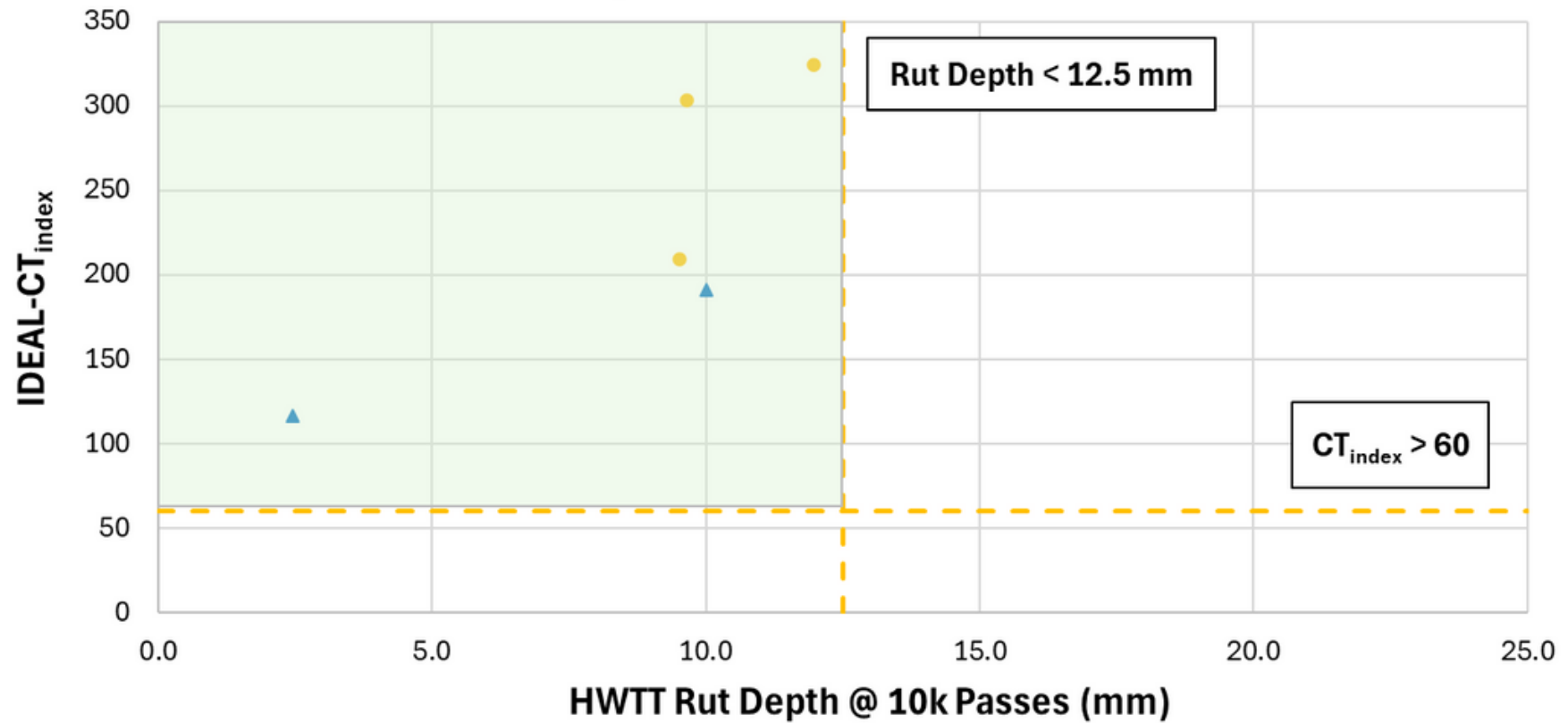
- What is BMD?
 - “asphalt mix design using performance tests on appropriately conditioned specimens that address multiple modes of distress taking into consideration mix aging, traffic, climate and location within the pavement structure” FHWA 2015

Why BMD?

- Address concerns with durability and cracking.



Hamburg (HWTT) vs. IDEAL-CT



A Manicured Stretch of Pavement

Thank You

