BMD IMPLEMENTATION STATUS UPDATE

JAY SENGOZ MARCH 19,20,21 2024

pennsylvania
DEPARTMENT OF TRANSPORTATION

PENNDOT BY THE NUMBERS

*Total miles on all PA roadways

LB (1-24)

SOL 481-24-01

- Published on February 23, 2024
  - Supersedes SOL 481-22-01 Dated January 21, 2022

- REVISED IMPLEMENTATION OF BMD FOR WEARING COURSE MIX DESIGNS

- FULL IMPLEMENTATION PHASED OVER 3 YEARS

- BULLETIN 27 CHAPTER 2A REVISED TO INCLUDE THE SUBMISSION OF BMD DATA

SOL 481-24-01

JMF YEAR 2025

- All Dense-graded **wearing** courses
  - 6.3 mm, 9.5 mm, 12.5 mm, 19.0 mm
  - N_{design} = 50 or 75 gyrations
  - Skid Resistance Levels of “E”,“H”,“G”,“M”, or “L” are **required**
- SMA gap-graded wearing courses are **required**
  - 9.5 mm, 12.5 mm
  - N_{design} = 100 gyrations

SOL 481-24-01

JMF YEAR 2025 Continued

- Dense-graded **binder** courses are **not required** but encouraged
  - 19.0 mm, 25.0 mm

- Dense-graded **base** courses are **not required** but encouraged
  - 25.0 mm, 37.5 mm

- Dense-graded **4.75 mm** is **not required**

SOL 481-24-01

JMF YEAR 2025 Continued

- Pervious Asphalt Pavement System with 9.5 mm, open-graded wearing and binder course, 9.5 mm or 19.0 mm, N_{design} = 50 gyrations are **not required**
- Gap-graded Ultra-Thin Bonded Wearing courses (Types A, B, or C) are **not required**

SOL 481-24-01

JMF YEAR 2026

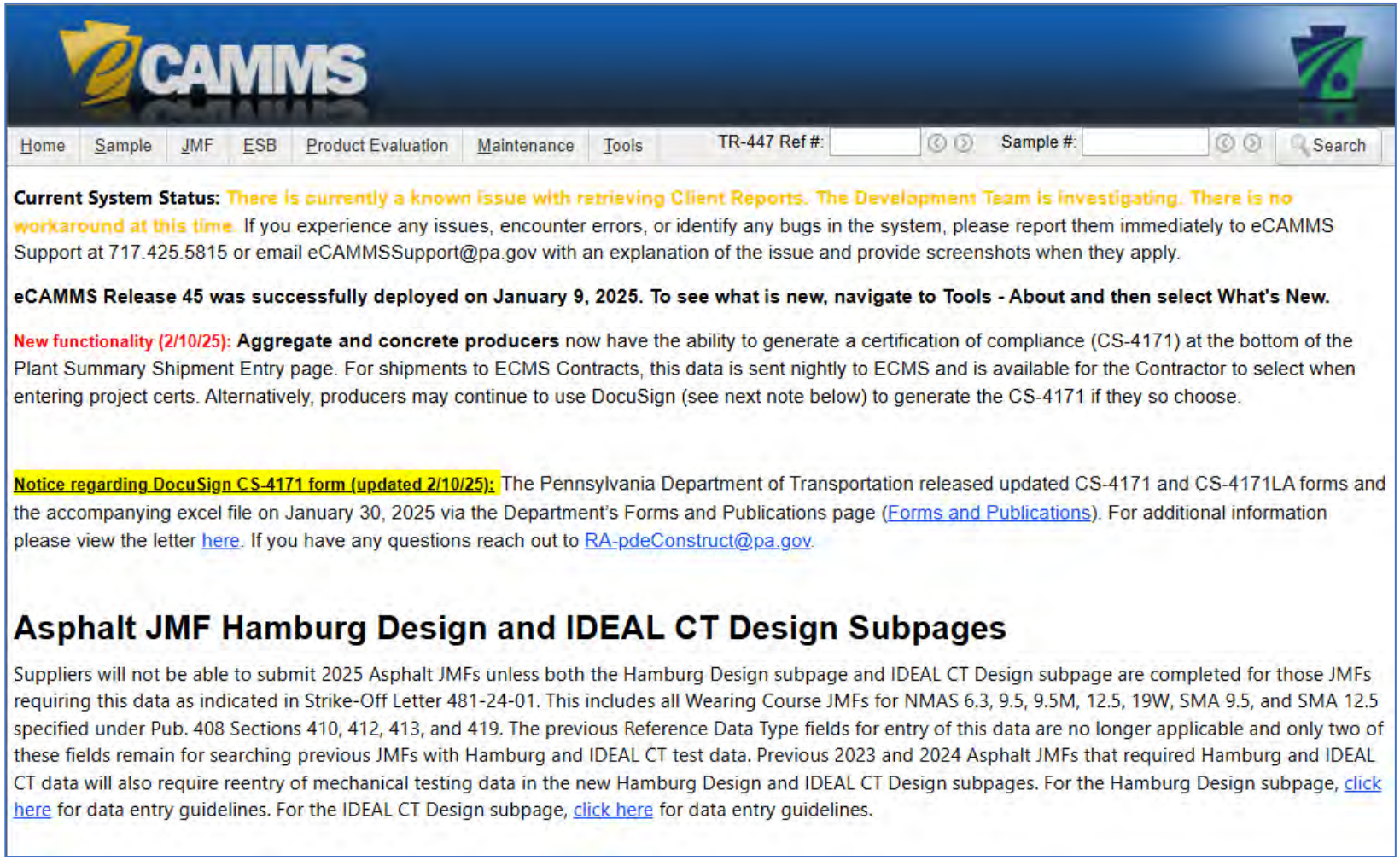
- Requirements are the same as the JMF YEAR 2025

- It is intended that revised asphalt mixture design mechanical test **thresholds or limits** for Superpave Asphalt Mixture Design, dense-graded wearing course JMFs with a NMAS of 6.3 mm, 9.5 mm, 9.5 mm Fine-Graded, 12.5 mm, 19.0 mm, N_{design} = 50 and 75 gyrations, All SRLs, **will be issued, but not enforced**.

SOL 481-24-01

	2024	2025	2026
Nd = 50 Wearing	✓	✓	✓
Nd = 75 Wearing SRL = E or H	✓	✓	✓
Nd = 75 Wearing SRL = G, M, or L	✗	✓	✓
6.3 mm	✓	✓	✓
Binder Course	✗	✗	✗
Base Course	✗	✗	✗
SMA	✗	✓	✓
4.75mm, Pervious, Ultra-Thin	✗	✗	✗

JMF REFERENCE DATA



Current System Status: There is currently a known issue with retrieving Client Reports. The Development Team is investigating. There is no workaround at this time. If you experience any issues, encounter errors, or identify any bugs in the system, please report them immediately to eCAMMS Support at 717.425.5815 or email eCAMMSSupport@pa.gov with an explanation of the issue and provide screenshots when they apply.

eCAMMS Release 45 was successfully deployed on January 9, 2025. To see what is new, navigate to Tools - About and then select What's New.

New functionality (2/10/25): **Aggregate and concrete producers** now have the ability to generate a certification of compliance (CS-4171) at the bottom of the Plant Summary Shipment Entry page. For shipments to ECMS Contracts, this data is sent nightly to ECMS and is available for the Contractor to select when entering project certs. Alternatively, producers may continue to use DocuSign (see next note below) to generate the CS-4171 if they so choose.

Notice regarding DocuSign CS-4171 form (updated 2/10/25): The Pennsylvania Department of Transportation released updated CS-4171 and CS-4171LA forms and the accompanying excel file on January 30, 2025 via the Department's Forms and Publications page (Forms and Publications). For additional information please view the letter here. If you have any questions reach out to RA-pdeConstruct@pa.gov.

Asphalt JMF Hamburg Design and IDEAL CT Design Subpages

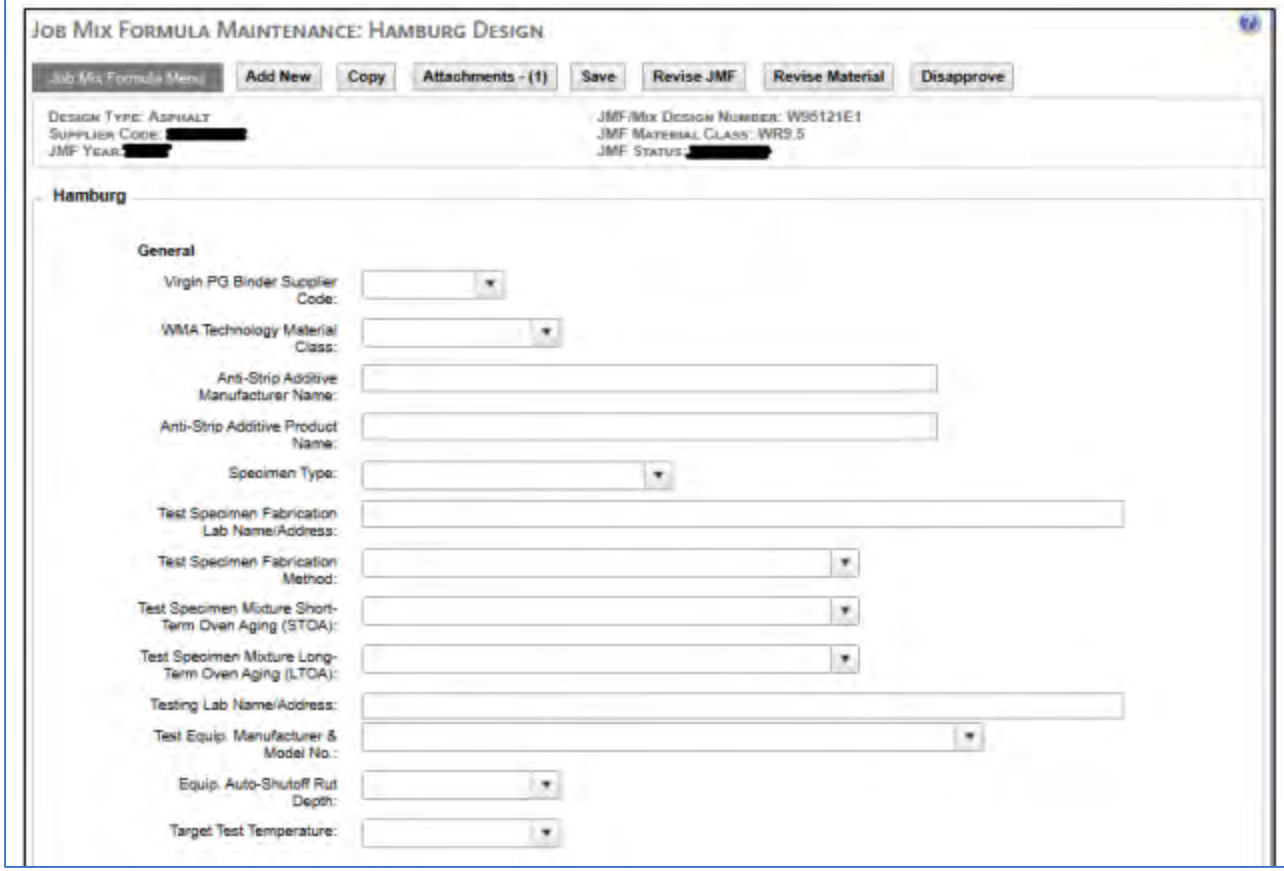
Suppliers will not be able to submit 2025 Asphalt JMFs unless both the Hamburg Design subpage and IDEAL CT Design subpage are completed for those JMFs requiring this data as indicated in Strike-Off Letter 481-24-01. This includes all Wearing Course JMFs for NMAS 6.3, 9.5, 9.5M, 12.5, 19W, SMA 9.5, and SMA 12.5 specified under Pub. 408 Sections 410, 412, 413, and 419. The previous Reference Data Type fields for entry of this data are no longer applicable and only two of these fields remain for searching previous JMFs with Hamburg and IDEAL CT test data. Previous 2023 and 2024 Asphalt JMFs that required Hamburg and IDEAL CT data will also require reentry of mechanical testing data in the new Hamburg Design and IDEAL CT Design subpages. For the Hamburg Design subpage, click here for data entry guidelines. For the IDEAL CT Design subpage, click here for data entry guidelines.

JMF REFERENCE DATA

eCAMMS Asphalt JMFs

New Hamburg Design page

Hamburg Design page with fields blank (Greyed-Out fields are calculated fields and do not require data input by the user):



JMF REFERENCE DATA

Hamburg

General

Virgin PG Binder Supplier Code:	
WMA Technology Material Class:	
Anti-Strip Additive Manufacturer Name:	
Anti-Strip Additive Product Name:	
Specimen Type:	
Test Specimen Fabrication Lab Name/Address:	
Test Specimen Fabrication Method:	
Test Specimen Mixture Short-Term Oven Aging (STOA):	
Test Specimen Mixture Long-Term Oven Aging (LTOA):	
Testing Lab Name/Address:	
Test Equip. Manufacturer & Model No.:	
Equip. Auto-Shutoff Rut Depth:	
Target Test Temperature:	

JMF REFERENCE DATA

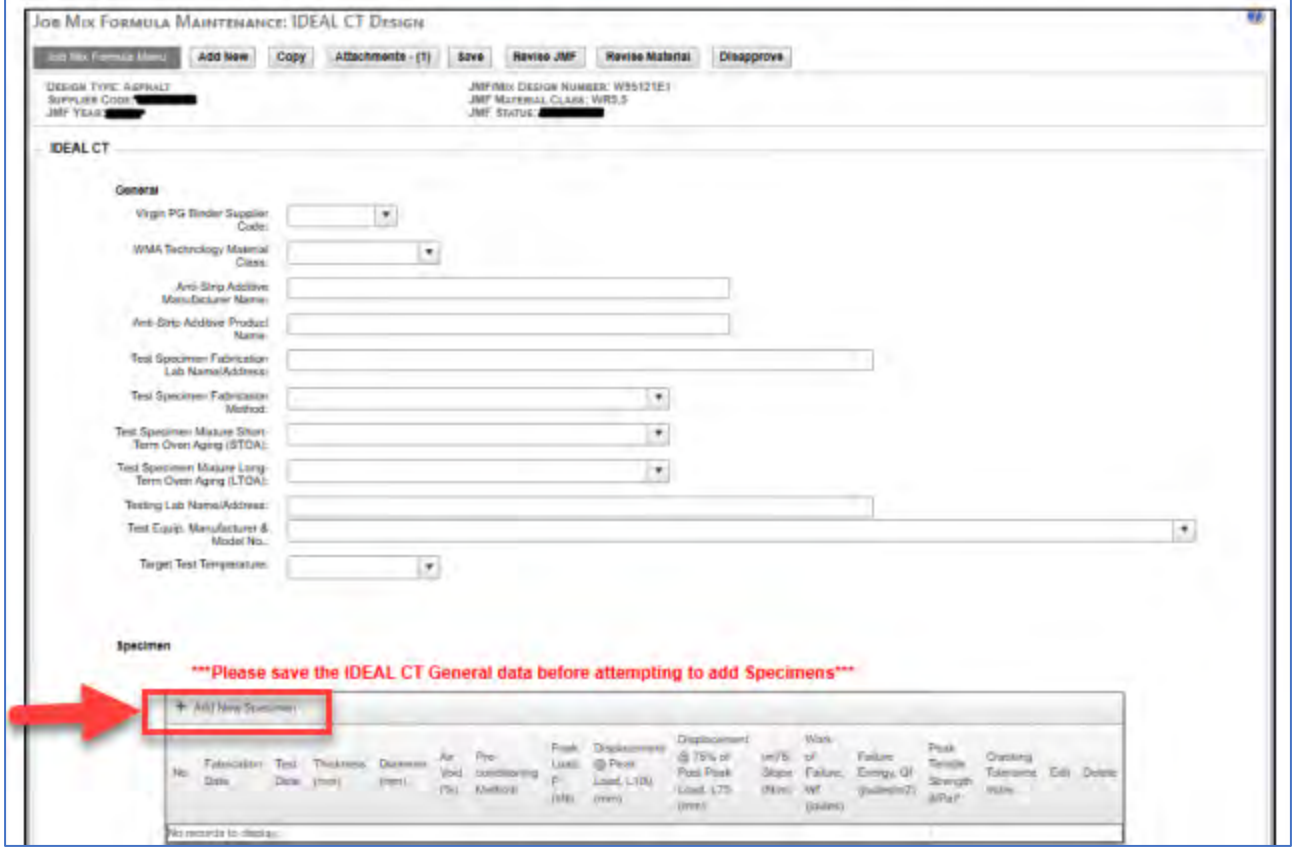
	Left Wheel Track	Right Wheel Track	Average
Test Specimen Fabrication Date:			
Test Specimen Test Date:			
Specimen #1 (Front) Air Void (%):			
Specimen #2 (Rear) Air Void (%):			
Average Specimen #1 & #2 Air Void (%):			
Rut Depth @ 10K Passes (mm):			
Rut Depth @ 20K Passes (mm):			
No. of Passes @ 12.5 mm Rut Depth:			
No. of Passes @ Equip. Auto-Shutoff Rut Depth:			
Creep Slope:			
Stripping Slope:			
No. of Passes @ SIP:			

JMF REFERENCE DATA

eCAMMS Asphalt JMFs

New IDEAL CT Design Page

IDEAL CT Design page where all fields are initially blank (Greyed-Out fields are calculated fields and do not require data input by user):



JMF REFERENCE DATA

IDEAL CT

General

Virgin PG Binder Supplier Code:	
WMA Technology Material Class:	
Anti-Strip Additive Manufacturer Name:	
Anti-Strip Additive Product Name:	
Test Specimen Fabrication Lab Name/Address:	
Test Specimen Fabrication Method:	
Test Specimen Mixture Short-Term Oven Aging (STOA):	
Test Specimen Mixture Long-Term Oven Aging (LTOA):	
Testing Lab Name/Address:	
Test Equip. Manufacturer & Model No.:	
Target Test Temperature:	

JMF REFERENCE DATA

Specimen

+ Add New Specimen

No.	Fabrication Date	Test Date	Thickness (mm)	Diameter (mm)	Air Void (%)	Pre-conditioning Method	Peak Load, P (kN)	Displacement @ Peak Load, L100 (mm)	Displacement @ 75% of Post Peak Load, L75 (mm)	|m75| Slope (N/m)	Work of Failure, Wf (joules)	Failure Energy, Gf (joules/m2)	Peak Tensile Strength (kPa)*	Cracking Tolerance Index	Edit	Delete
1	12/02/24	12/04/24	60.2	148.6	6.5	2	8.840	4.24	6.11	0.1	81.60	9121.68	629.0	98.0		
2	12/02/24	12/04/24	60.9	148.6	6.6	2	8.770	4.52	6.81	0.1	85.70	9469.88	616.9	106.0		
3	12/02/24	12/04/24	61.4	148.6	6.8	2	8.930	4.86	5.92	0.1	96.10	10532.61	623.0	93.0		

Specimen calculations

Number of Specimens:	3
Average Thickness (mm):	60.8
Average Diameter (mm):	148.6
Average Air Void (%):	6.6
Average Peak Load, P (kN):	8.847
Average Displacement @ Peak Load, L100 (mm):	4.54
Average Displacement @ 75% of Post Peak Load, L75 (mm):	6.28
Average |m75| Slope (N/m):	0.1
Average Work of Failure, Wf (joules):	87.80
Average Failure Energy, Gf (joules/m2):	9,708.06
Average Peak Tensile Strength (kPa)*:	623.0
Cracking Tolerance Index Average:	99.0
Cracking Tolerance Index Std. Dev. (s):	7.0
Cracking Tolerance Index COV (%):	0.7

JMF REFERENCE DATA

Field Name	Field Format	Data to be Input	Dropdown Options [Only Option(s) that should be Selected]	Field Required (Yes/No)?
Test Specimen Fabrication Lab Name/Address:	Text	Company Name and Address of the laboratory that prepared or fabricated the test specimens used for the IDEAL-CT testing. *For Bulletin 41 Producer/Supplier company names and addresses, it is recommended to fully copy the PennDOT online Bulletin 41 Supplier Physical Address information and paste it into this field.*	N/A	Yes.
Test Specimen Fabrication Method:	Dropdown	Type of Test Specimens used for the IDEAL-CT testing.	• CORE (Field Cores) • LMLC (Lab Mixed Lab Compacted) • PMPC (Plant Mixed Plant Compacted)	Yes.
Test Specimen Mixture Short-Term Oven Aging (STOA):	Dropdown	Loose mixture short-term oven conditioning/aging used prior to using the Superpave Gyratory Compactor (SGC) to compact the test specimens used for the IDEAL-CT testing.	• 2 HRS @ 116 C (WMA) • 2 HRS @ 135 C (HMA) • 2 HRS @ 140 C (PG58S-28) • 2 HRS @ 145 C (PG64S-22) • 2 HRS @ 153 C (PG64E-22)	Yes.

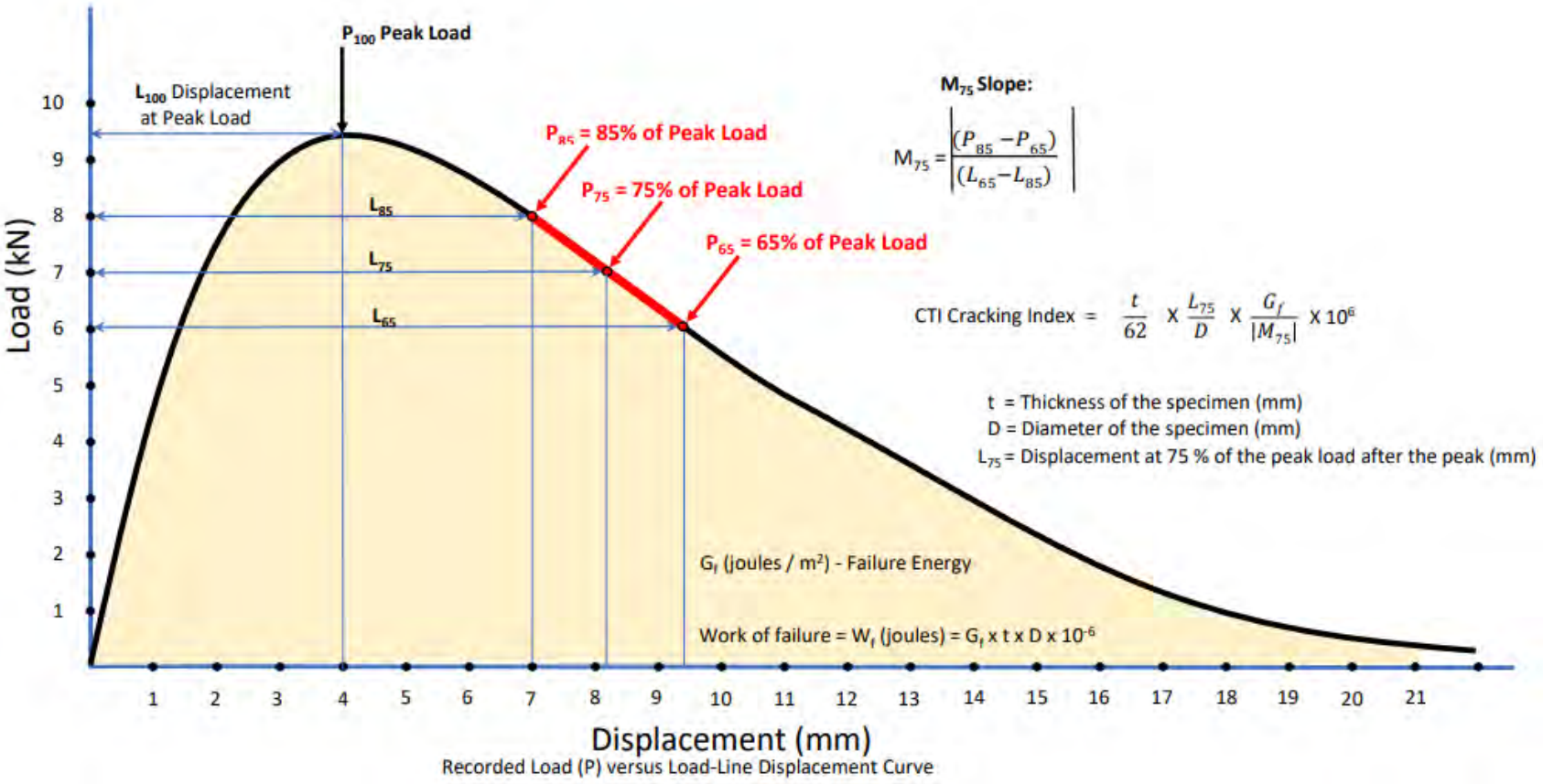
JMF REFERENCE DATA

Field Name	Field Format	Data to be Input	Dropdown Options [Only Option(s) that should be Selected]	Field Required (Yes/No)?
Equip. Auto-Shutoff Rut Depth:	Dropdown	Rut Depth set in the Hamburg Wheel Tracking Test Device control software where the equipment will shut-off due to exceeding the set rut depth prior to reaching a completed test of 20,000 passes.	• 12.5 mm, • 15 mm, • 18 mm, • 20 mm SOL 481-24-01, Bulletin 27, Chapter 2A, requires this depth to be 20 mm.	Yes.
Target Test Temperature:	Dropdown	Target Test Temperature used for the Hamburg Wheel Track Testing.	• 50 C	Yes.

ECAMMS UPDATE

E-mail notification dated 12/7/2022

ASTM D8225 - Standard Test Method for Determination of Cracking Tolerance Index of Asphalt Mixture
Using the Indirect Tensile Cracking Test at Intermediate Temperature



Recorded Load (P) versus Load-Line Displacement Curve

JMF REFERENCE DATA

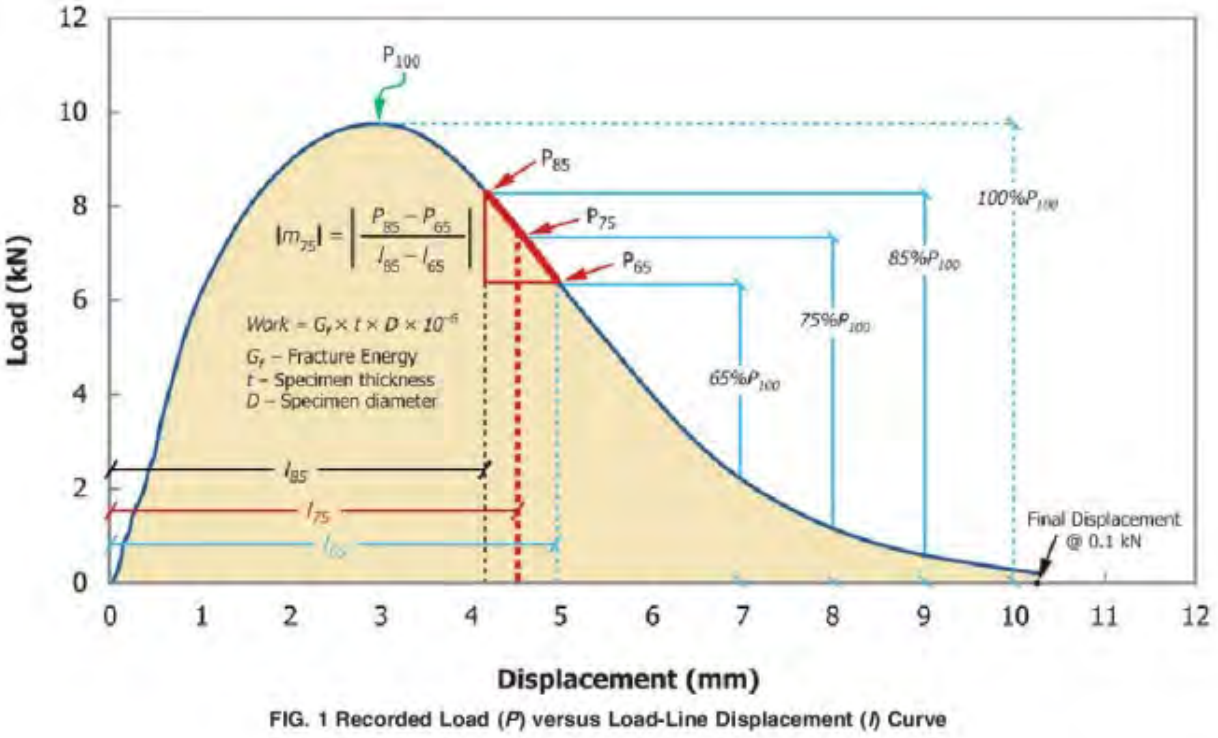
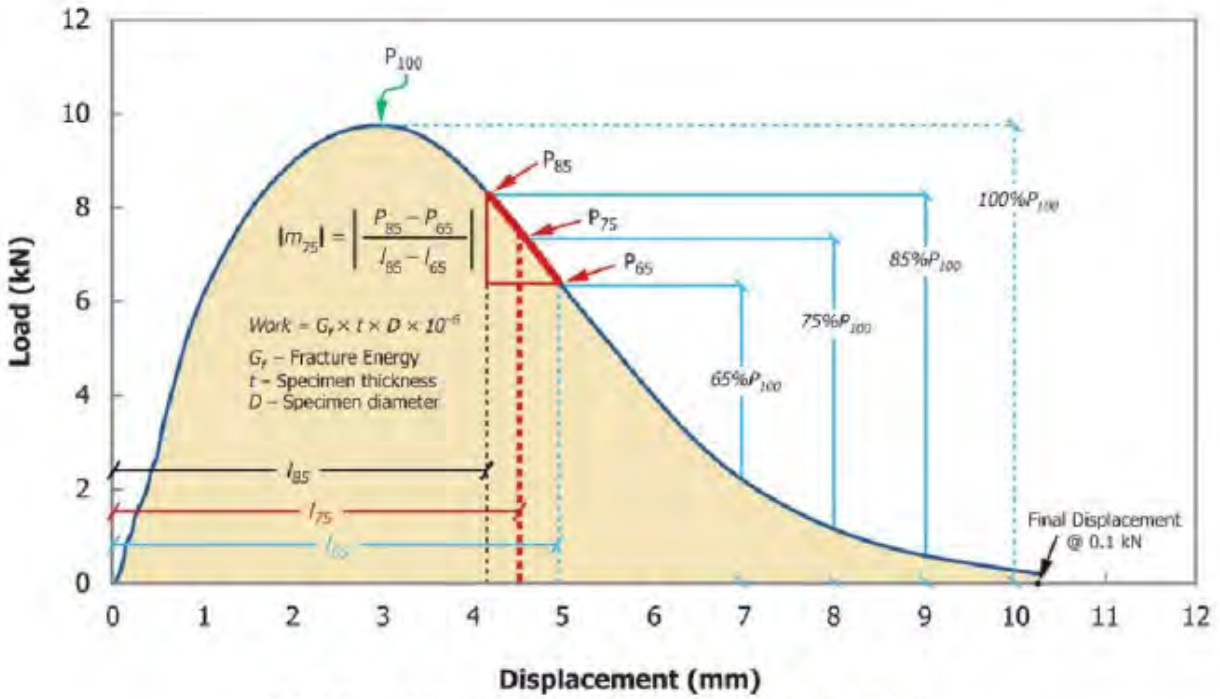


FIG. 1 Recorded Load (*P*) versus Load-Line Displacement (*l*) Curve

Example:
P85 = 14.99 kN
P65 = 11.47 kN
L85 = 5.02 mm
L65 = 5.83 mm

JMF REFERENCE DATA



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Example:
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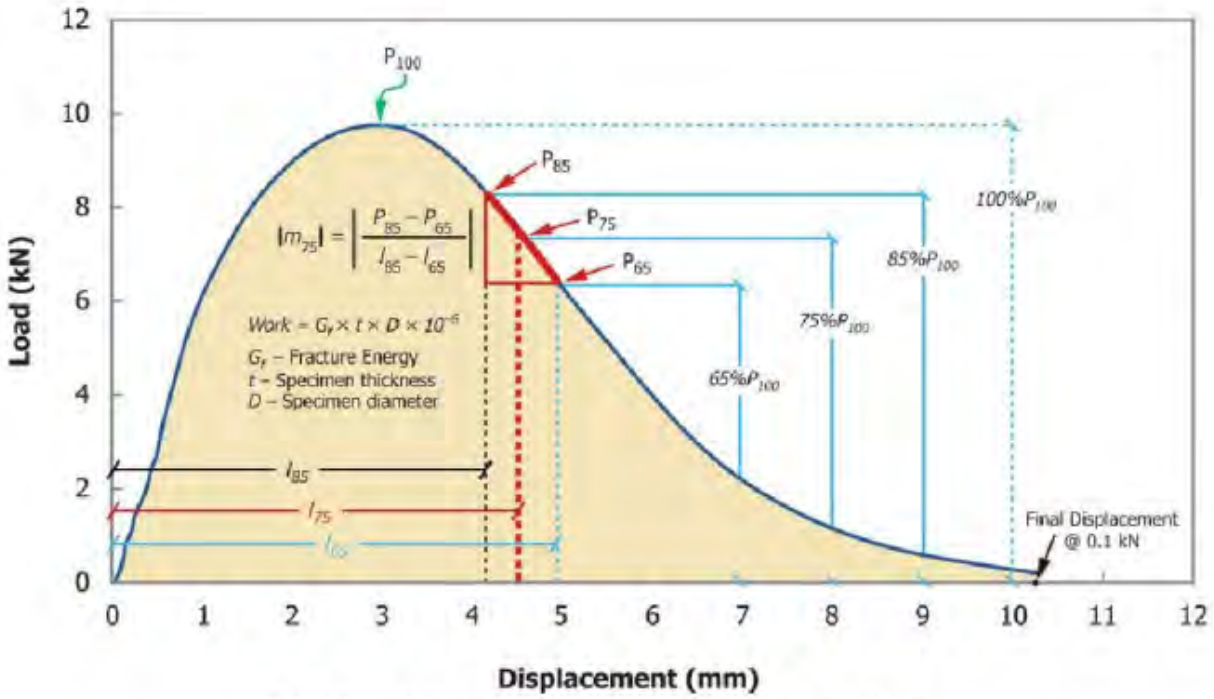
$$m = \left| \frac{(14.99-11.47)\ \text{kN}}{(5.02-5.83)\ \text{mm}} \right|$$

JMF REFERENCE DATA



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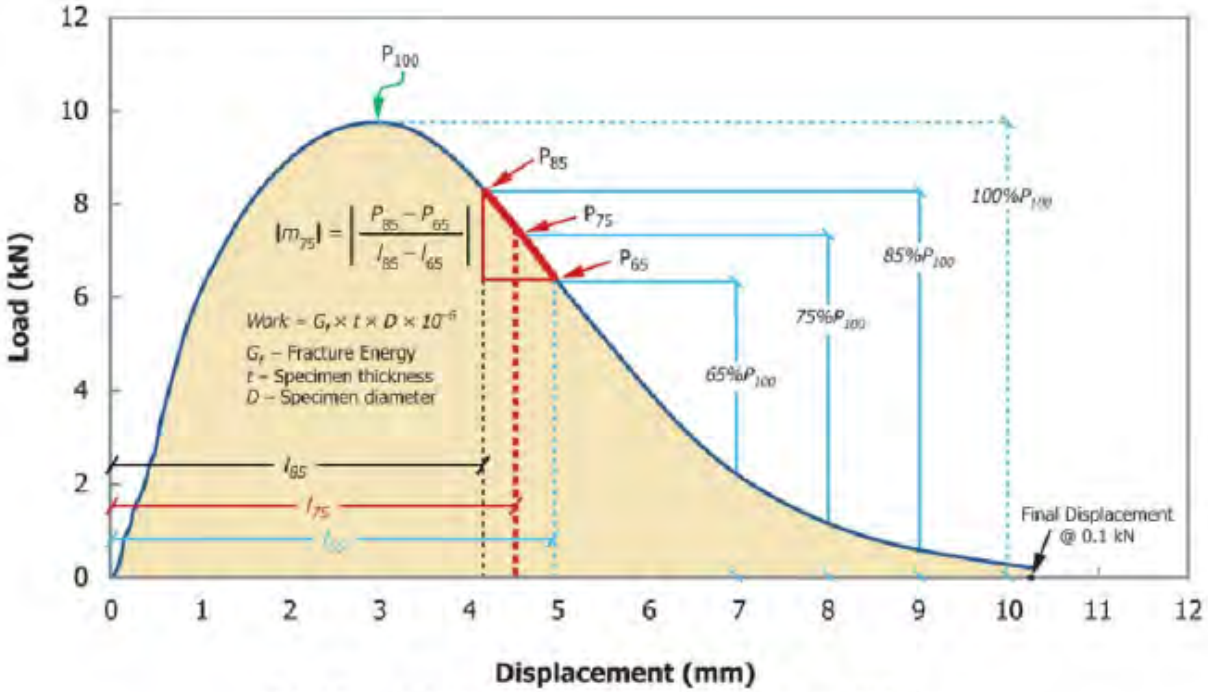
$$m = \left| \frac{(14.99-11.47)\ \text{kN}}{(5.02-5.83)\ \text{mm}} \right|$$

$$m = \frac{3.52\ \text{kN}}{0.81\ \text{mm}}$$

JMF REFERENCE DATA



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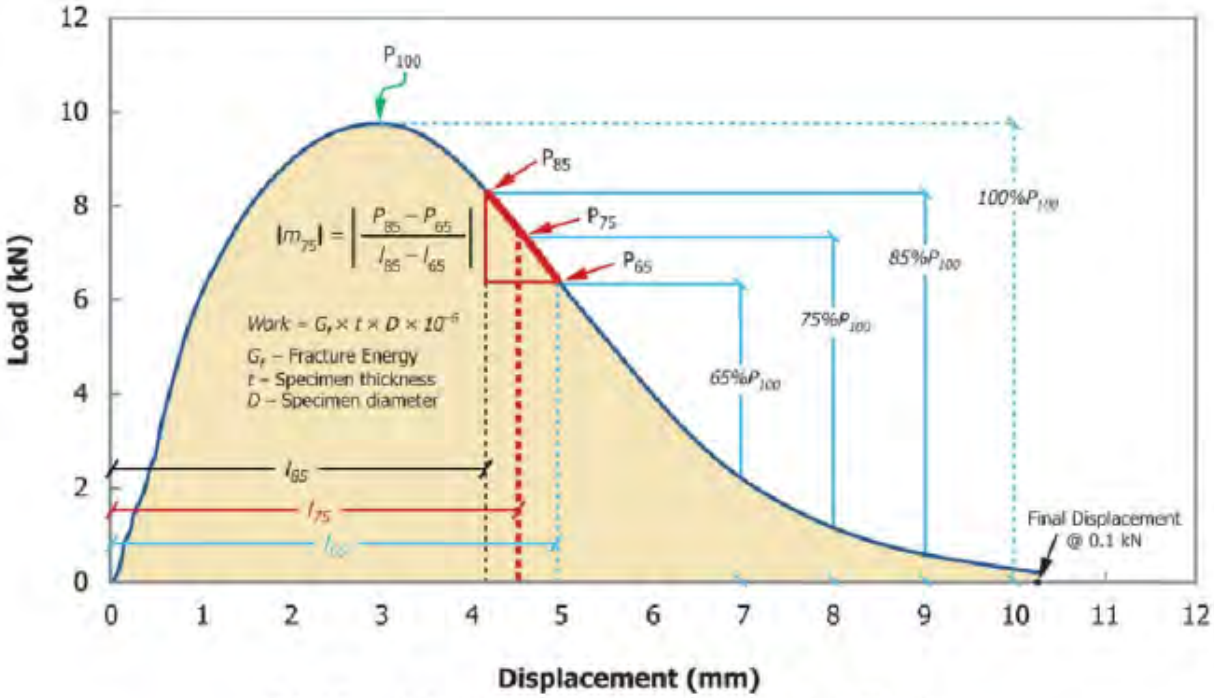
$$m = \frac{3.52\ \text{kN}}{0.81\ \text{mm}} = \frac{3520\ \text{N}}{0.00081\ \text{m}}$$

JMF REFERENCE DATA



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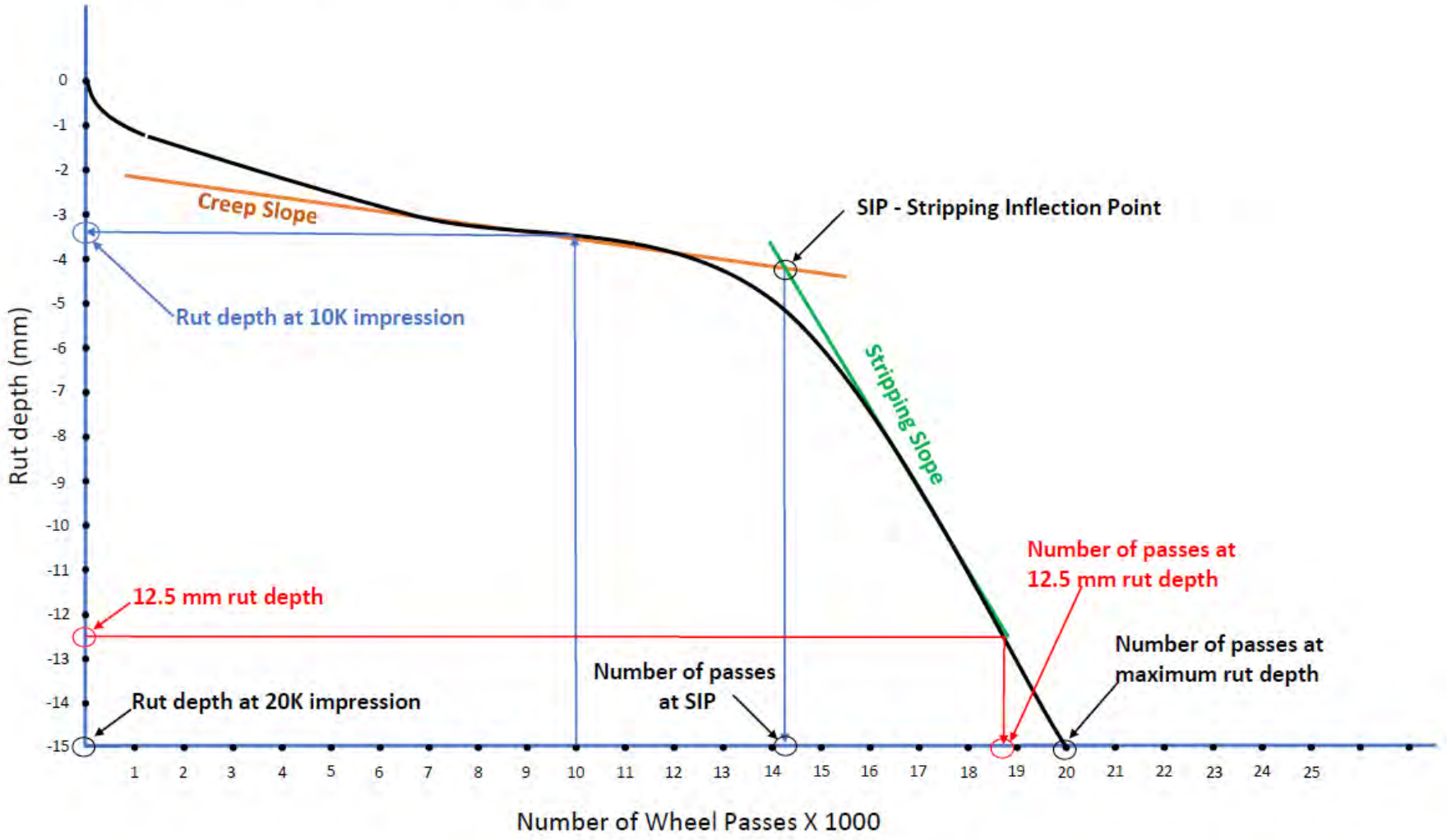
$$m = \frac{3.52\ \text{kN}}{0.81\ \text{mm}} = \frac{3520\ \text{N}}{0.00081\ \text{m}}$$

$$m = 4345679.012\ \text{N/m}$$

JMF REFERENCE DATA

AASHTO T 324 Standard Method of Test for Hamburg Wheel-Track Testing of Compacted Asphalt Mixtures



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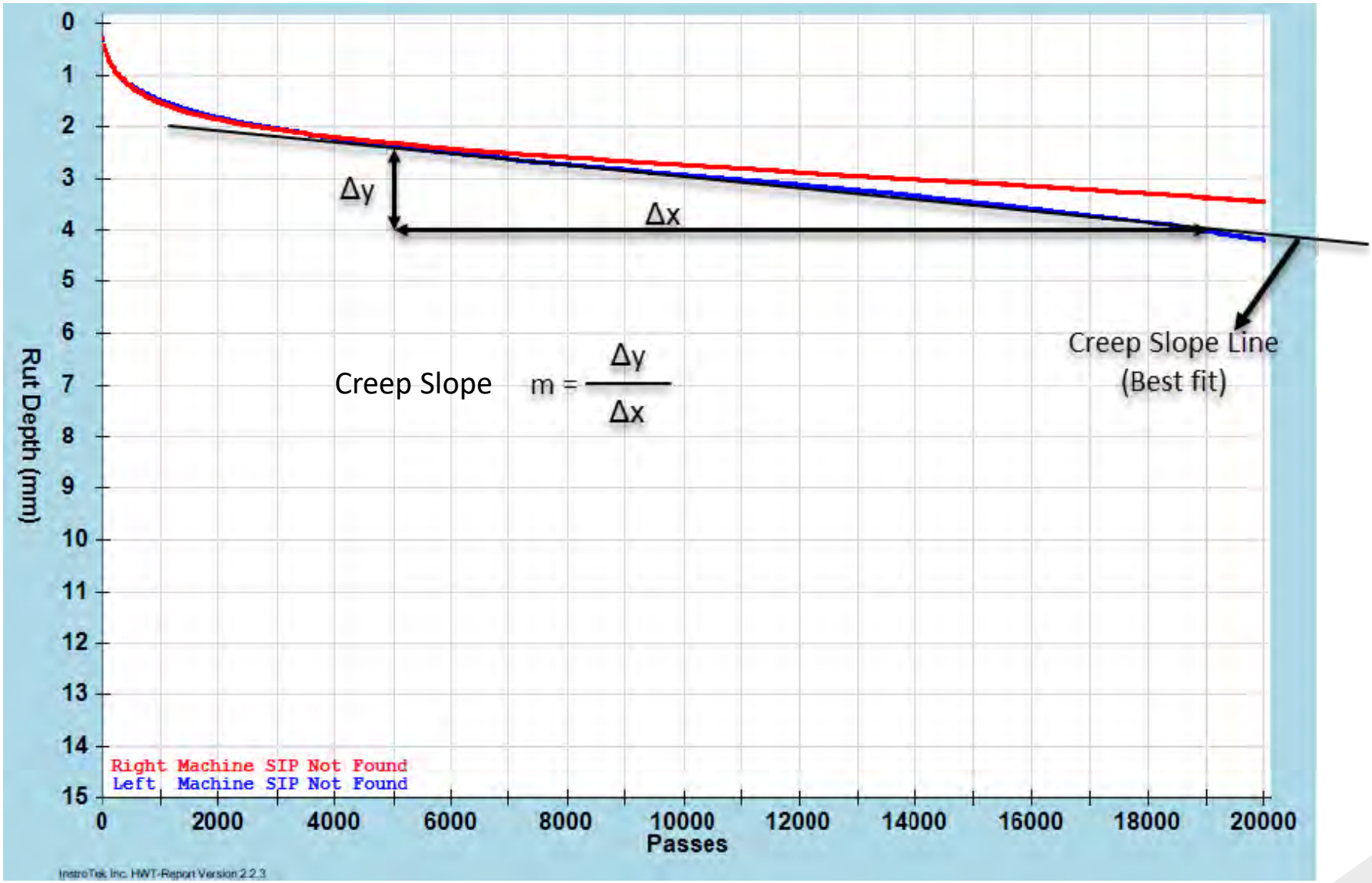

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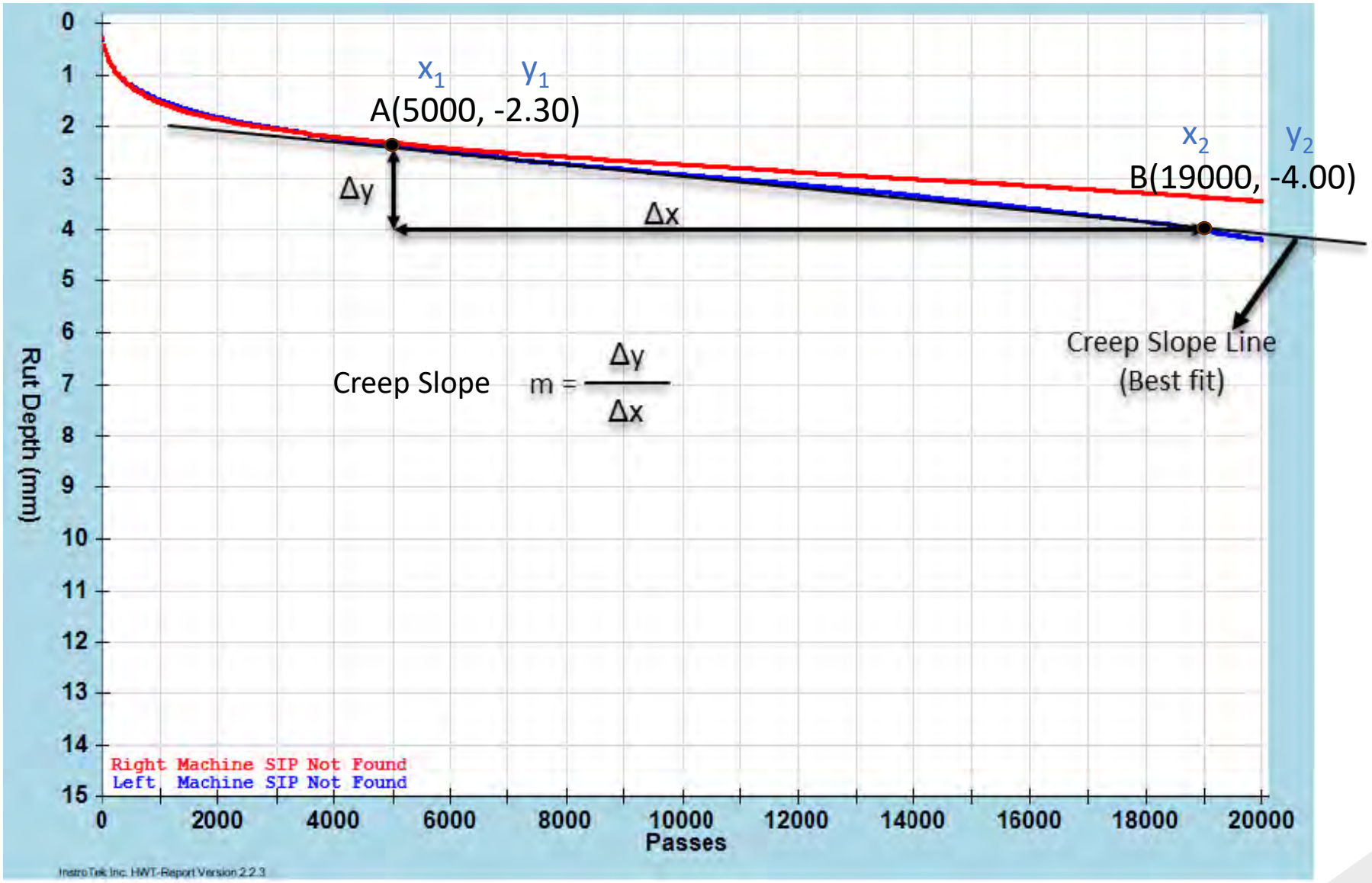

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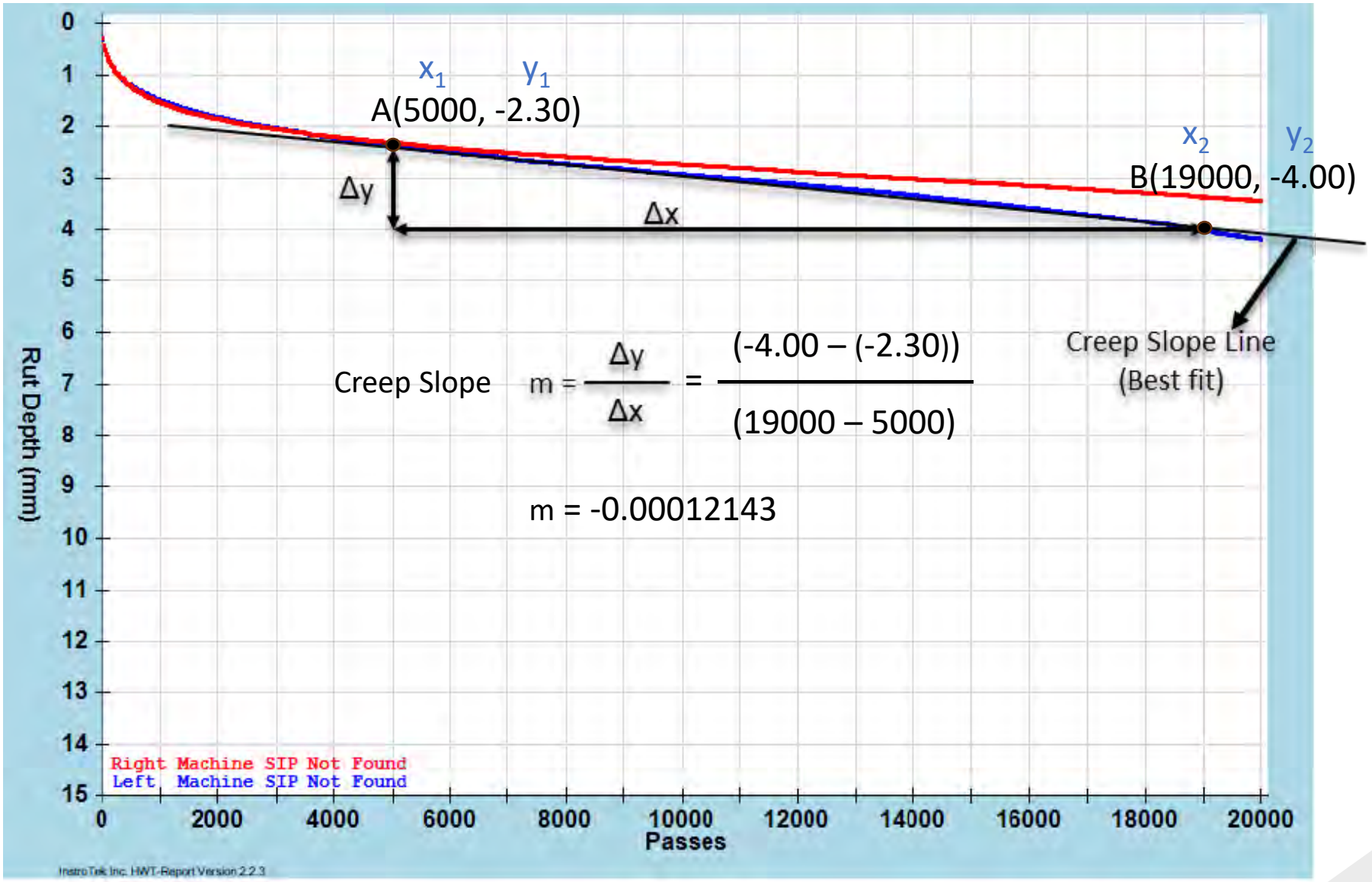

DATA CHALLENGES

VARIABILITY IN DATA (IDEAL-CT)

- HIGH COV
- PEAK LOAD
- CT INDEX

VARIABILITY IN DATA (HAMBURG)

- SLOPE VALUES
- RUT DEPTH DIFFERENCES (L and R)
- SIP NOT FOUND
- AUTO SHUTOFF @ 12.5mm

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QUESTIONS

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