



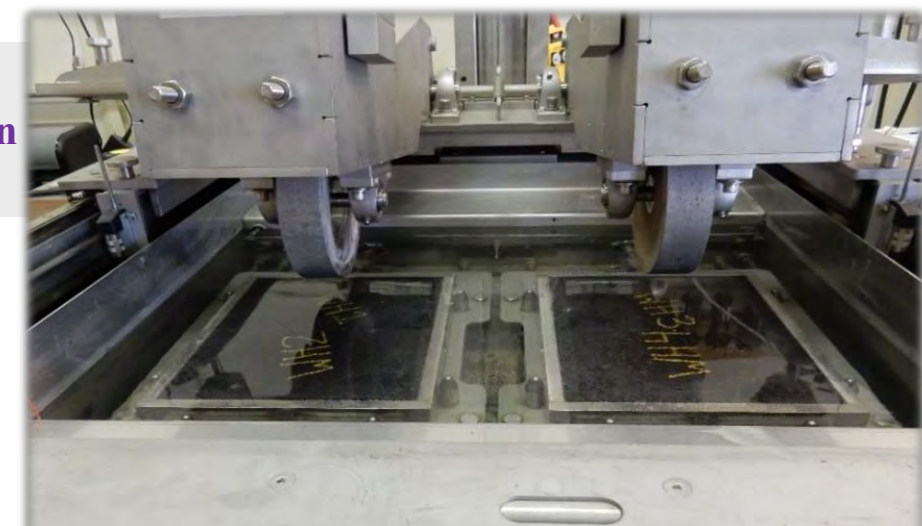
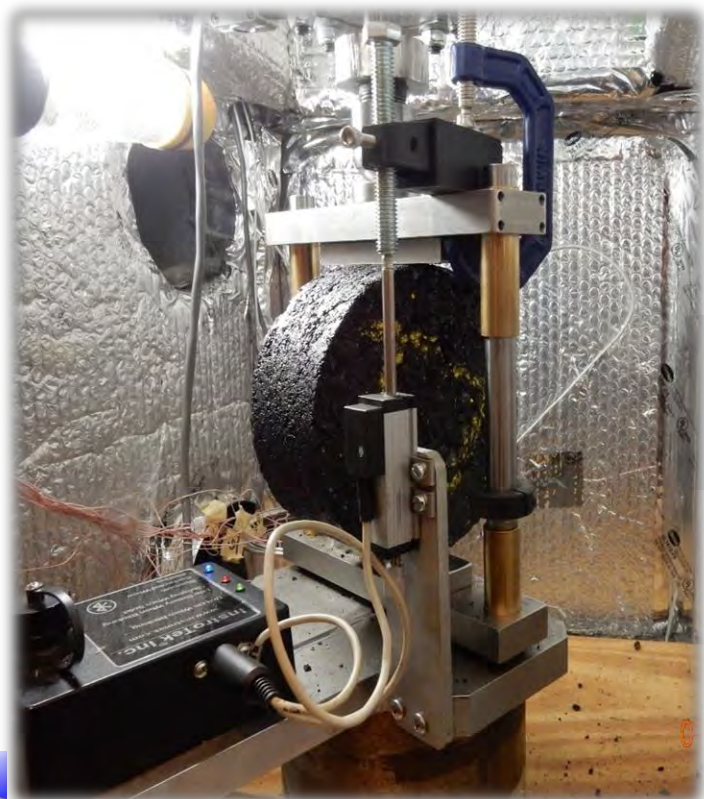
Performance Test Data Data Quality & Interpretation

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**Pennsylvania
Asphalt Pavement Association
62nd Annual Conference**



We Will Review:

- **Performance Test Data**
 - **IDEAL-CT**
 - **Hamburg Wheel Tracking**

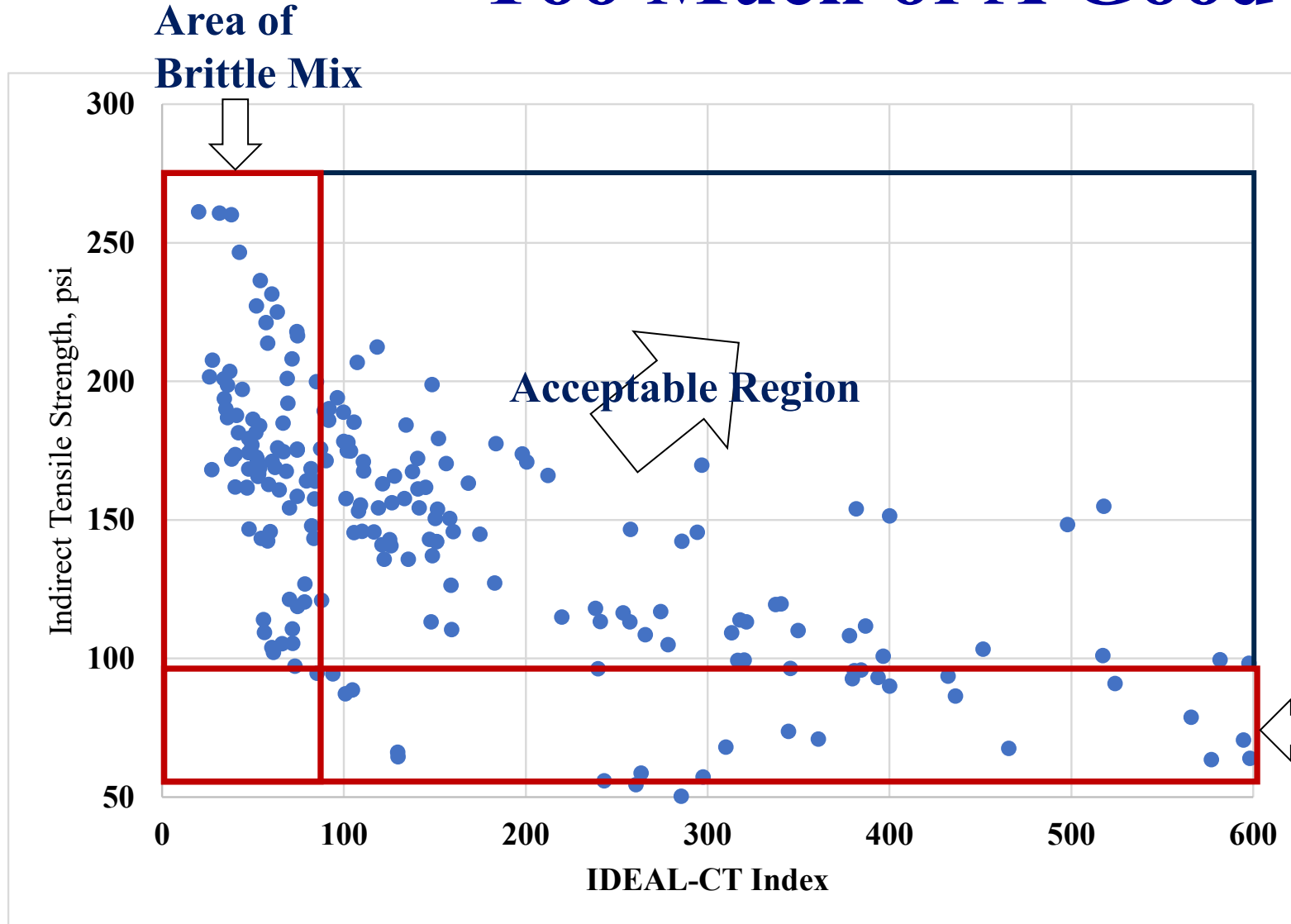
- **Considerations in Establishing Thresholds**



Review of IDEAL-CT Test Data



Too Much of A Good Thing?

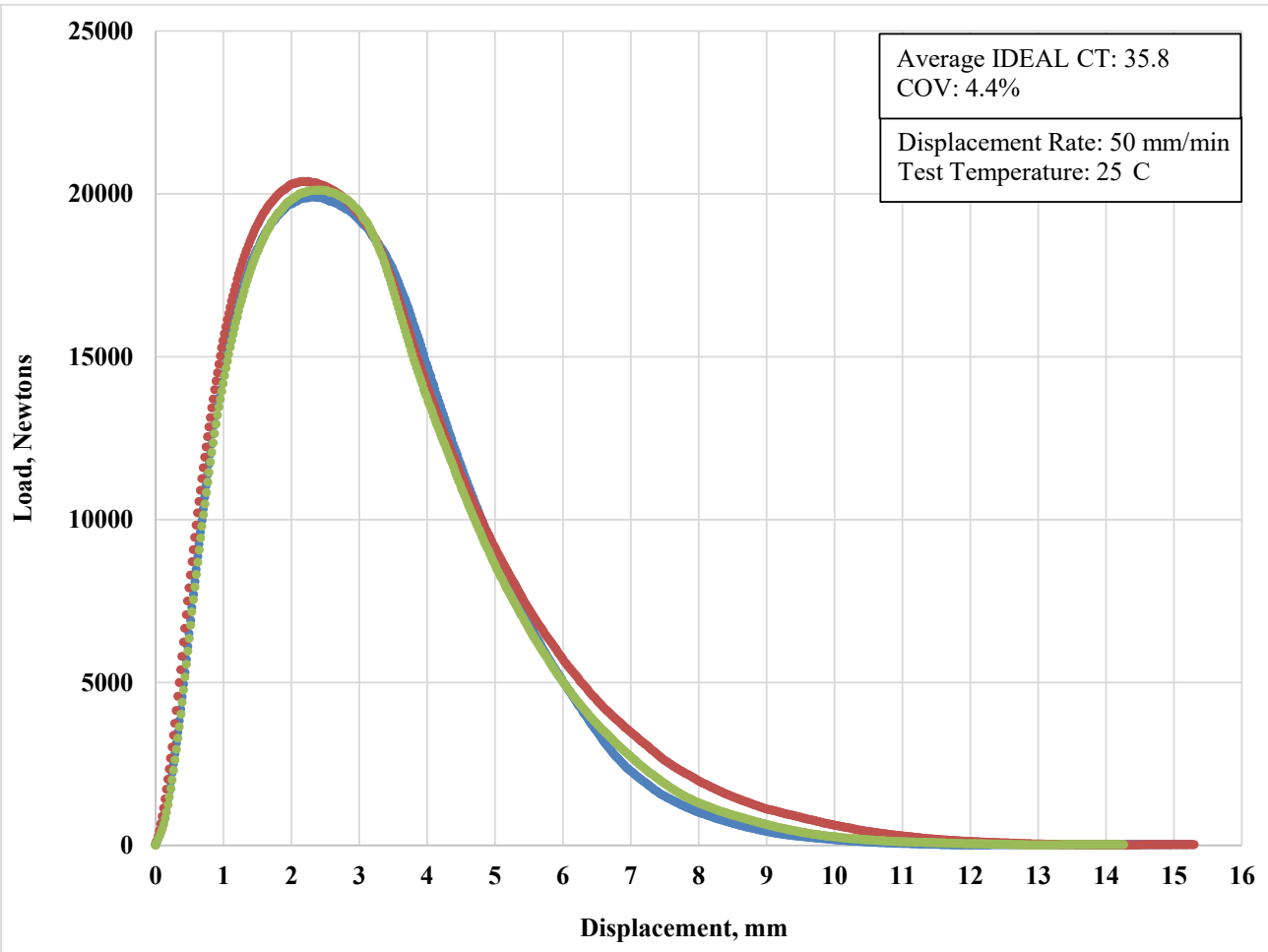


Too high a flexibility?
Maybe sign of a weak mix.

Don't lose sight of tensile strength.

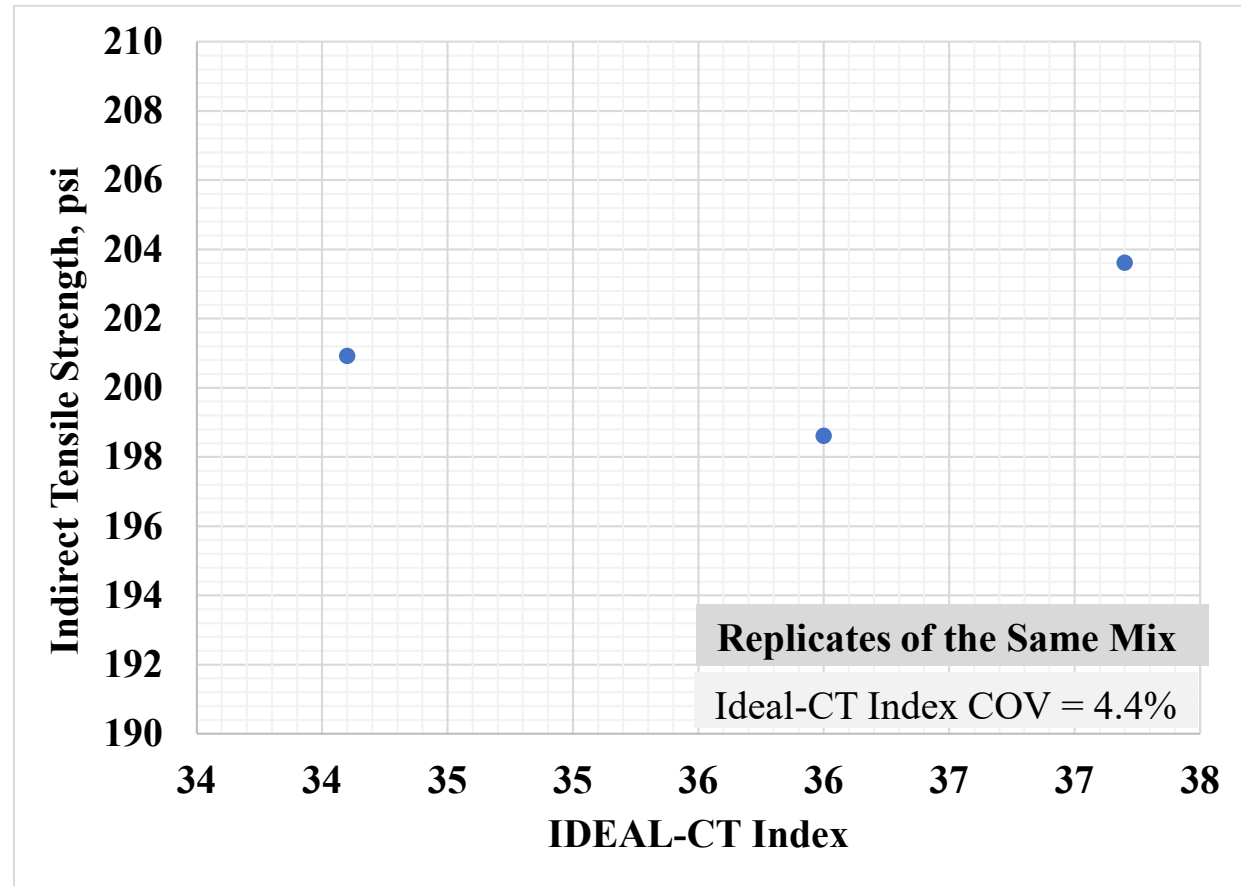
Consider a minimum limit for tensile strength.

How to Deal with Data Variability?

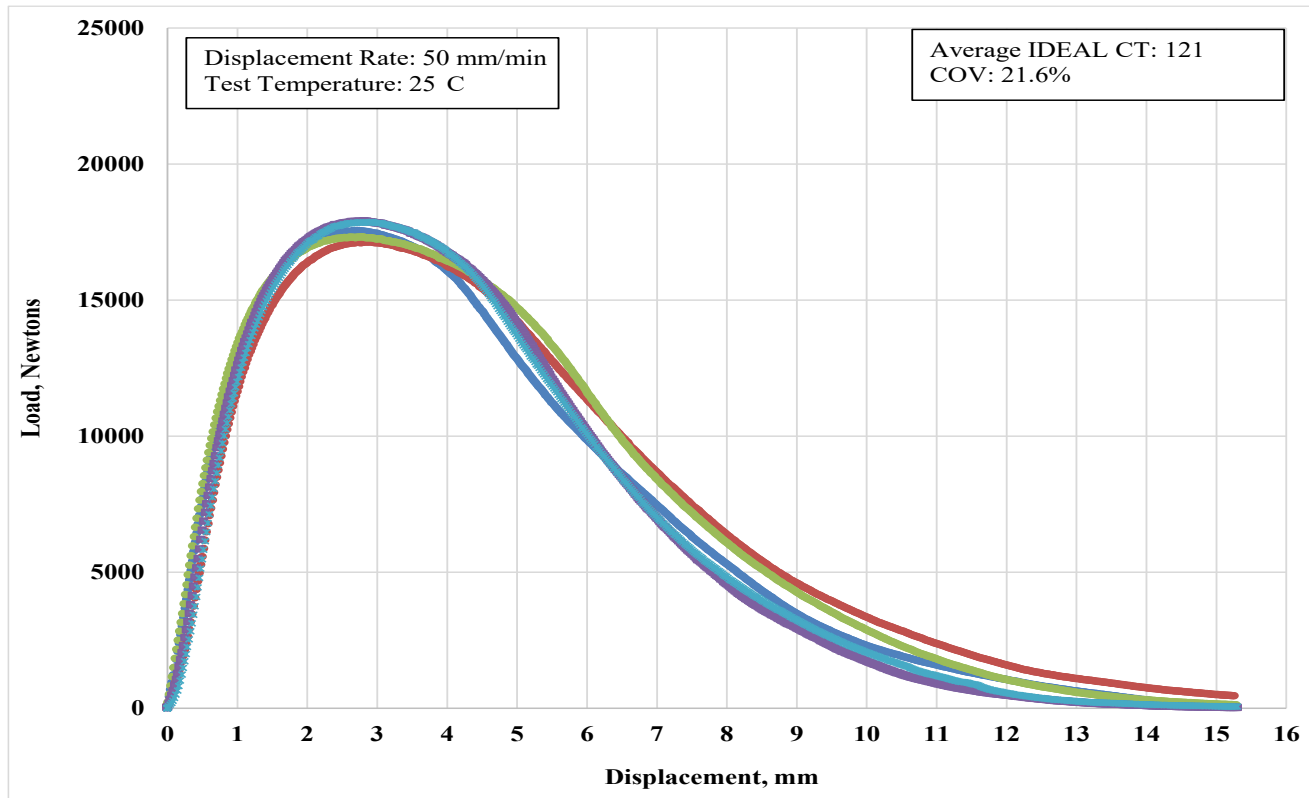


**Mix too brittle,
PG 64-22 and 25% RAP
Long-Term Conditioned**

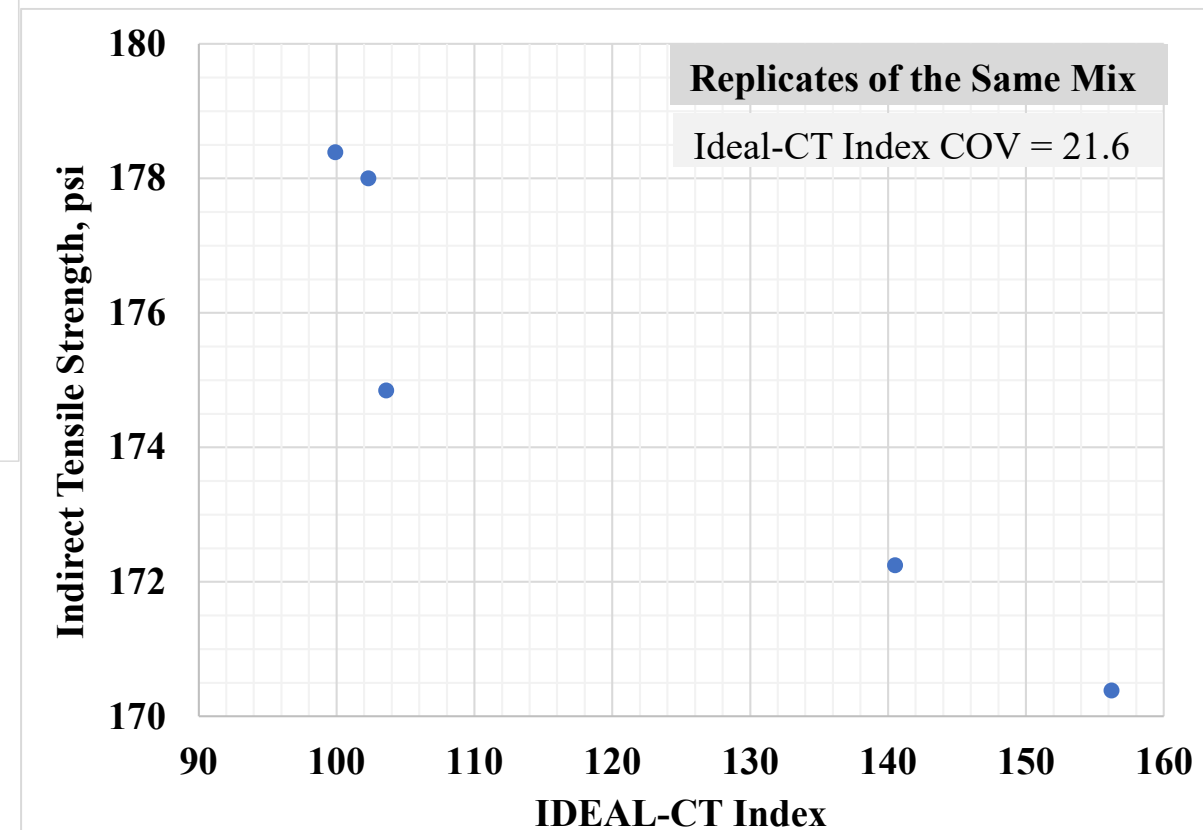
**Extremely well controlled.
Low Variability**



How to Deal with Data Variability?



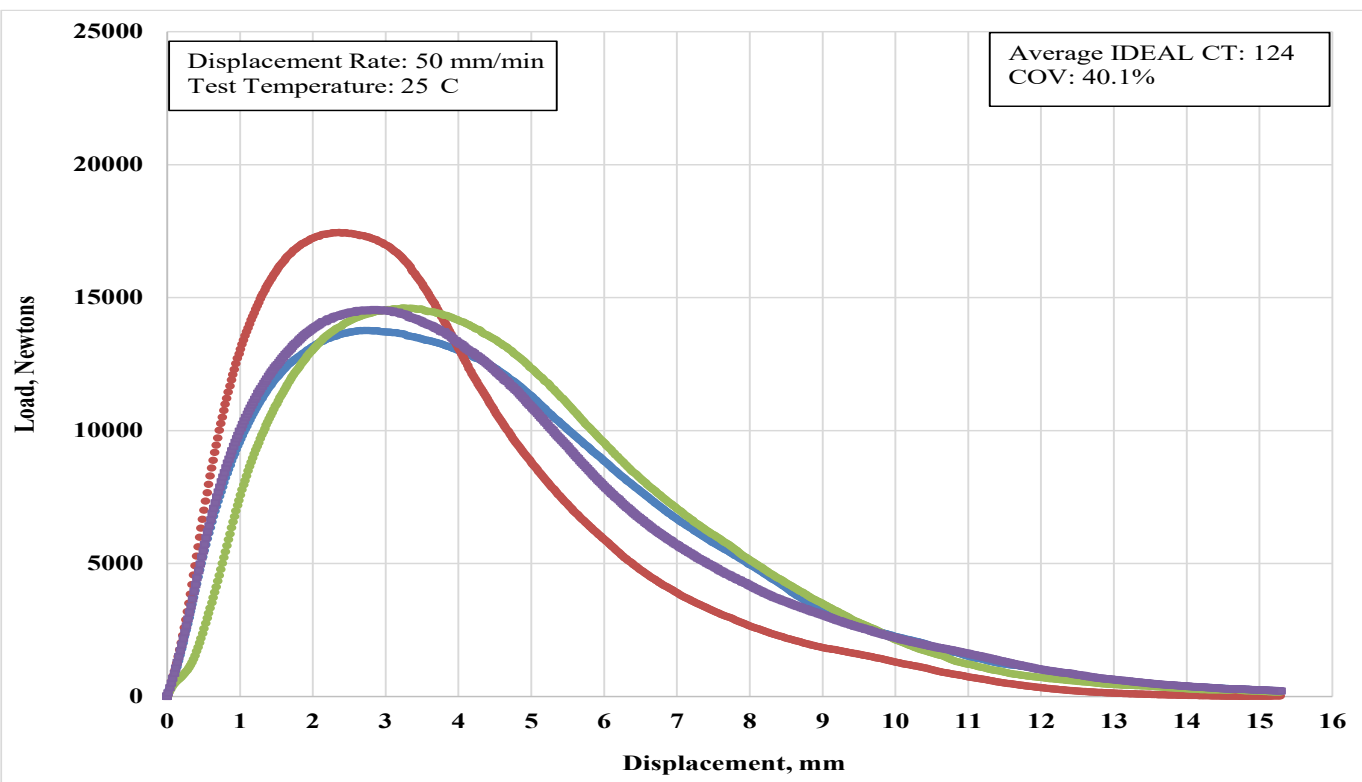
**Well controlled.
Acceptable Variability**



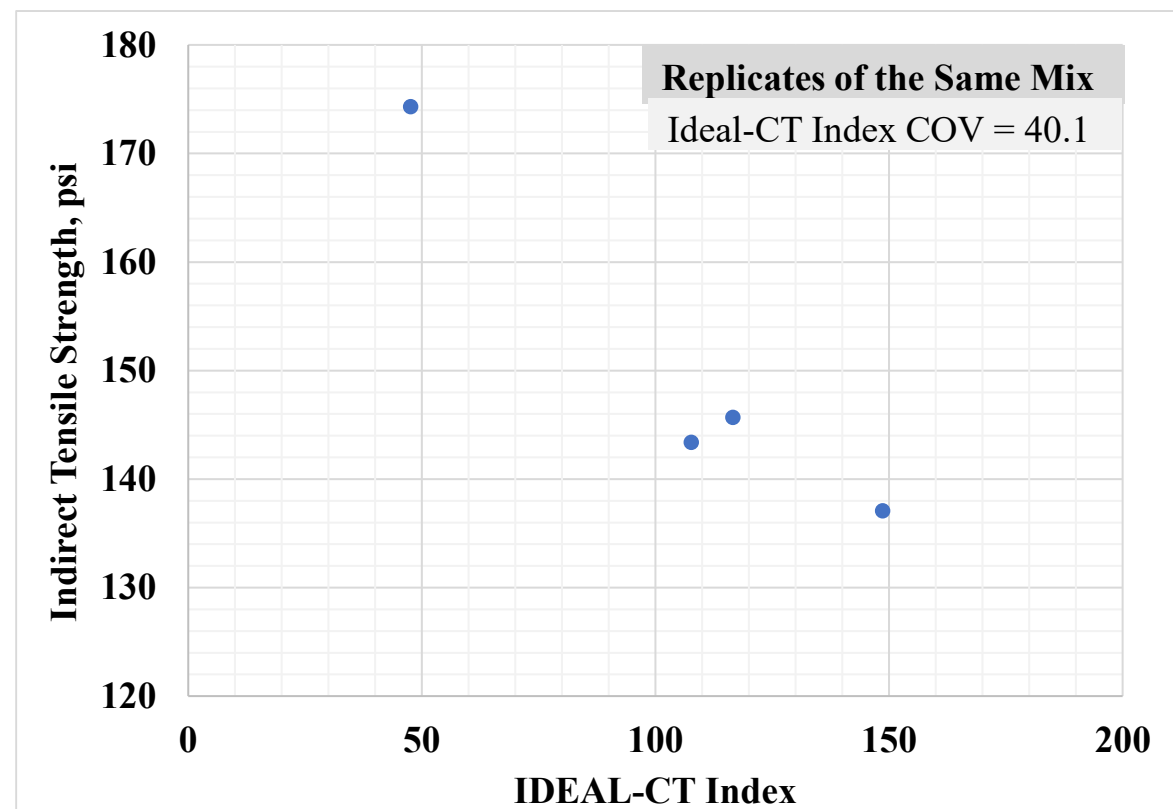
**Mix Acceptable,
PG 64-22 and 0% RAP**



How to Deal with Data Variability?



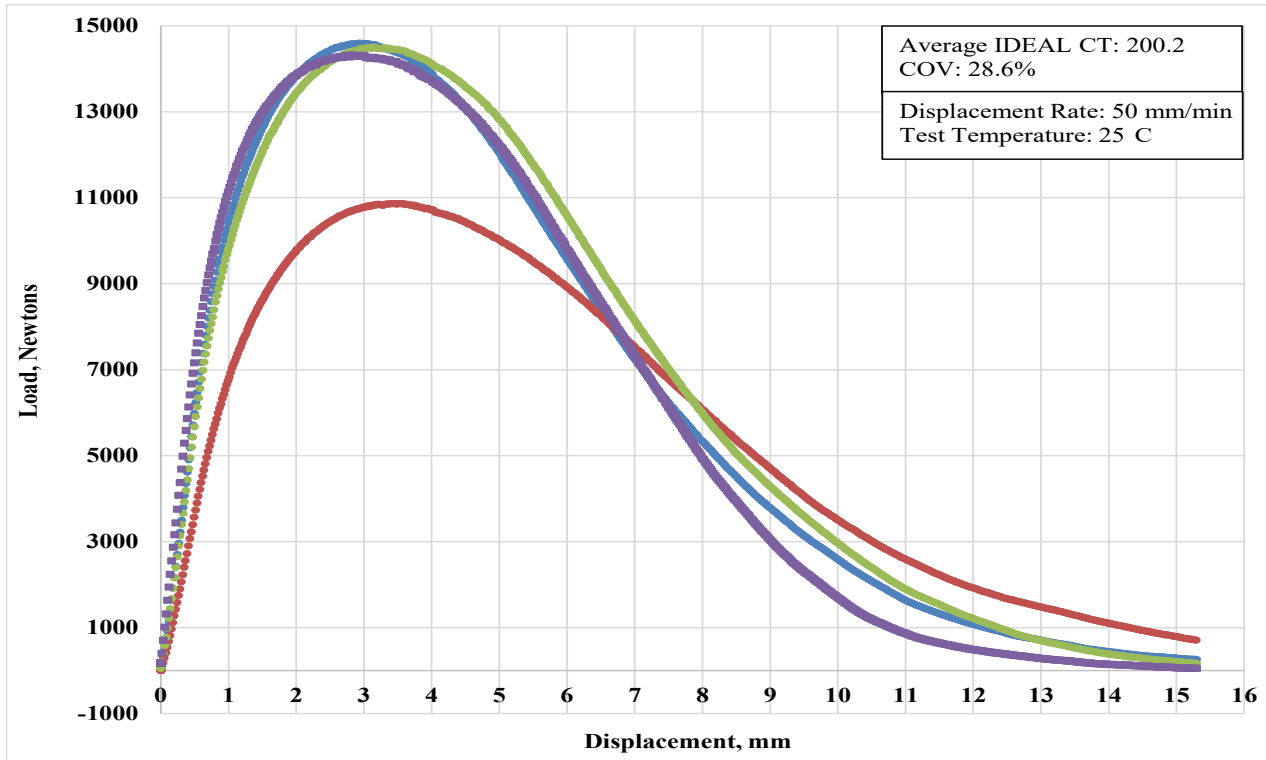
**Outlier? Maybe
High Variability**



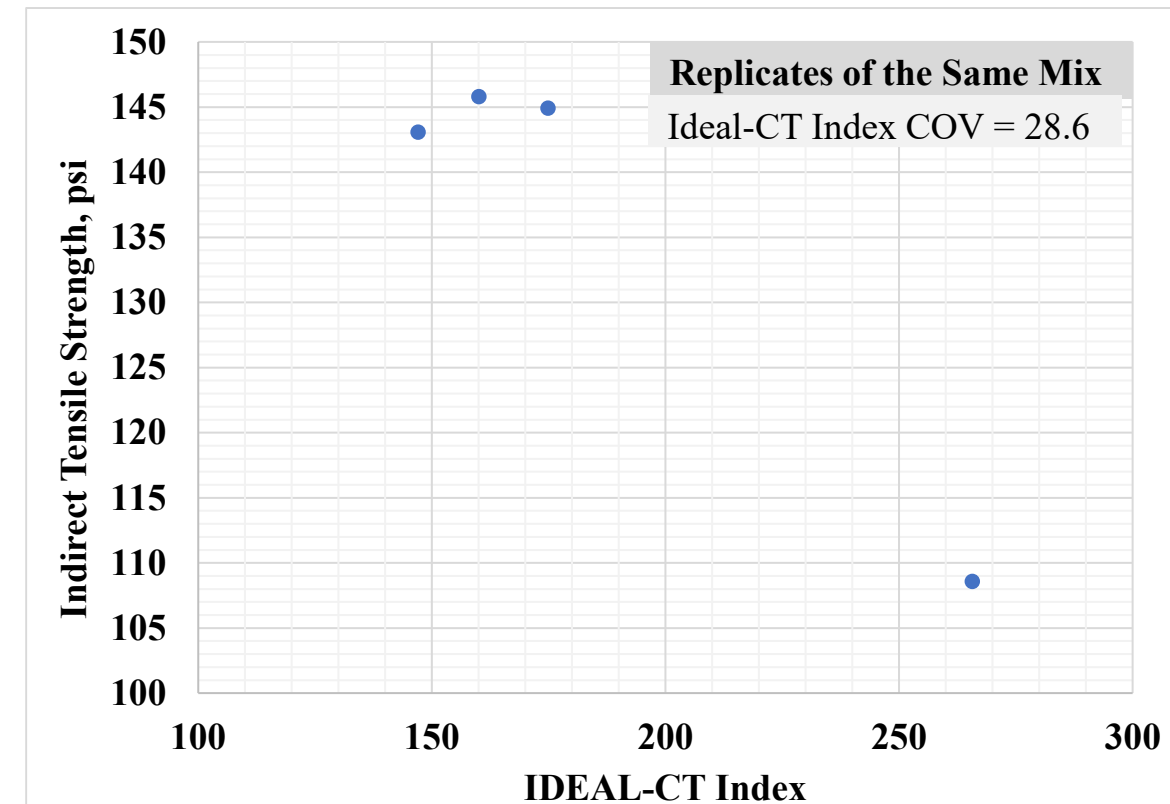
**Either remove outlier (through stat. test)
Or repeat testing.**



How to Deal with Data Variability?



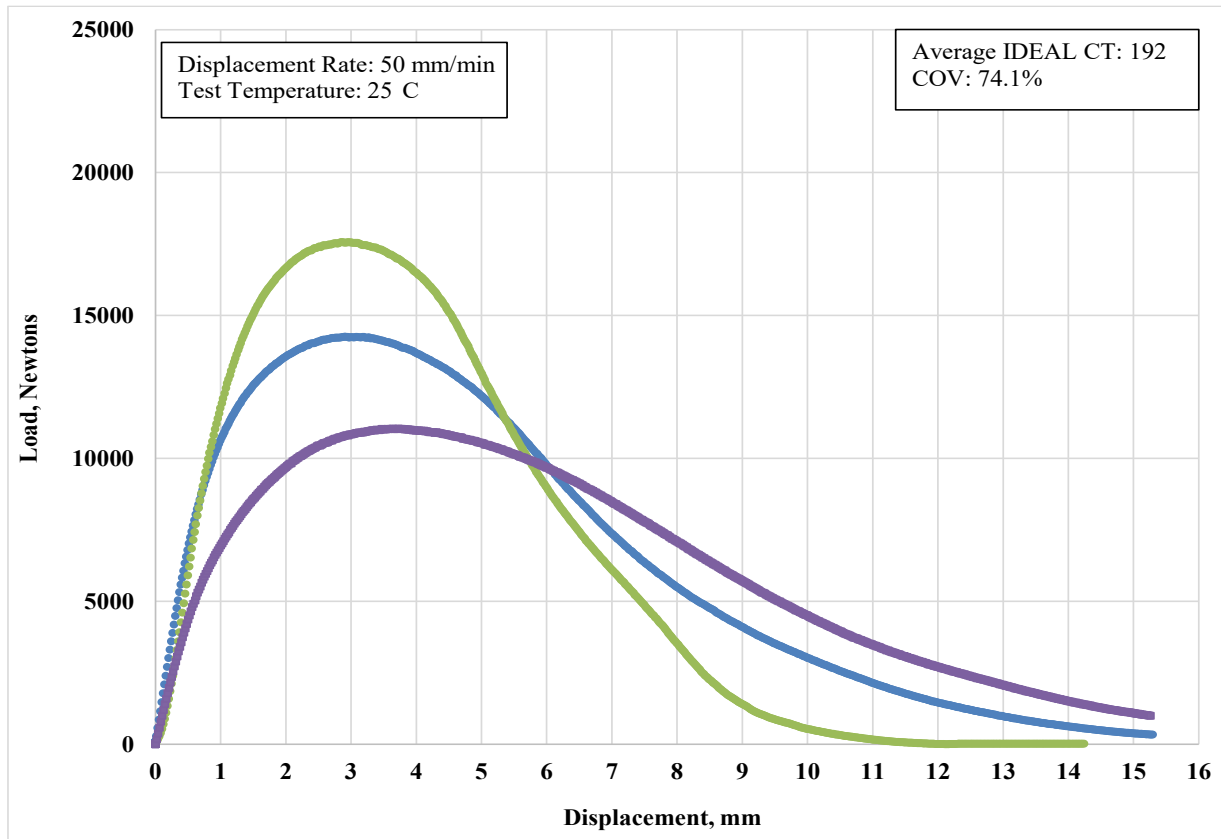
**Outlier? Maybe
High Variability**



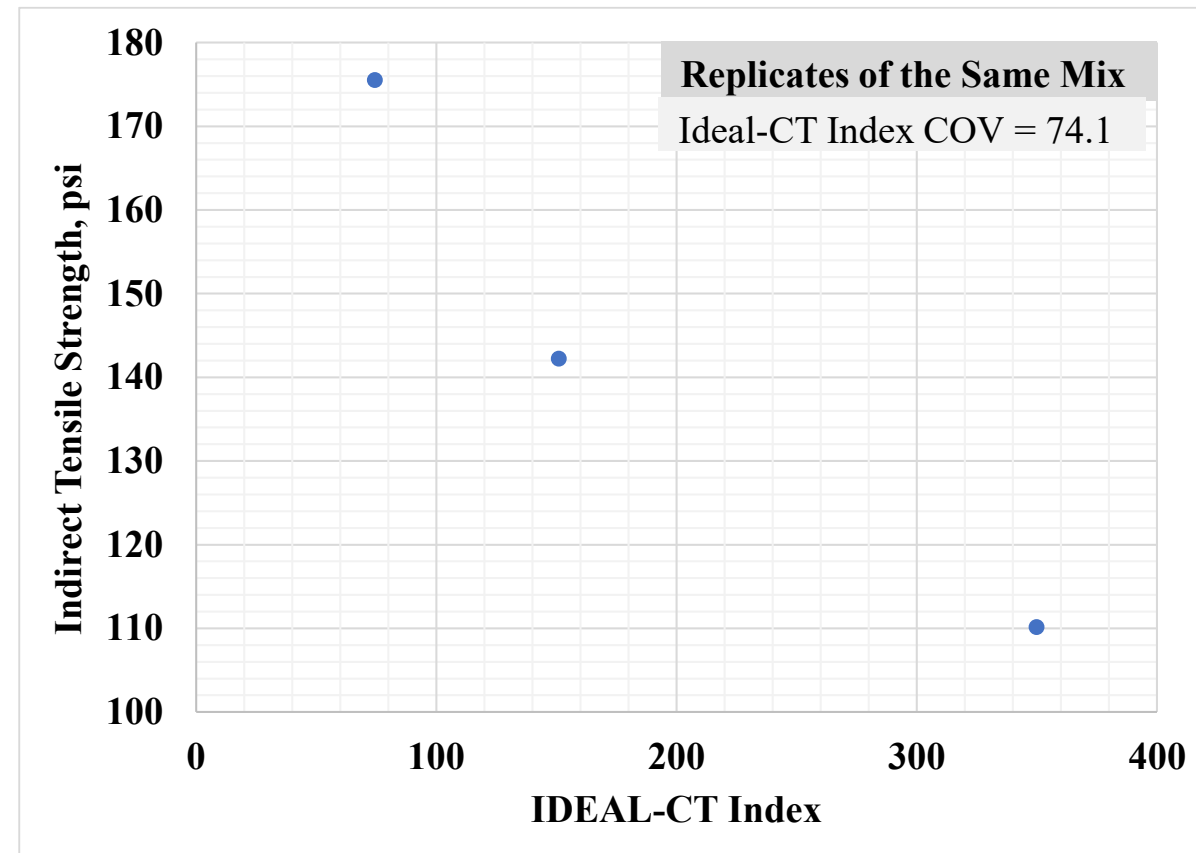
**But could accept the results because both
Flexibility and Strength satisfied...**



How to Deal with Data Variability?



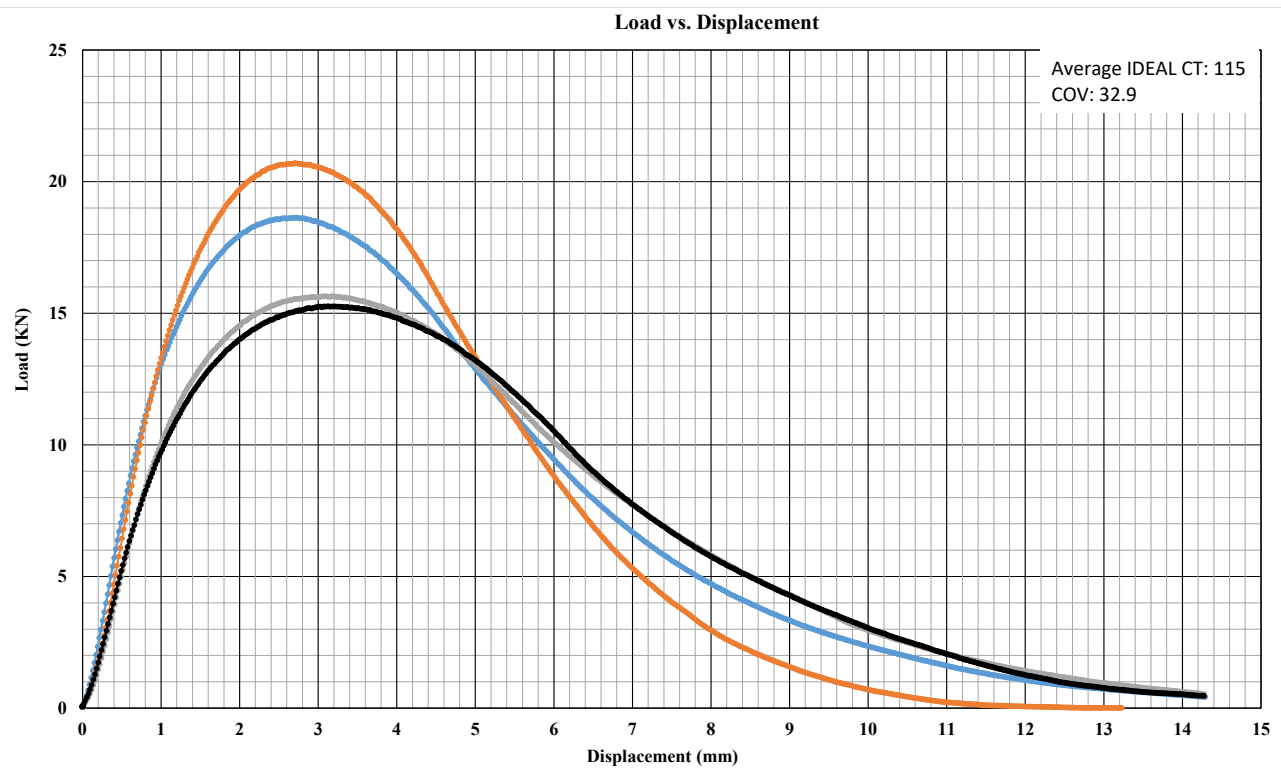
High Variability.
Not much hope here.
Problem when testing only three.



Test four specimens to increase chances of acceptance. Repeat testing



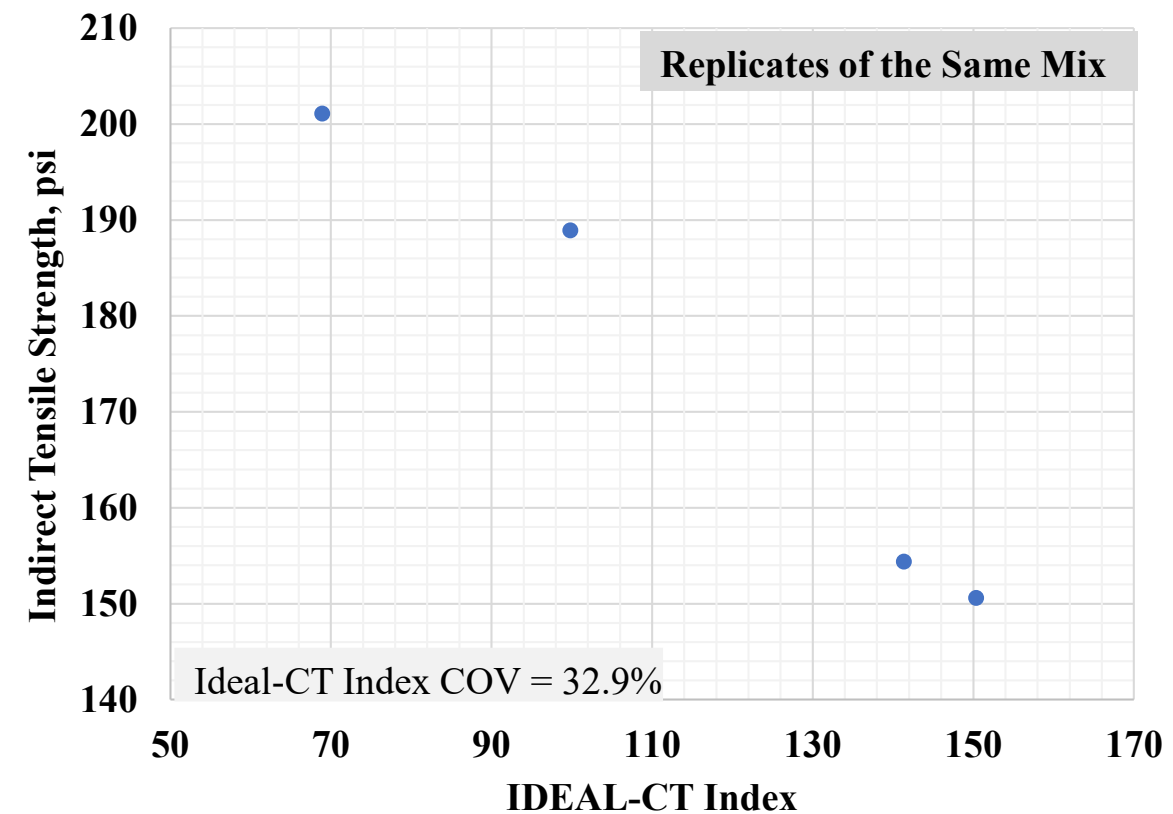
How to Deal with Data Variability?



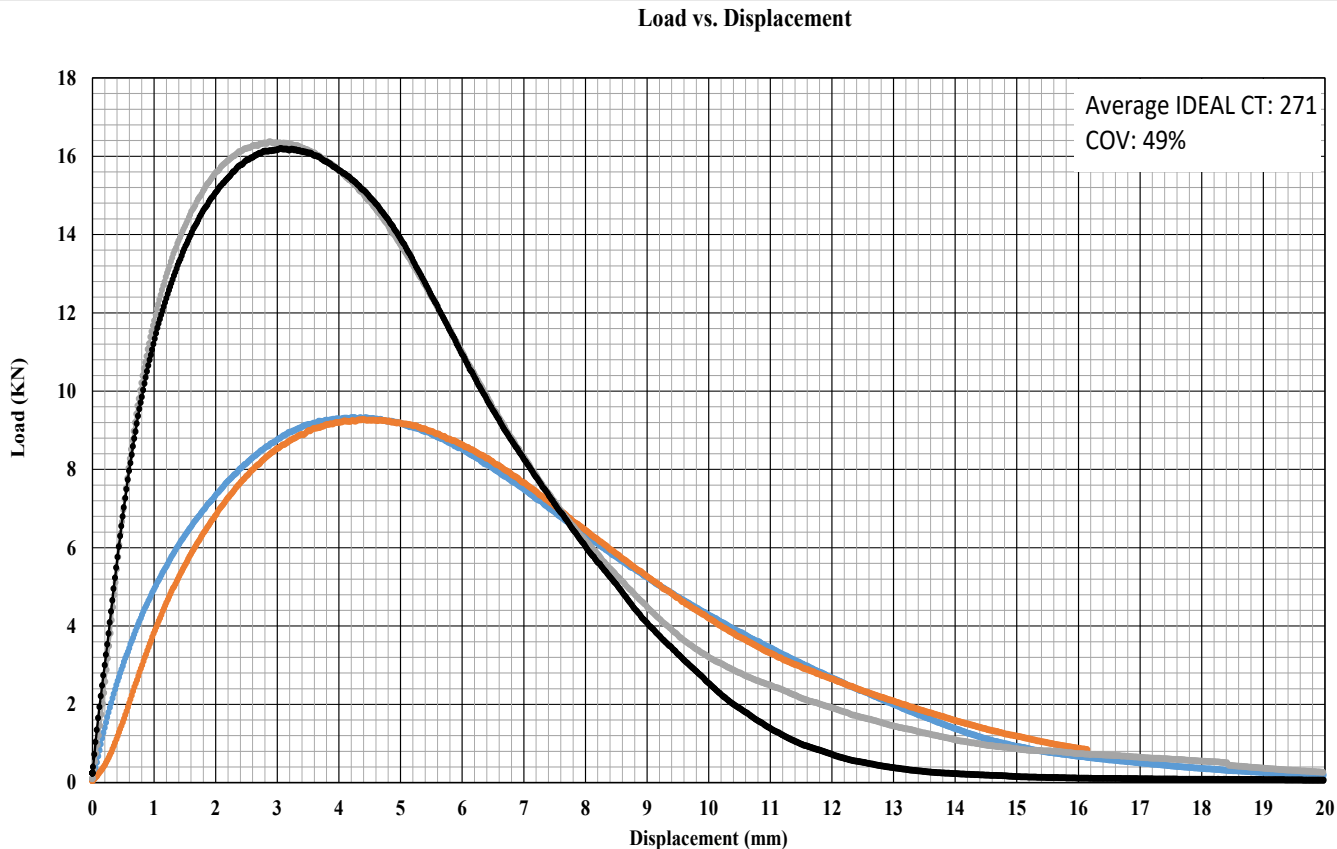
High Variability.

One specimen low on flexibility

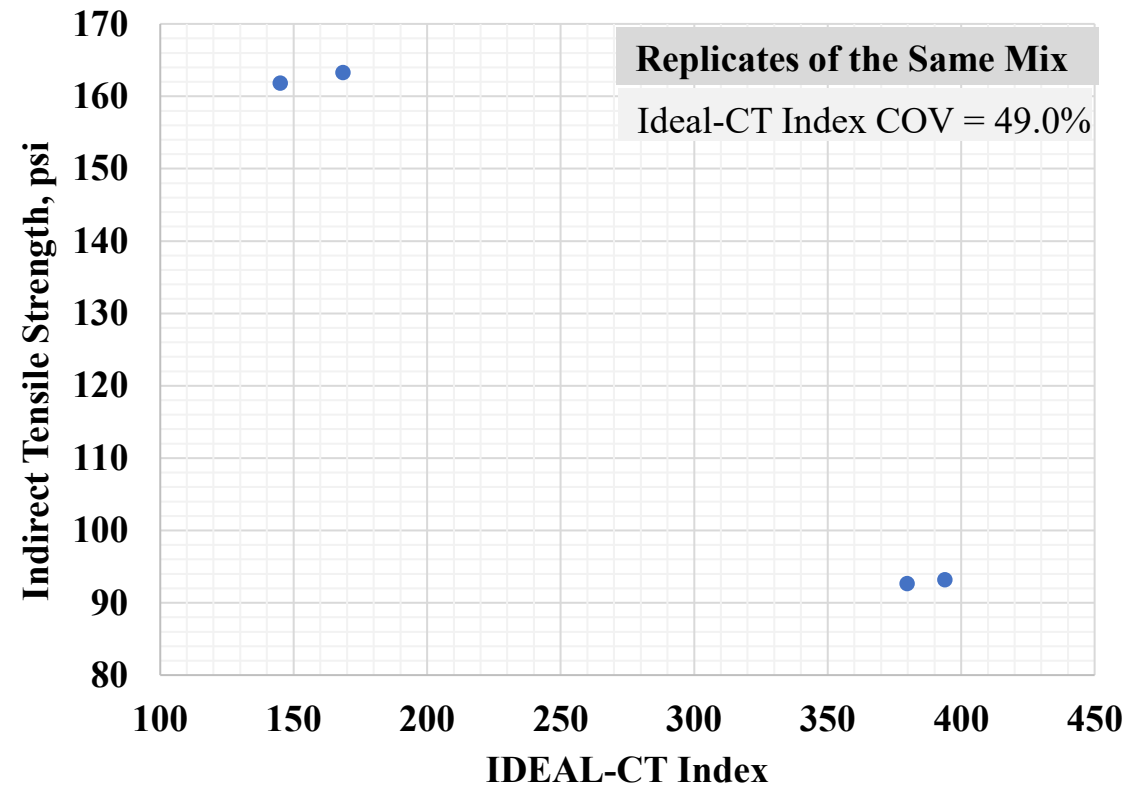
Do you drop one and just use 3?



How to Deal with Data Variability?



**High Variability
Even Split.
A Tough One to Analyze.**

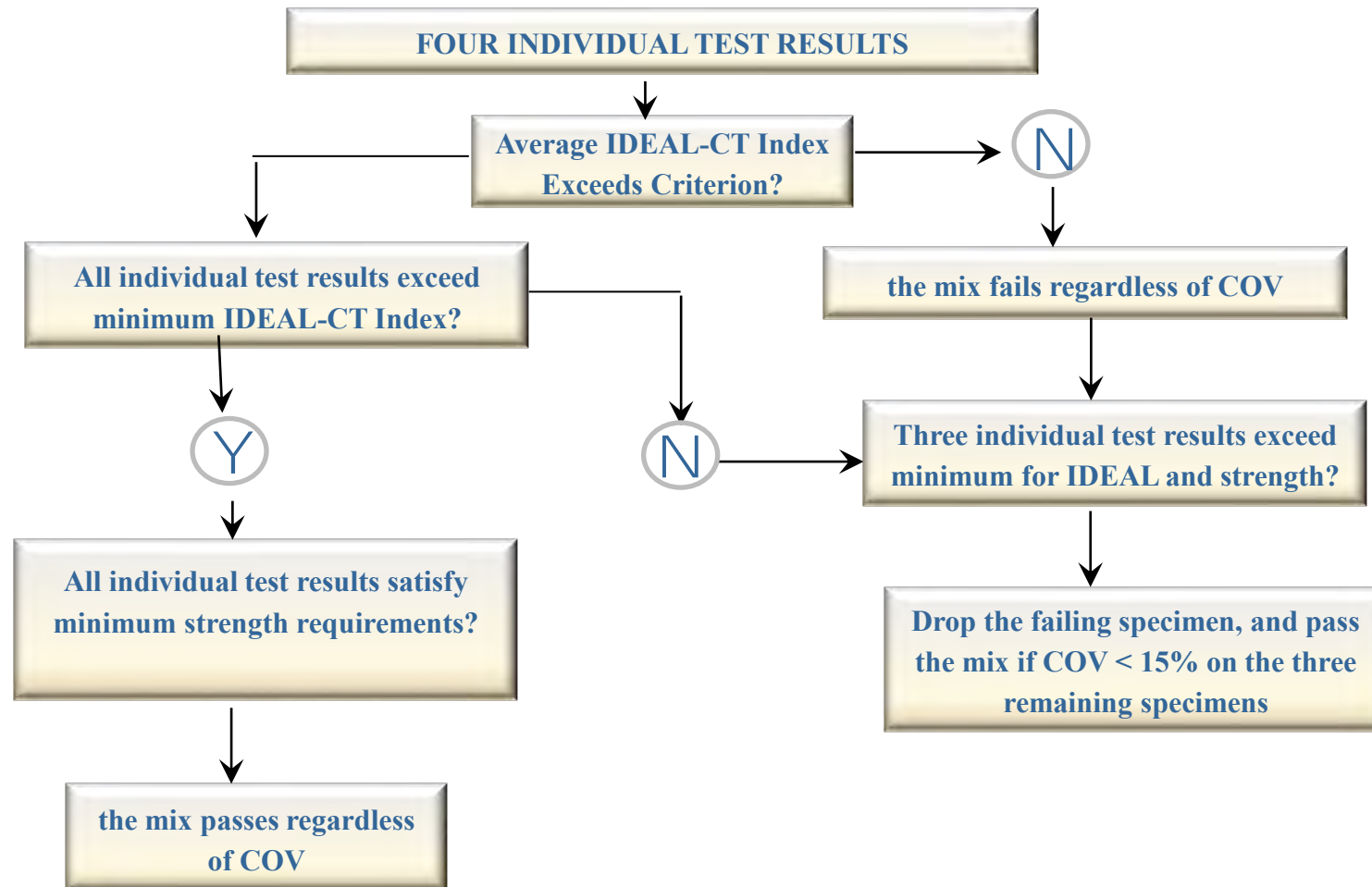


**High Flexibility on All Specimens
BUT, is 90 psi acceptable for strength?
If so, then all good.
If not, repeat testing.**



How to Decide IDEAL-CT Test Data?

Maybe can bypass COV in some cases?

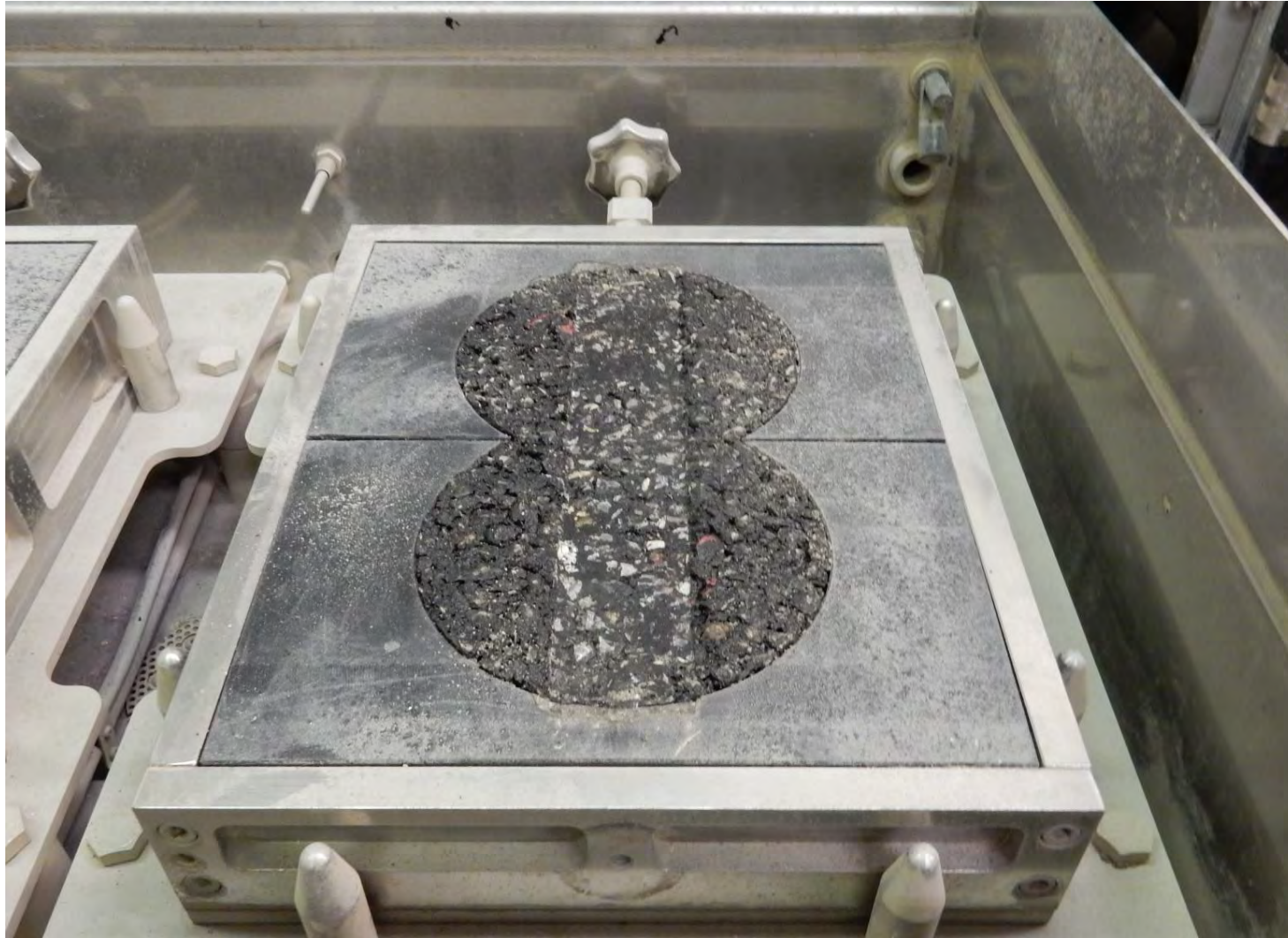


Pass/Fail Criteria

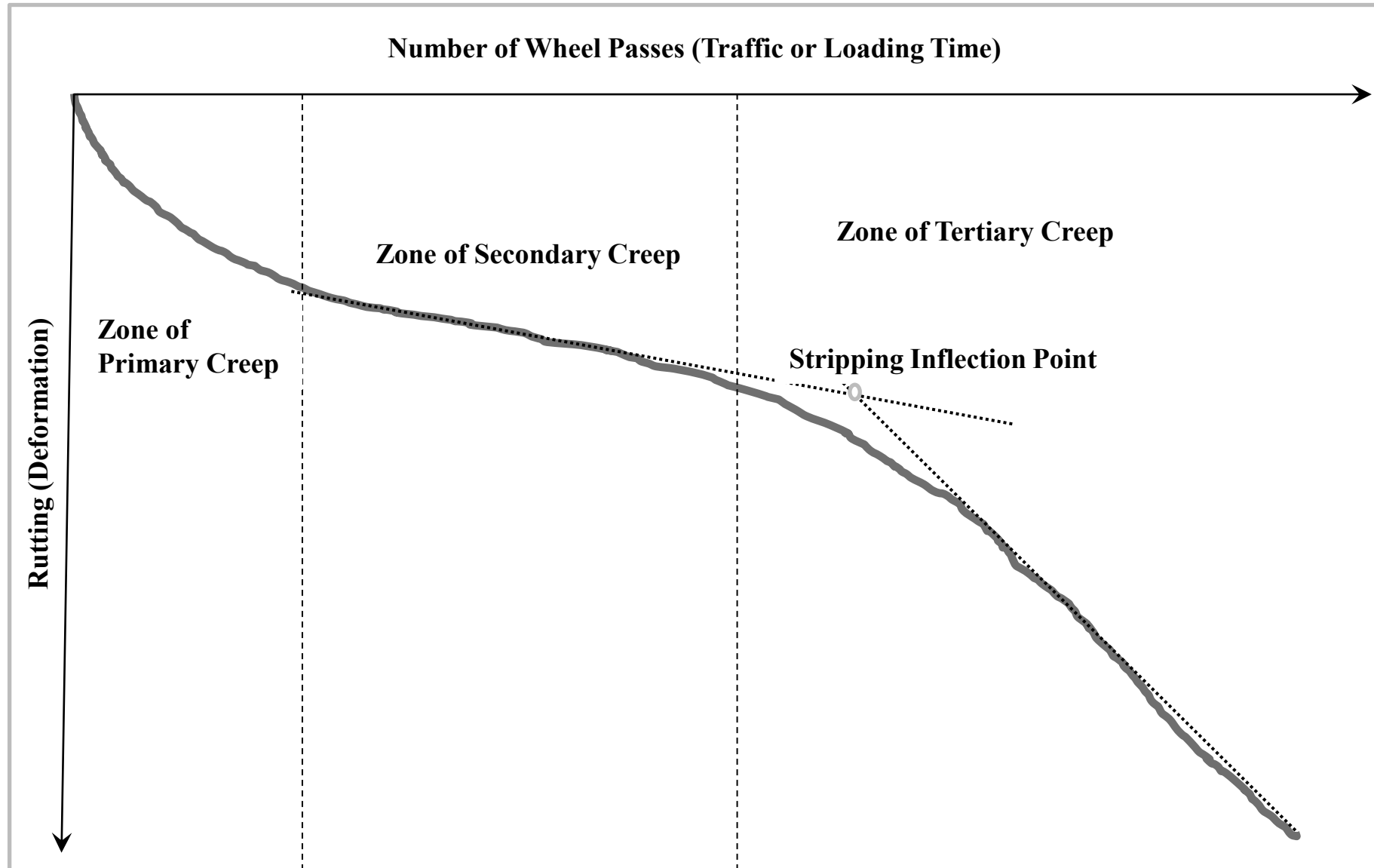
- **One Size Does Not Fit All.**
- **Use Criteria Based on A Tiered Approach.**
- **Tiers Not Based on Mix Ingredients.**
- **BUT based on project conditions (traffic, temperature, pavement structure).**



Review of HWT Test Data



HWTT: Rutting/Moisture Damage Test



HWTT: Wet vs Dry

Tested under water →



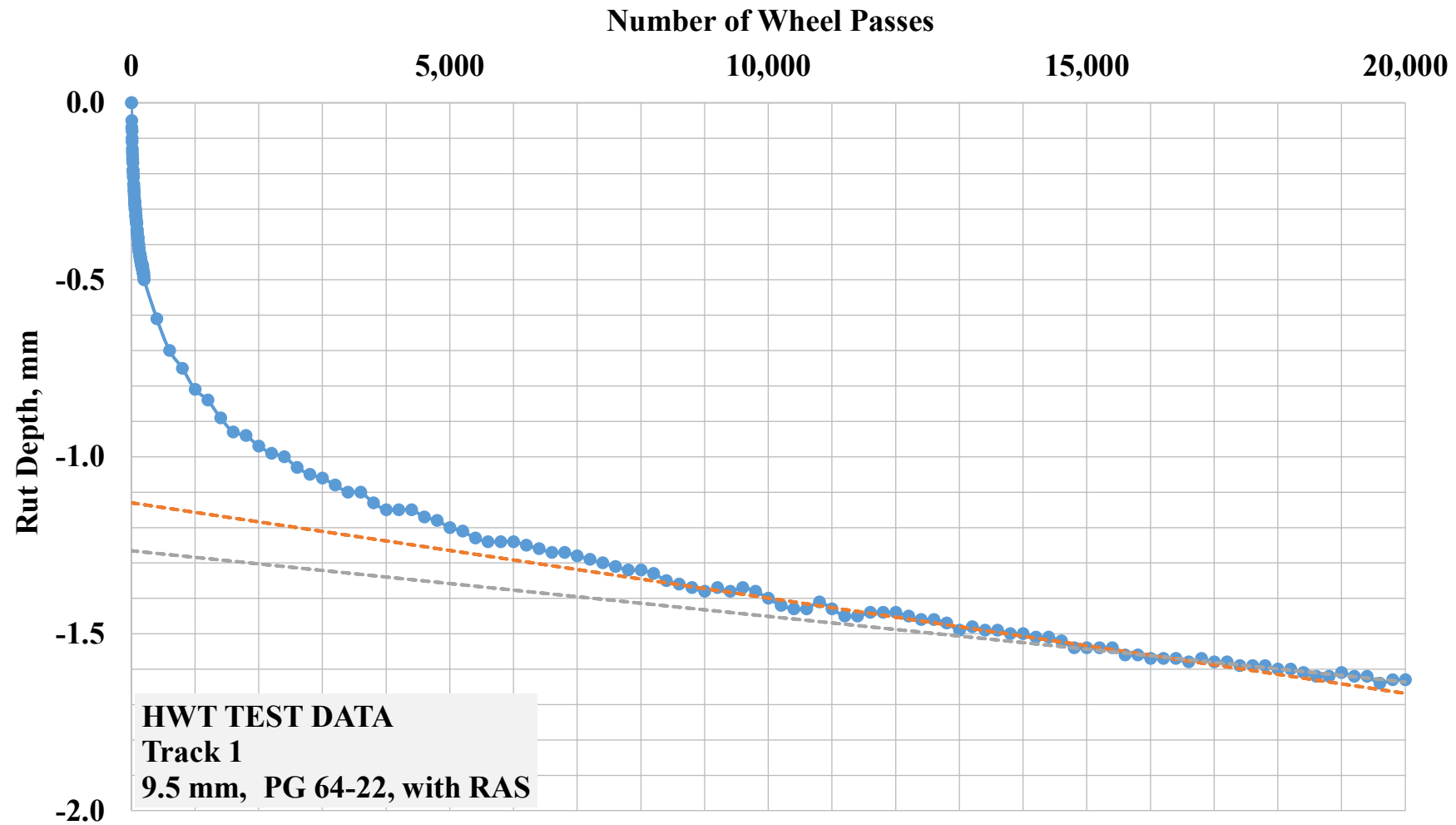
← Tested dry

What Data Do We Get From HWTT?

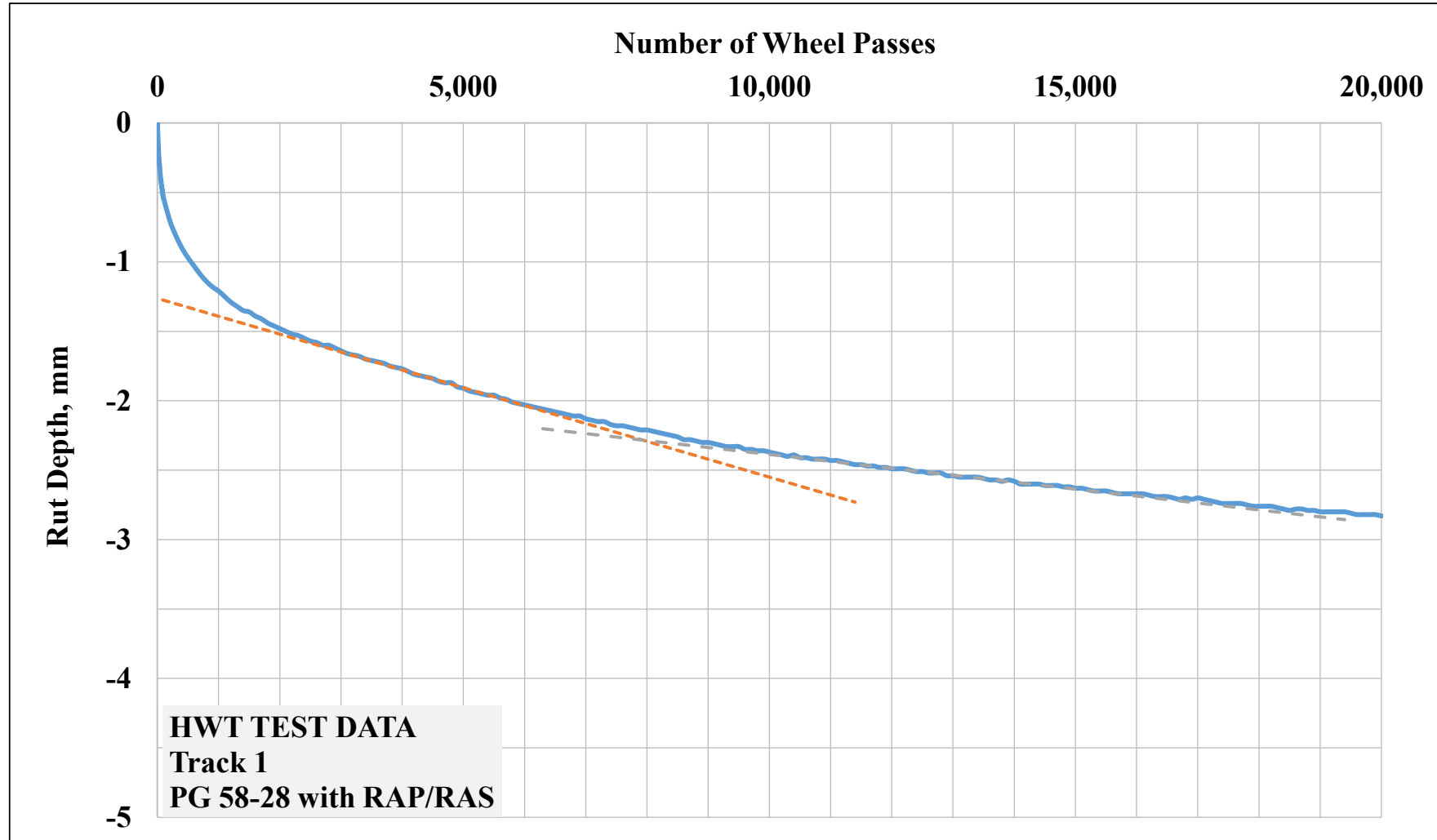
PARAMETERS	Track 1	Track 2	Average
Max Rut (mm)	-15.05	-17.13	-16.1
SIP (# of passes)	10,708	16,990	13,849
Ratio of the slope (strip/creep)	2.17	2.85	2.51
No. of Passes to 10 mm rut depth	14,319	13,665	13,992
No. of Passes to 12.5 mm rut depth	17,151	17,456	17,304
Rut depth at 10,000 passes, mm	-6.6	-8.28	-7.4
Creep Slope (mm/1000 passes)	0.41	0.54	0.47
Stripping Slope (mm/1000 passes)	0.88	1.53	1.21



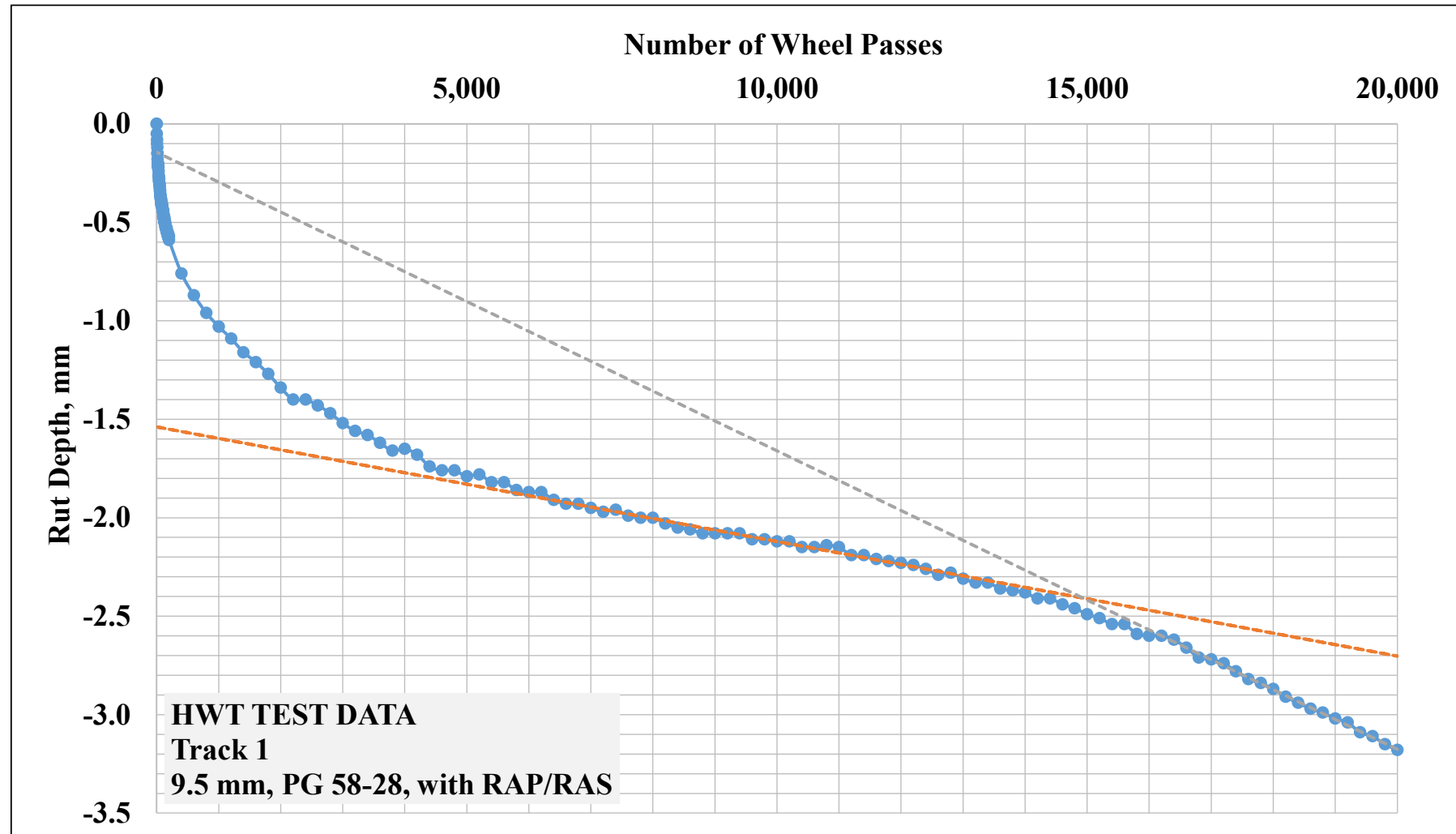
Excellent Performer in HWT



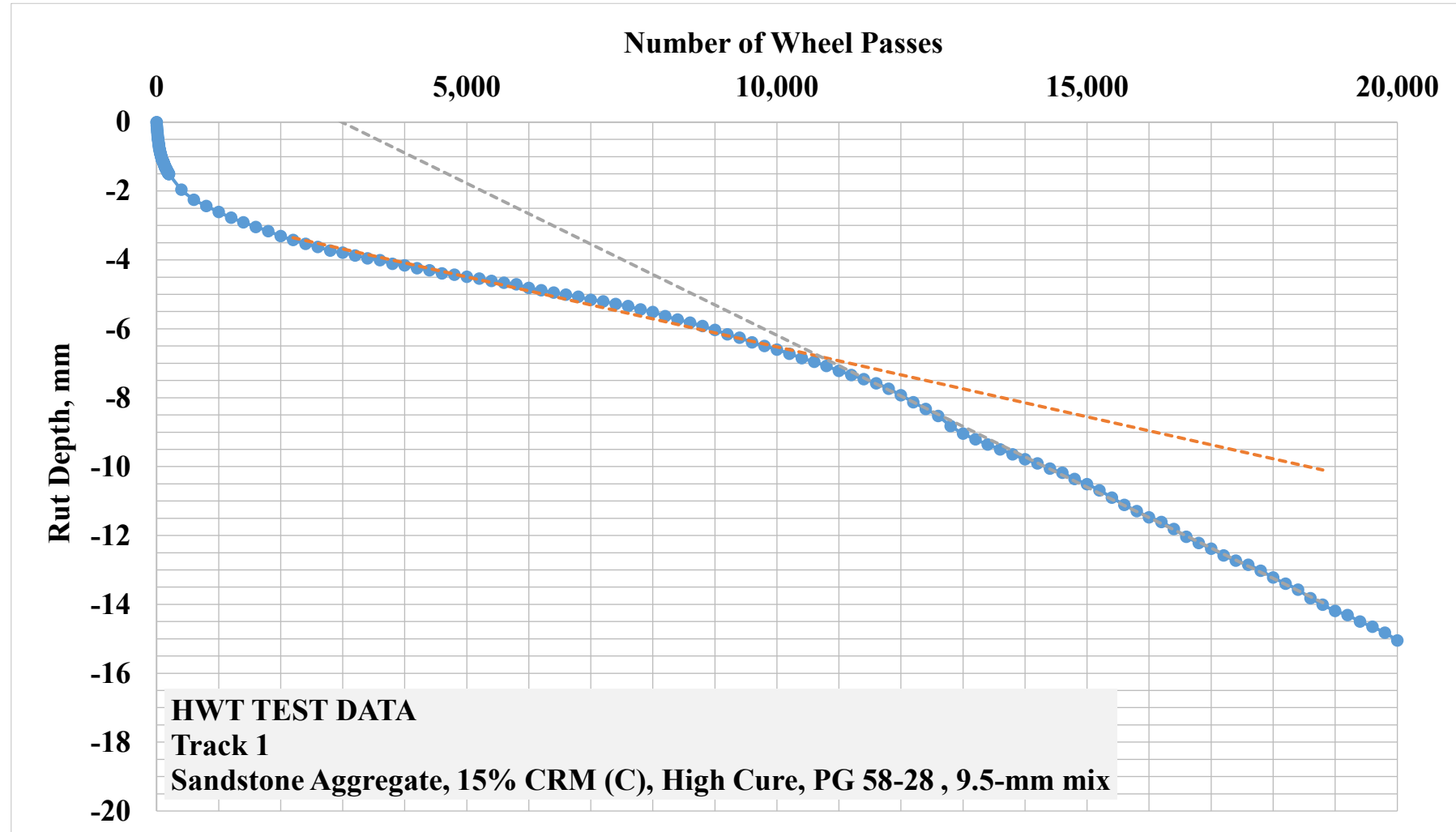
Excellent Performer in HWT



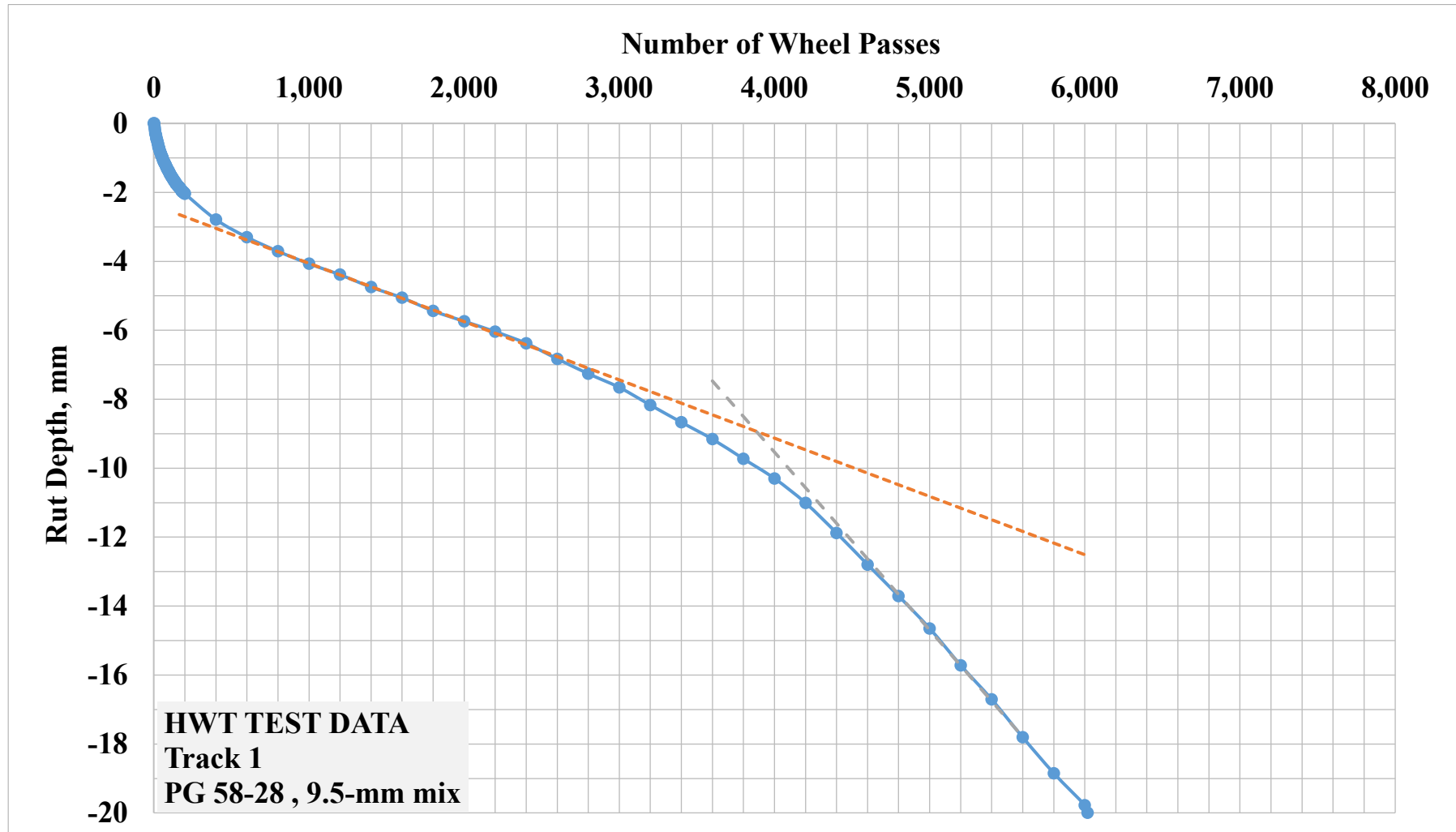
Good Performer in HWT Test



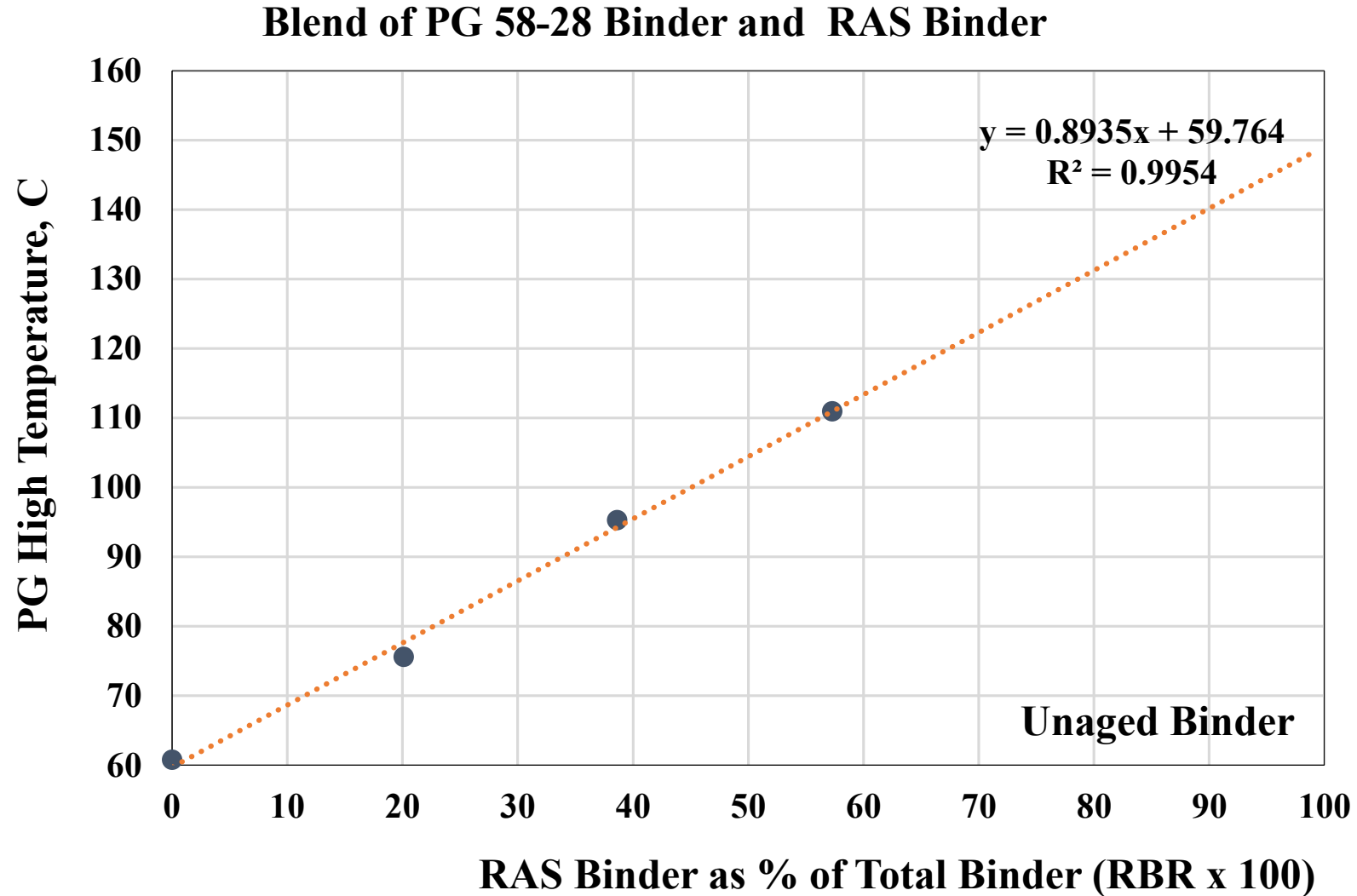
Good Performer in HWT Test?



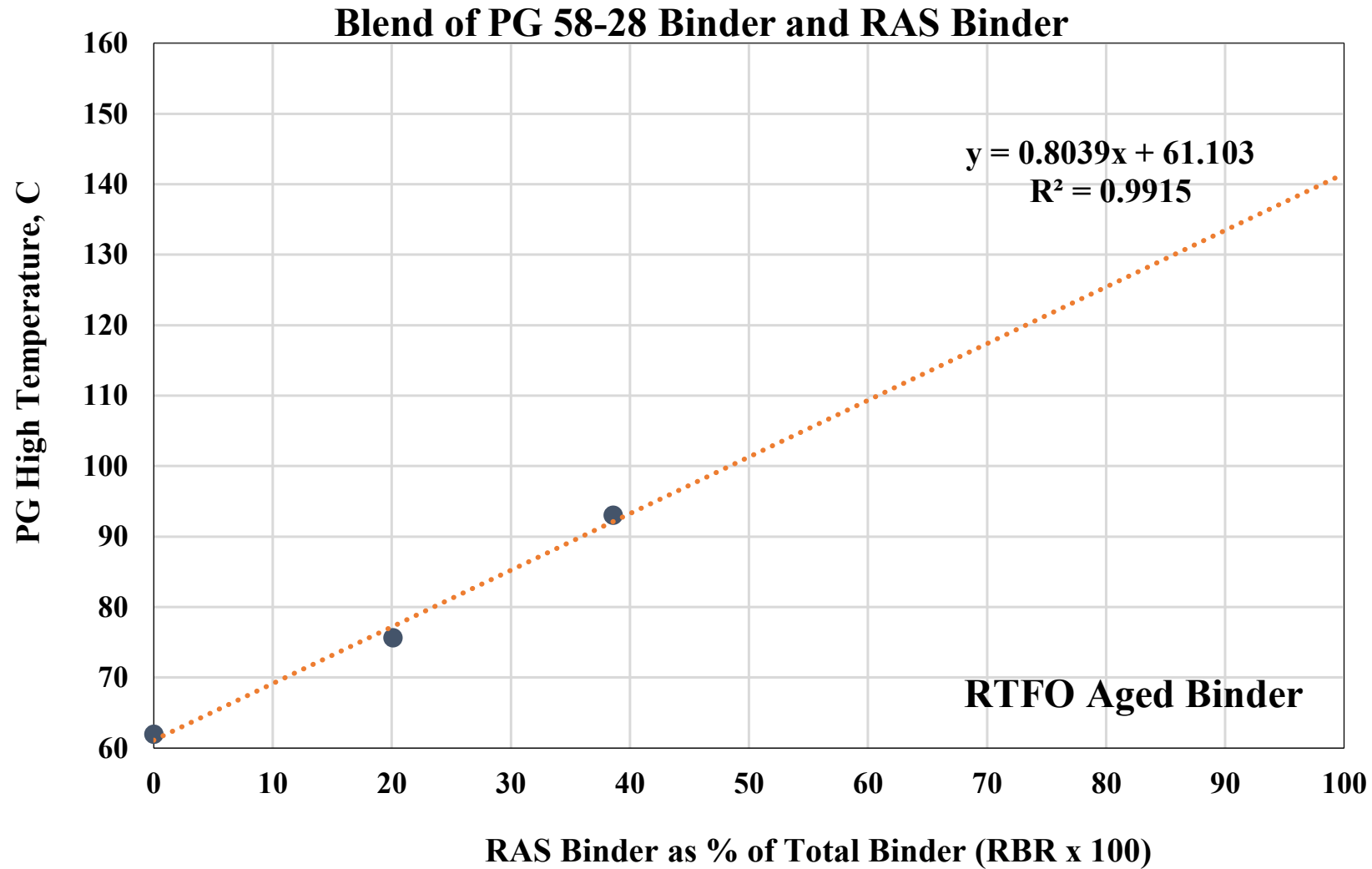
Poor Performer in HWT Test



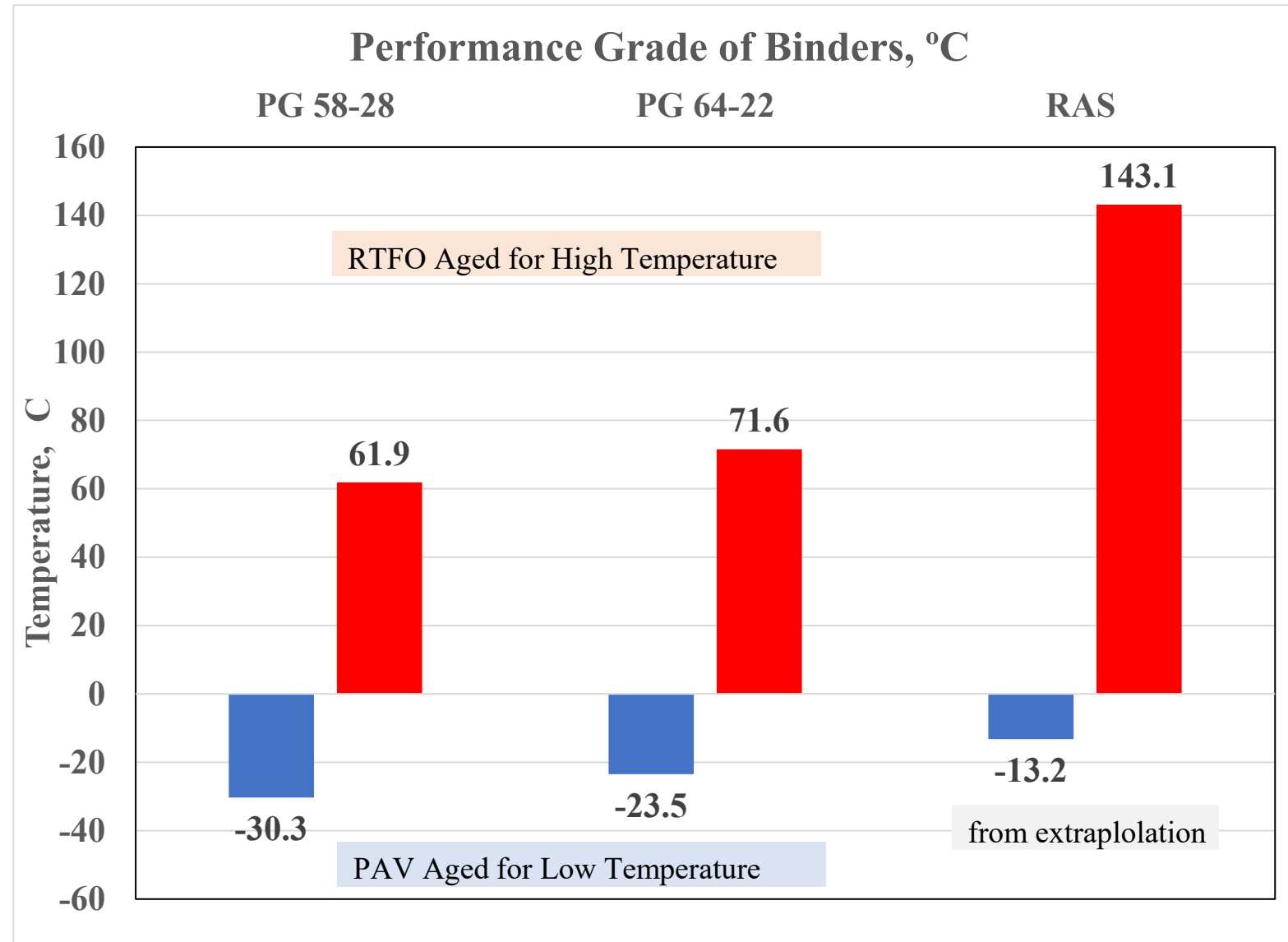
High Temp. PG at Different RBRs



High Temp. PG at Different RBRs



RAS Binder Performance Grade



Choosing Traffic-based Criteria (HWTT)

Traffic Level, (Million ESALs)	Max. Rut Depth at 20,000 passes (mm)	SIP (Min.)	Strip/ Creep Ratio (Max.)	Passes to 12.5-mm Rut (Min.)
≥ 10	10			
	15	16,000	2.0	15,000
≥ 3 and <10	10			
	15	14,000	2.0	12,000
	20	16,000	3.0	14,000
<3	15			
	18	14,000	3.0	10,000
	22	16,000	4.0	12,000

NOTE: Values are provided as examples and must be verified.