

# Mass Loss Task Group Update

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MTE Services Inc.

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# Membership and Progress

- **Members**

- Mike Anderson
- Andrew Cascione
- Codrin Daranga
- Stacey Glidden
- Brett Lambden
- Hassan Tabatabaee

## **Activities**

1. Jan 2018 – Initial Work Plan Submitted.
2. Feb 2018 – Kickoff Conference call.
3. March 2018 – Workplan revised based on task group response.

# Goal

## Improve Understanding of Mass Loss Parameter

- Reasons specification was included and origins of 1.0% maximum limit.
- Survey of mass loss for current PG XX-34 grades and softer. Both unmodified and modified.
- Evaluation of test procedure. Including variability and effect of test temperature.
- TGA analysis: Effect of temperature ramp rate and volatile loss vs. mass loss.

# Survey of Mass Loss Parameter

## Questions

- Q1: Is mass loss a concern for your products?
- Q2: Please list the unmodified and modified grades supplied with a low temperature grade of -34 or softer.
- Q3: Would you be willing to provide mass loss and certification data for the grades listed in question1?
- Q4a: Would you be willing to submit samples of unmodified grades for testing?
- Q4b: Would you be willing to submit samples of modified grades for testing? Samples will be blinded by Asphalt Institute and shipped to MTE.

Tests include: RTFO mass loss at different temperatures, TGA, mixing and compaction temperature evaluation, and rheological evaluation after extended aging.

# Survey of Mass Loss Parameter

## Administration

- Web-based Survey will be administered.
- Testing details provided in survey.
- Any samples collected will be administered by Asphalt Institute to maintain anonymity of suppliers.
- Materials used in study will be determined based on survey response.

# Evaluation of Test Procedure

## 1. Effect of Test Temperature

- a. Limited data reported in Sept. 2017.
- b. More data at  $163\pm 5^{\circ}\text{C}$  needed.

## 2. Single Lab Variability

- a. Preliminary data (MTE) was more precise than precision limits in T240. Reported in September 2017.

## 3. Multi-lab Variability

- a. WCTG January 2018 Sample. PG 58V-34. *Complete.*
- b. CSBG 2018 Q1 Sample. PG 58H-34. Analysis Pending

# WCTG Results

PG 58V-34

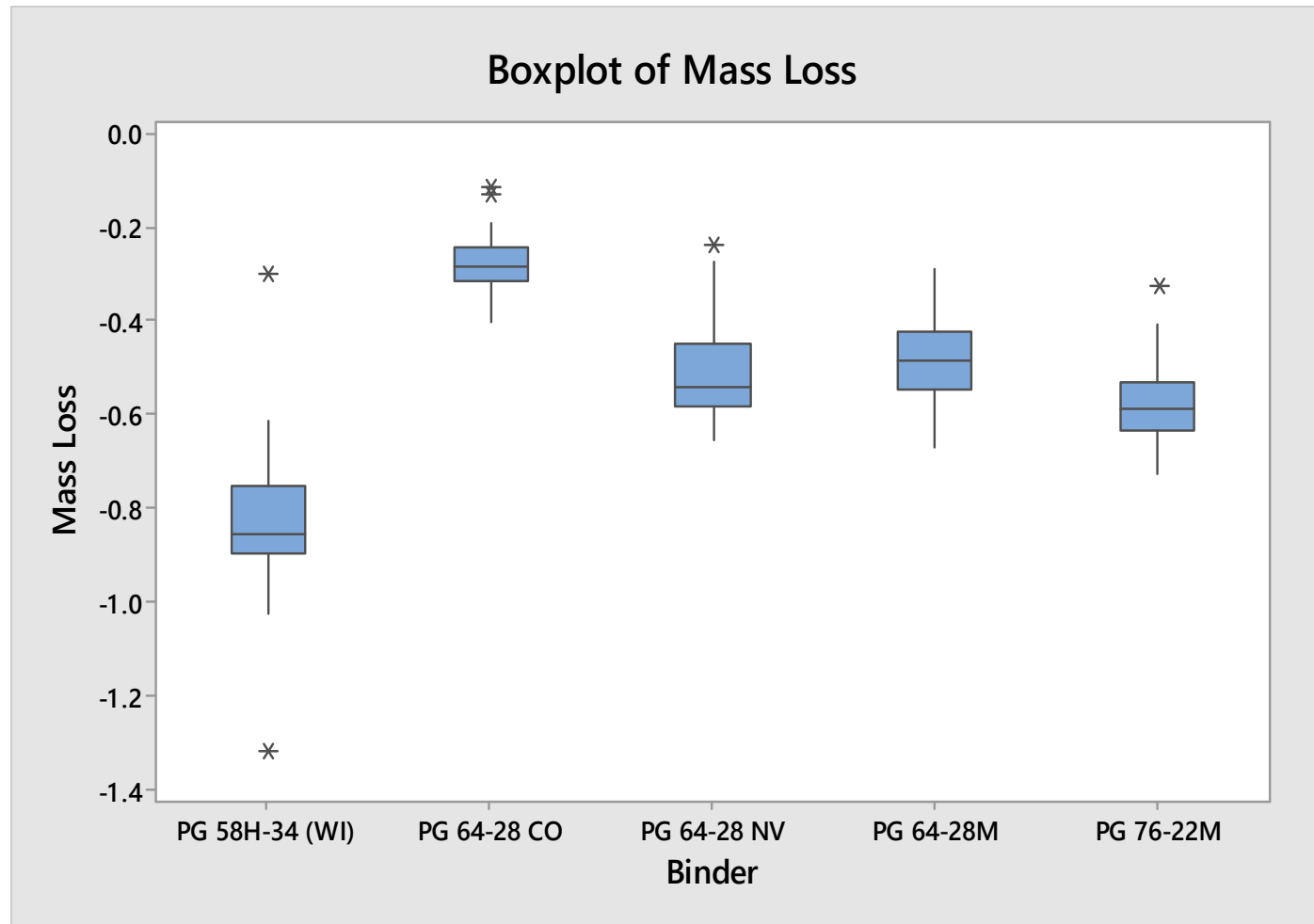
Binder	N	Mean	SE Mean	StDev	Min	Q1	Med	Q3	Max
PG 58H-34 (WI)	34	-0.833	0.0276	0.161	-1.32	-0.895	-0.853	-0.751	-0.300

**COV = 19.3%**

**Current Tolerance in CSBG = 20%**

# WCTG Results

## PG 58V-34 vs. Other Asphalts

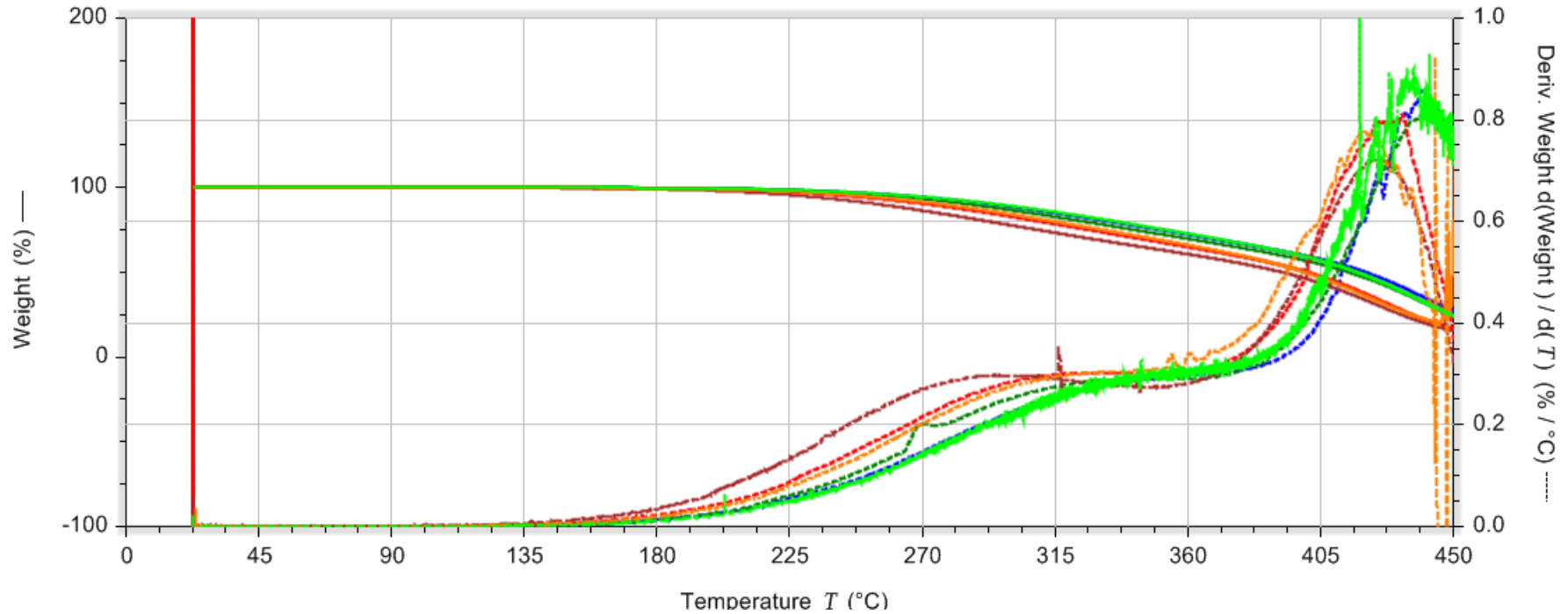






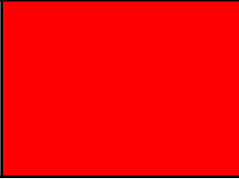



# Further Analysis

## TGA

Tested in  
oxygen  
environment



	Source 1, PG 46, 10°C/min		Source 2, PG 52, 10°C/min		Source 3, PG 46, 10°C/min
	Source 1, PG 46, 5°C/min		Source 2, PG 52, 5°C/min		Source 3, PG 46, 5°C/min

# Discussion

- Mass loss parameter measurement requires review.
  - Sensitivity to Test Conditions: Temperature, temperature ramp rate.
  - Variability depends on magnitude of measurement.
  - 20% tolerance implemented by CSBG seems appropriate.
- Testing in oxidative and inert environment to quantify volatile loss (Planche, Eurobitume 1989)
- Preliminary discussion indicates mass loss is not an issue for most suppliers within the task group.
  - One supplier communicated issues that started last fall.

# ETG Feedback

- Comments on Workplan
- Approval to send survey.
- Overlap with NCHRP efforts?

## **References:**

1. Claudy, P., King, G., Letoffe, J., Planche, JP. "Thermogravimetric Analysis (TGA) as a Technique to Study Bitumen Oxidation. Eurobtiume I-17 Report, 1989.

# Thank You

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