2017 VAA Laboratory Round Robin

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Why Run a Round Robin?

➢ AC Content and Gradation results are used for:
  ▪ Monitoring mixes
  ▪ Adjusting mixes
  ▪ Paying for mixes

➢ Volumetrics is a Go/No-Go decision

➢ Shutdowns and limited production costs money

➢ It’s critical all tests are performed correctly.
Let’s look at cost:

- Assume the average contract price for a ton of asphalt is $70.00/ton
- Per Specification, two acceptance and one monitor test per 1000 tons must be completed

At the minimum rate of testing, the results will represent $70,000 in asphalt
Why ... Continued

➢ If the results show acceptable material and the actual material fails, then owner is harmed

➢ If the results show acceptable material and the owner results show failing material resulting in limited production or shutdown, then the contractor is harmed if the material is actually acceptable
Need To Know Tests Are Performed Correctly

➢ There are two variables, other than the mix, that impact test results

  ▪ Equipment
    • Make sure its calibrated and maintained properly

  ▪ Technicians
    • Properly trained and following correct procedures
Imagine Splitting a Sample With Another Lab, But The Test Results Don’t Match .... Why?

➢ Who is right?
➢ Which data do you use to make adjustments?
➢ What if it results in limited production, shutdown or pay reduction?
What Were We Hoping To Achieve?

1. With a known material, how reproducible are individual labs compared to a reference lab?

2. If variability is identified, what is the source of variability – equipment, person, procedures, or material?

3. How do individual test results compare to VDOT limits?
➢ Field mix was used
  ▪ Bulk sampling

➢ There was a lot of variability in the results
Difference in This Round Robin

- Mix is a virgin SM-9.5A
- Lab produced samples
- Aggregate was sieved down on individual sieves
  - Separated on 14 sieves
Samples Were Mixed Individually

➢ Rice and Furnace samples were mixed in a small 5 quart mixer
➢ Gyratory was mixed in a bucket mixer
➢ Each sample was mixed for 1 minute
Packaged Individually

➢ All samples were packaged in wax lined boxes to reduce sticking and loss of AC due to absorption

➢ By preparing samples individually there was no need to split or separate any materials
During production HTAS tested random samples to establish target values.

These values are the average of 5 samples:

- $G_{mm} = 2.433$
- $G_{mb} = 2.341$
- $AC = 6.30$ (oven corrected AC content)
Gradation

9.5 mm Nominal Sieve Size

Percent Passing

Sieve Size (mm)
Instructions for Round Robin

➢ Minimal instruction was given to participants
  ▪ Mix Type - SM-9.5A
  ▪ Condition Rice Sample for 2 hours at 275F prior to testing
  ▪ Burn Furnace Sample with 0.0 correction factor
  ▪ Compact Gyratory Sample to 50 gyrations

➢ Most asked question: “What is the compaction temperature?”
Participating Companies

- A & A Contractors
- Allan Myers
- B & S Contracting
- Boxley
- Branscome Companies
- Branscome Paving Company
- Chemung Contracting
- Colony Construction

- Francis O. Day
- Hi-Tech Asphalt Solutions
- Lee Hy Paving Corp
- National Asphalt Mfg
- Superior Paving Corp
- Virginia Paving Company
- S. L. Williamson Co Inc
- VTTI
- W-L Construction & Paving

9 Labs AMRL Accredited
Measured $G_{mb}$ vs. Reference $G_{mb}$

- Measured $G_{mb}$
- D2S (+)
- D2S (-)
AMRL Observation

➢ AMRL Accreditation focuses on the lab not the technician

➢ Only one technician is required to perform each test
  ▪ Not always the same technician that does the day to day testing?
Lessons Learned

➢ With a known material, participating labs/technicians reproduced reference lab results

➢ Overall standard deviation on $G_{mm}$, $G_{mb}$ and gradations very low

➢ “Failed” results were identified and causes determined
Round Robin – Phase 2?

➢ Expand round 1 participating labs and technicians

➢ Investigate variability due to sampling procedures for specific gravities and volumetrics
  ▪ Split sampling
  ▪ Bulk sampling

➢ Develop Industry Credentialing Program for Plant Technicians
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- Hi-Tech Asphalt Solutions, Inc.
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