EAR
Workshop

Specification Review

Specification Overview

Topics

- Brief overview of the CQC system for asphalt
- Basic testing requirements
- Failure criteria
- Defective material

Contractor Quality Control for Asphalt

- Production Lot sizes 2000 or 4000 tons
  - Four sublots 500 or 1000 tons
  - Plant Lot and Roadway Lot the same
- Quality Control (QC) tests randomly 1 set/sublot
  - FDOT determines when to sample
    - Split samples obtained for Verification & Resolution
  - G_{mm}, SGC (G_{mb}), P_b, gradation (P_{-8}, P_{-200})
  - Five cores (G_{mb}) per sublot for density
- Must meet requirements of Table 334-4
  - Master Production Range
  - Pass/Fail criteria

Table 334-4
Master Production Range

Characteristic	Tolerance (1)
Asphalt Binder Content (percent)	Target ± 0.55
Passing No. 8 Sieve (percent)	Target ± 5.50
Passing No. 200 Sieve (percent)	Target ± 1.50
Air Voids (percent) Coarse Graded	2.00 – 6.00
Air Voids (percent) Fine Graded	2.30 – 6.00
Density, percent G_{mm} (2)	
Coarse Graded (minimum)	93.00
Fine Graded (minimum)	90.00
(1) Tolerances for sample size of n = 1 from the verified mix design (2) Based on an average of 5 randomly located cores	

Contractor Quality Control for Asphalt

- Verification (VT) 1 set/Lot
  - Only determines if QC data is acceptable for pay
  - Randomly select one of four sublots
    - Split sample (plant)
    - Same cores (roadway)
  - G_{mm}, SGC (G_{mb}), P_b, gradation (P_{-8}, P_{-200})
  - Use Between-laboratory precision values
    - Table 334-5
  - If everything compares favorably → accept material and pay based on QC results
  - If an unfavorable comparison → Resolution

Table 334-5
Between-Laboratory Precision Values

Property	Maximum Difference
G_{mm}	0.016
G_{mb}	0.022
P_b	0.44 Percent
P_{-200}	FM 1-T 030 (Figure 2)
P_{-8}	FM 1-T 030 (Figure 2)

Contractor Quality Control for Asphalt

- Pay Factors determined per Lot:
  - V_a, Density, P_b, P_{-200}, P_{-8}
  - 1 – 2 tests: Small Quantity Pay Table
  - 3 – 4 tests: Percent Within Limits (PWL)
- Composite Pay Factor for each Lot determined based on the following weighting:
  - 35% Density
  - 25% V_a
  - 25% P_b
  - 10% P_{-200}
  - 5% P_{-8}
- System slightly different for FC-5
  - Lot size, Pay factors

Contractor Quality Control for Asphalt

- Independent Verification (IV) 1 set/Lot
  - District Bituminous staff
    - Plant – P_b, gradation (P_{-8}, P_{-200}), Air Voids
    - Roadway – Five cores (G_{mb}) for density
  - Use same Table 334-4
  - If any tests results do not meet the requirements of Table 334-4, cease production
  - Address failing test results in accordance with 334-5.9.5

Tests

- Asphalt Content (P_b)
  - FM 5-563
  - Loose (uncompacted) mixture
- Gradation (P_{-8} and P_{-200})
  - FM 1-T 030
  - Recovered Aggregate
- <u>Volumetric Testing</u> – prior to testing samples condition the test sized sample for 1 hour at the target roadway temperature

Tests

- Maximum specific gravity (G_{mm})
  - FM 1-T 209
  - Loose (uncompacted) mixture
- Gyratory Compaction – N_{des}
  - Plant Air Voids at N_{des}
  - AASHTO T 312-04
- Bulk specific gravity of compacted mix (G_{mb})
  - FM 1-T 166
  - Core, SGC specimen

334-5.9 Minimum Acceptable Quality Levels:

- Individual Lot Pay Factors 0.80 to 0.89
  - First time correct, 2 consecutive - cease
- Composite Pay Factor 0.75 to 0.79
  - Handle per 334-5.9.5
- Composite Pay Factor Less than 0.75
  - Remove and Replace

334-5.9.5 Defective Material:

- Includes IV and QC failures
- Remove and Replace….or
- Engineering Analysis Report
  - Paid by contractor
  - Remain in place at composite pay factor, or
  - Remove and Replace
- The Engineer may determine that an engineering analysis is not necessary or may perform an engineering analysis to determine the disposition of the material

334-5.9.5 Defective Material: Assume responsibility for removing and replacing all defective material placed on the project, at no cost to the Department.

As an exception to the above and upon approval of the Engineer, obtain an engineering analysis by an independent laboratory (as approved by the Engineer) to determine the disposition of the material. The engineering analysis must be signed and sealed by a Professional Engineer licensed in the State of Florida.

The Engineer may determine that an engineering analysis is not necessary or may perform an engineering analysis to determine the disposition of the material.

Any material that remains in place will be accepted with a composite pay factor as determined by 334-8, or as determined by the Engineer.

If the defective material is due to a gradation, asphalt binder content or density failure, upon approval of the Engineer the Contractor may perform delineation tests on roadway cores in lieu of an engineering analysis to determine the limits of the defective material that requires removal and replacement. Prior to any delineation testing, all sampling locations shall be approved by the Engineer. All delineation sampling and testing shall be monitored and verified by the Engineer. The minimum limit of removal of defective material is fifty-feet either side of the failed sample. For materials that are defective due to air voids, an engineering analysis is required.