QUALITY MANAGEMENT PROGRAM

Session 13

QMP Components (460.2.8)

- Quality Control (QC)
  - Performed by the contractor
- Assurance (CA) – optional (last year for CA)
  - Performed by the contractor or on their behalf
- Quality Verification (QV)
  - Performed by the Department

Quality Control

- HTCP certified personnel for sampling and testing
- Laboratory conforming to WisDOT's Laboratory Qualification Program
- Required for contracts with 5000 tons or more of QMP HMA mixture
- For smaller contracts, contractor may use an off site lab
- Engineer may waive testing for contracts with less than 500 tons (must be in writing)

QC Sampling and Testing

5000 tons of HMA or more

- Random sampling (CMM 8.36)
- HMA sampled from trucks at plant
- Perform tests same day as taking samples, and report data upon completion
- Retain split samples for 14 days

QC Sampling and Testing

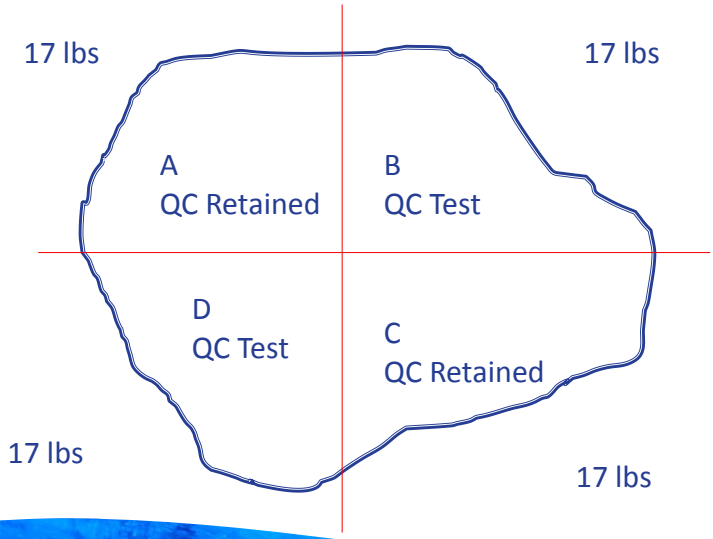
Total Daily Plant Production	Samples per Day
50 to 600 tons	1
601 to 1500	2
1501 to 2700	3
2701 to 4200	4
Greater than 4200	Add 1 sample for each additional 1500 tons or fraction of 1500 tons

Sample size:

≤ 12.5 mm	70 lb
19-25 mm	100 lb
≥ 37.5 mm	160 lb

Sample Identification

- Contractor
- QC, QC-ret, QV, QV-ret
- State project ID
- Date
- Sample number
- Type of asphaltic mixture
- State mix design ID (250-XXXX-yr)
- Percent binder
- Daily tonnage sampled
- Current bulk specific gravity of the aggregate (G_{sb})



QC Testing

- Blended aggregate gradation and fines (P200)
- Asphalt content – by calculation, optionally by nuclear gauge reading or inventory
- Bulk specific gravity of compacted specimens (G_{mb})
- Maximum specific gravity of loose mix (G_{mm})
- Air voids (V_a)
- Voids in mineral aggregate (VMA) – by calculation

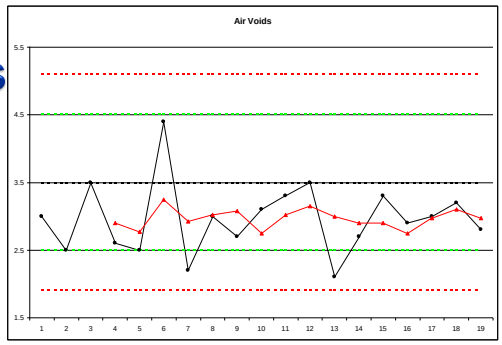
Additional QC Testing

- RAM extraction gradations are sampled from cold feed bin or stockpile
- Field TSR tests on mixes with antistrip (not required on contracts with less than 5000 tons)

QC Documentation

- Keep daily records
- Running average calculation sheets – blended aggregate, mixture properties and binder content sent daily
- Testing records and control charts are sent to engineer within 10 days after paving completed

QC Control Charts



- Asphalt content, %
- Bulk/max sp. gravity
- Air voids, %
- VMA, %
- Blended aggregate gradation – percent passing 25.0, 19.0, 12.5, 9.5, 2.36 and 0.075 mm sieves
- Plot individual results (black) and 4 point running average (red); CA data (blue); warning limits (dashed green); JMF limits (dashed red)

Control Limits

Item	JMF Limits	Warning Limits
37.5 mm	+/- 6.0	+/- 4.5
25.0 mm	+/- 6.0	+/- 4.5
19.0 mm	+/- 5.5	+/- 4.0
12.5 mm	+/- 5.5	+/- 4.0
9.5 mm	+/- 5.5	+/- 4.0
2.36 mm	+/- 5.0	+/- 4.0
0.075 mm	+/- 2.0	+/- 1.5
Asphaltic Content %	+/- 0.3	+/- 0.2
Air Voids %	+/- 1.3	+/- 1.0
VMA %	- 0.5	- 0.2

Average of last four test results
Consider action when results approach warning limits
Must react if running average enters warning bands

Pay Adjustment

Item	Within Warning Bands	Outside JMF Limits
Gradation	90%	75%
Asphalt Content	85%	75%
Air Voids	70%	50%
VMA	90%	75%

- If running average exceeds JMF limits, stop production and make adjustments.
- If air voids running average of 4 exceeds JMF limits, remove and replace. Engineer may allow to remain in place at 50% pay.
- If 4 pt running average exceed JMF for other properties, engineer may allow to remain in place at 75% pay.

Quality Verification (QV)

- Verification testing of independent samples
- Observing contractor sampling
  - Engineer directly observes sampling and takes immediate possession
- Monitoring control charts
- Engineer may direct contractor to take additional samples at any time during production

Quality Requirements

- Certified personnel
  - HTCP HMA IPT, TPC, MD, or Transportation Materials Sampling Technician to observe QV sampling
  - HTCP HMA IPT, TPC, or MD of HMA ACT under a certified technician to split samples and perform testing
  - HMA IPT or higher to ensure sampling and testing is performed correctly, analyze test results and post resulting data
- Qualified lab – separate from contractor's lab

QV Testing

- Bulk specific gravity of compacted mixture
- Maximum specific gravity
- Air voids
- VMA

No tests required if less than 500 tons

1 test for 501 to 5,000 tons

- One additional test for each additional 5k tons

QV Results

- Quality is acceptable if
  - Air voids within 2.7 to 5.3%
  - VMA is within -1.5% of minimum Nmas target
- If QV results are outside limits, engineer will investigate through dispute resolution
- Dispute resolution – bureau's AASHTO accredited lab and personnel will test retained QV sample and nearest QC retained sample backwards

QV Results

- Region pulls an additional QV sample and runs nearest QC-retained split portion forward
- If the testing tolerance between the Region and the QC-ret sample are not within JMFL then additional split testing will occur until the testing compares.

Corrective Action

- Remove and replace nonconforming material
- Reduced pay (50%) for nonconforming HMA material allowed to remain in place-per engineer discretion
- Reduced pay (25%) for nonconforming PG binder material

QMP IRI RIDE

QMP Ride

- Contractor testing with inertial profiler
- Inertial profiler from list of approved devices
  - Calibrated at Rodeo
- Certified operator
- Applicable to all projects over 1500’
- Profile final mainline riding surface
- Include in QC Plan
- Standard segment = 500 feet long/per wheelpath
- Department may do verification testing

QMP Ride Categories

- HMA I – multiple opportunities to improve ride (layer(s) of HMA, wedging, leveling, milling or grinding)
- HMA II – single opportunity to improve ride
- HMA III – asphalt pavement sections with a bridge, bridge approach, railroad crossing or intersection.
- HMA IV – like HMA III but speed limit < 55 mph

Ride Corrective Actions - Localized

Engineer to assess areas with IRI > 200 in/mi

1. Have contractor correct roughness
2. Leave in place with no pay reduction
3. Assess pay reduction (except HMA IV)
   - Length in feet x (IRI - 200)
   - Max $250 for areas less than 25 feet long
   - Longer than 25 feet - $10 per foot.

Ride Corrective Actions - Excessive

IRI > 140 in/mi

- HMA I – correct to 60 in/mi
- HMA II – correct to 85 in/mi
- By milling and replacing full width
- Or correct using techniques approved by engineer
- Reprofile after correction
- Assess payment reduction

MRS Data Review

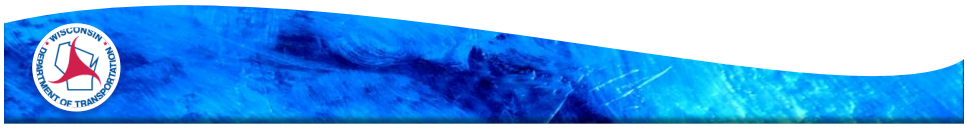
- Must be a registered user of the Atwood System
  - For “Review” you must request special authority
  - “Final Reviews” must be printed out in hard copy and signed then included with Material Records
  - Incentives should be paid per bid item and match MRS data
  - Disincentives need to be created via contract mod and paid in full (not in combination with incentives)

QMP NUCLEAR DENSITY

QMP Nuclear Density

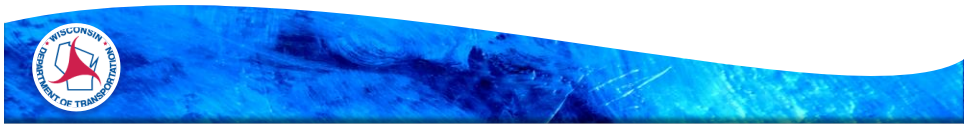
QMP Nuclear Density

- On all contracts over 10,000 tons of QMP HMA
- Not to be used on any of the non-QMP HMA material (driveways, entrances, tie-ins, temporary, etc…)
- Certified testers
- Approved gauges that are correlated to the project
- Contractor performs QA testing for payment
  - Department verifies the density values with QV testing



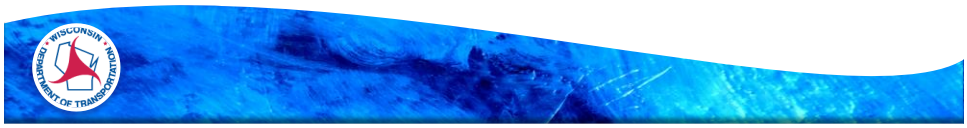
QMP Nuclear Density

- Establish project reference site
- QV testing is done on 10% min of the sublots and any discrepancies will go to dispute resolution
- 1500’ lane segment
  - Lots/sublots predetermined
  - Sideroads, turnlanes, etc…will be measured for tonnage and tested accordingly



MTS Data in Atwoods

- HMA Pavement (Density Data)
- Contractor must enter data
  - Verify paving date & tonnage
  - Verify incentive eligibility (Air voids 3.5-5.0)
  - Verify calculations for incentives ($0.40/$.80)
  - For disincentives…make sure to account for PG binder, MRS does NOT calculate this for you
  - Do not negate incentives and disincentives pay for each one individually



- Questions?
- Comments?
- Experiences?