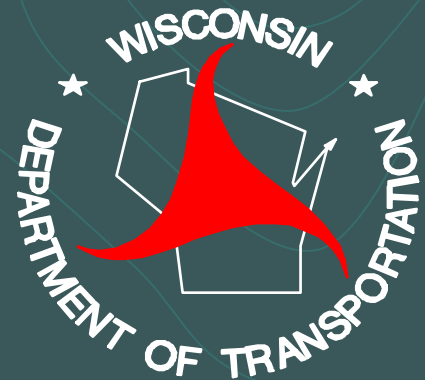


QMP and the Wisconsin DOT

*An Overview of HMA Quality Management
(the first decade)*

47th Louisiana Asphalt Paving Conference
February 23 & 24, 2005



Wisconsin HMA Time Capsule

- Late 1980s – *fix it, it's broke!*
- Early 1990s – **while you're fixing it, make sure you can track it, define it, and fix it faster if we think it's getting broke again**
- 2000 + – **after you've fixed it again, be able to control it enough to not only improve it, but also "predict the future" (performance)**

Age of Science

- Technology presents more interest than just for computers and space travel.
- If you can't bring the road to the lab, then take the lab out to the roadway

HMA Testing

Rotavapor Recovery

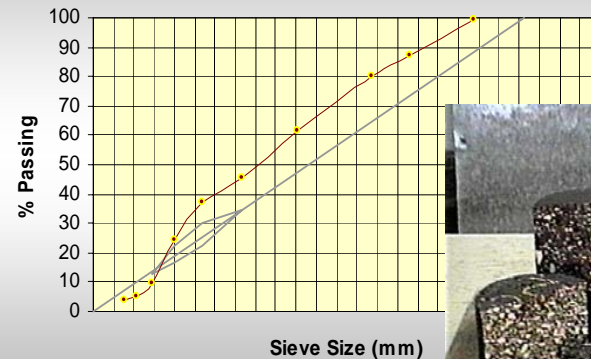


Dynamic Shear Rheometer

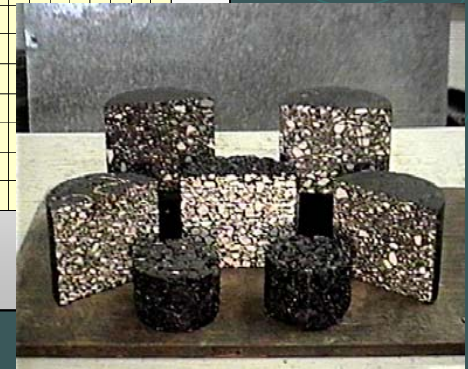
Research Studies



0.45 Power Chart



HMA Design



Aggregate Testing



Micro-Deval

Gradation



LA Wear

Soundness
&
Freeze-Thaw



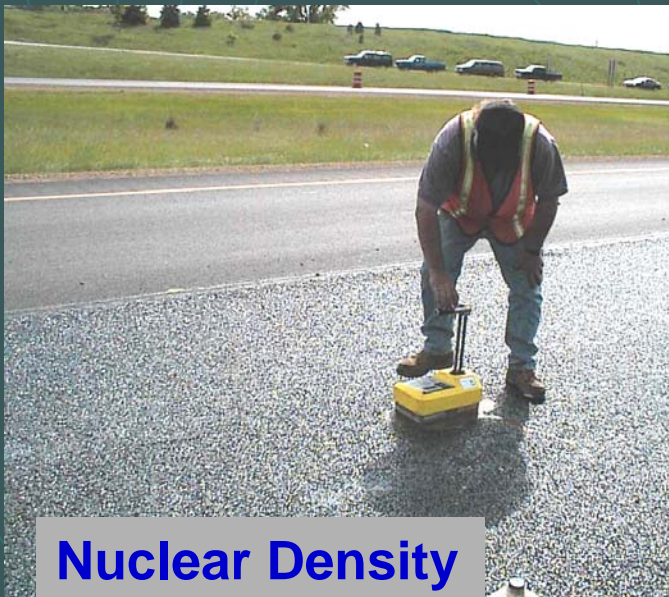
Final

Initial

Lab & Materials Quality Assurance

Materials Tracking System

Calibration Compliance



Nuclear Density

WisDOT Materials Tracking - [EDIT Test #: 1-804-4-2002 Project ID 5080-00-62]

File Utilities Window Help

View Data Web Reports Seed Files Reports Exit Calculator WordPad Calendar Layer User Info Mkt Info Prefix Info Help Links

Add Save Delete Print Data Preview & Print Read Only - this test not in user site

EDIT

Sample Card Test Data Currently Assigned Projects Copy Test Create Verified Report Verifier Name Close This Test

804 Main 804 Detail

Tester Affiliation: D. L. GASSER Observed Test Type: QA
 Reviewed By: CHUCK ORVILLE Placement Location: ROADWAY
 Reviewed Date: 05/03/02 Sampling Method: TRUCK BOX
 Comments: Sampling Location: 637 TONS

QC TESTER: STEFANIE BRANDT (DL GASSER)
 QA TESTER: BRICE LANIBERGER (D-1 LAB)
 CO VERIFICATION #: 250-0041-02
 QC DESIGN #: 65-02-12.5-E1(R)
 MIX TYPE: E - 1.0, 12.5 MM
 QC GYRATORY: TROXLER
 QA GYRATORY: INTERLAKEN
 SAMPLE #: 1-1
 GYRATION #: 60

SPLIT SAMPLE CORRELATION COMPARISON RESULTS

Correlation Tolerances +/-

| | 6.5 | 6.5 | 6.0 | 6.0 | 6.0 | 5.0 | 4.0 | 4.0 | 3.5 | 3.5 | 3.0 | 2.0 | 0.030 | 0.020 |
|--|-------|------|-------|---------|--------|---------|---------|---------|----------|----------|----------|----------|--------|-------|
| Sieve percent passing - Gradation sieve analysis | | | | | | | | | | | | | | |
| | 1 1/2 | 1 | 3/4 | 1/2 | 3/8 | # 4 | # 8 | # 16 | # 30 | # 50 | # 100 | # 200 | Gmb | Gmm |
| | 37mm | 25mm | 19mm | 12.5 mm | 9.5 mm | 4.75 mm | 2.36 mm | 1.18 mm | 0.600 mm | 0.300 mm | 0.150 mm | 0.075 mm | | |
| QA | | | 100.0 | 96.2 | 85.6 | 66.9 | 54.7 | 46.7 | 36.0 | 19.4 | 8.5 | 5.5 | 2.392 | 2.496 |
| QC | | | 100.0 | 93.3 | 86.1 | 69.1 | 57.0 | 48.6 | 38.9 | 19.1 | 8.8 | 5.9 | 2.401 | 2.496 |
| | | | 0.0 | 2.9 | -0.5 | -2.2 | -2.3 | -1.9 | -0.9 | 0.3 | -0.3 | -0.4 | -0.008 | 0.001 |

Comparison meets allowable tolerances ? Y

Ready

Start Microsoft Active... Inbox - Microsof... Exploring - QMB... Microsoft Power... Microsoft Excel... WisDOT Mat... Document1 - Mi... 5:13 PM

First Years Challenges

- Statewide Training Program
- Increase Testing Experience and Proficiency
- Additional Cost to Equip Field Labs
- Documentation
- "Find" Some Experts or ... Create Them

Specification Impacts

- **Dedicated Plant Staff Personnel**
- **Additional Department Presence On-Site**
- **Better Communications**
- **Contractor Quality Control**
- **Product Payment Evaluation Process**
- **Standardized Test Methods and Procedures**

Mix Designs

- Equipment
- Test Methods
- New Terminology
- Evaluation of Aggregate Structures
- Contractor Responsibility
- Mix Design Review (Verification Process)



Field Production

- Laboratories

 - Plants

 - Districts

- Common Language

- Wider Troubleshooting Knowledgebase

- Capability to Limit Production of Substandard or Non-Compliant Materials

Database

- **Materials Tracking System**
- **Department/Contractor Comparisons**
 - Mix Designs (starting point)
 - Quality Control (production)
 - Pre-season "round robins" (Tune Up) involving contractors, department Central Office and Regional labs, independent consulting labs, etc



Value - Data Analysis

- We know where we've been (tracked our history)
- We've gathered, calculated and documented
- So now what?

Verification

● Mix Designs

- Logical progression to change old system
- Shift Responsibility from Department to the Contractor (1990-1993)
- Previously a 14 day process, now a next day turn-around
- Spot check, Occasional Random Comparison Testing – Emphasis on field production

Production Mix? Can we use the same model?

Evolution

- Relate analysis results to performance
- Define critical mixture properties affecting performance
- Develop guidance for defining, producing and troubleshooting “quality product”
- Warranty
- Design Build?



... On the Horizon

- Performance Evaluation Equipment
- Real Time Quality Control
- Defining product in new terms
 - Ride
 - Mixture Stiffness
 - Noise
 - Permeability
 - Surface Texture

Future Troubleshooting ?



I told you using grass to prevent drain-down probably wouldn't work!

Happy Birthday !!

Celebrating being 10 years young
... and bracing for the next 10



For Further Information

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