



HMA Surface Characteristics Study

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BY TONY CARRILLO





Surface Characteristics

- Sidewalk had enough heat but ...
 - Lacked: cleanliness, portability, etc.
- Pavements need to be more than safe & durable
- Pavement Surface Characteristics Study - *Optimization*
 - Safe, Durable, economical, green
 - Friction, Texture, Ride, Noise, Permeability and Durability





Outline

- History
- Measured Pavement Characteristics
- Observed Performance
- Summary





History

- 1870's US Cities Started to use Wooden instead of Granite Blocks
 - Wooden Roads Quieter but ...
 - Service life of $\frac{1}{2}$ - $\frac{1}{4}$ that of Granite Brick/block
- Also tried mastic (native asphalt), but had traction issues (horse falls)





Work Plan

- Literature Review
- Test Section Construction
 - Phase 2, \$10.1M
- Seasonal Testing & Monitoring
- Analysis of Experimental Data
- Deployment & Implementation
- Final Report

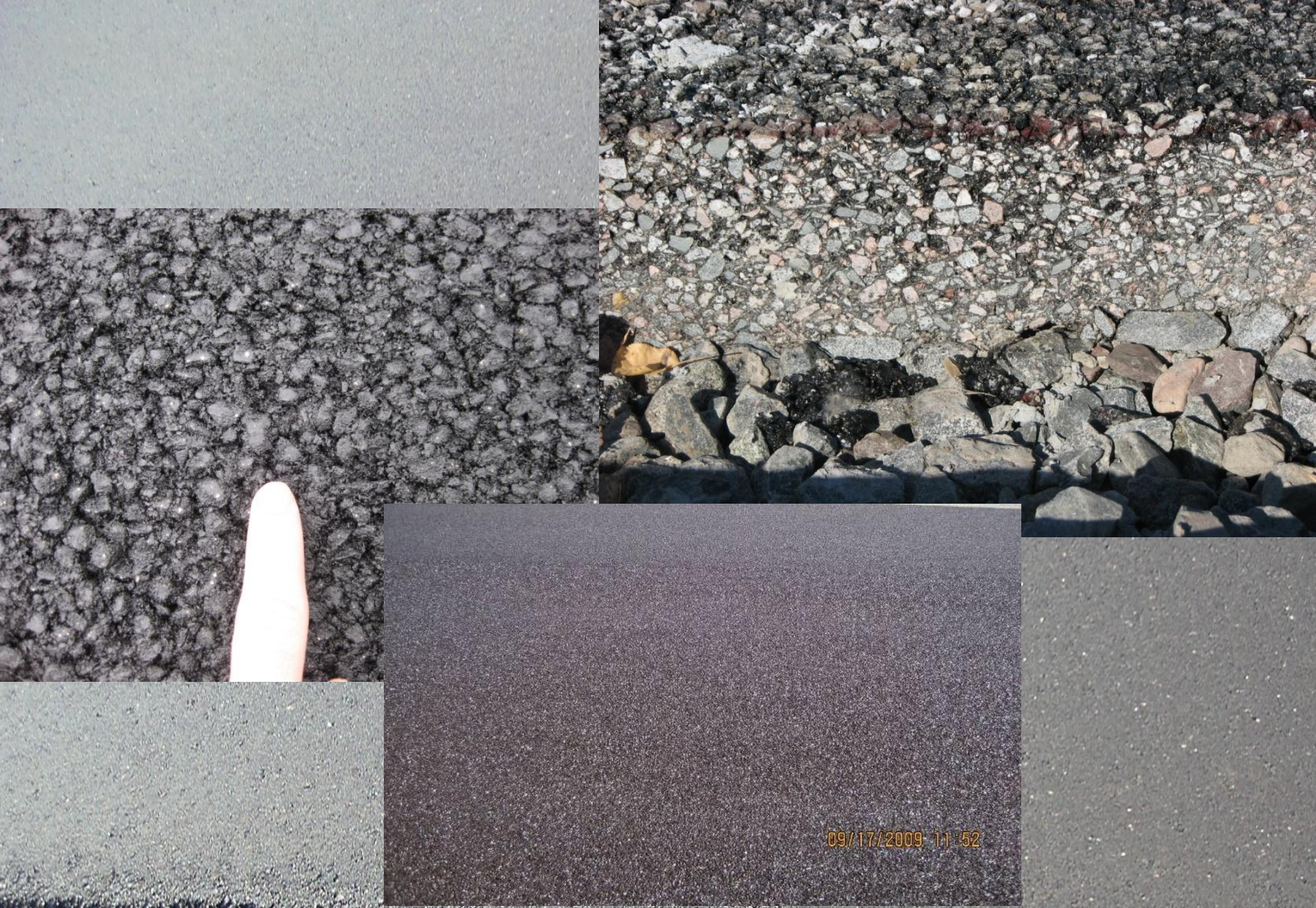




Test Section Construction

- 6 cells on Mainline and 5 cells on Low Volume Road
- Traditional HMA & New/emerging tech (variables: gradation, binder, recycle)
 - Porous HMA
 - Warm Mix Asphalt
 - 4.75 Taconite
- Pavement Preservation
 - Fog Seal (various ages)
 - Chip Seal (2 gradations)





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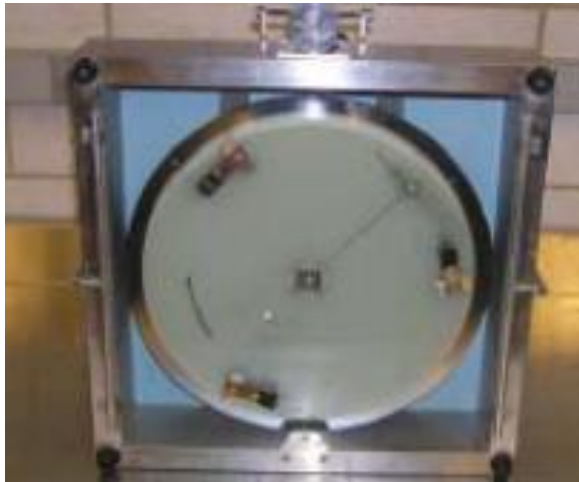
Seasonal Tests & Monitoring

- Cells are generally tested 2 -3 times per year
- Data collected every year for 4 year monitoring period of study:
 - Friction & Texture
 - Ride
 - Noise
 - Permeability
 - Durability

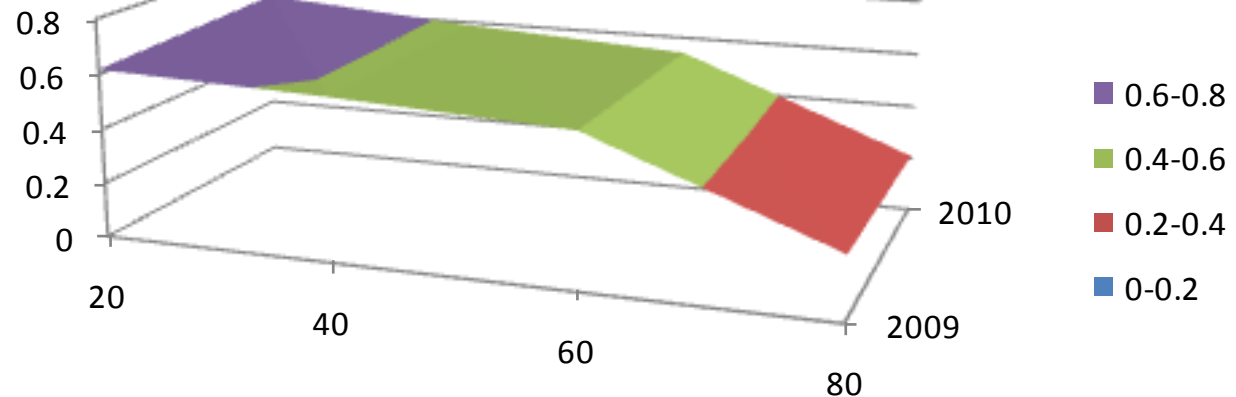


Tests & Monitoring: Friction

- Dynamic Friction Tester (DFT)
 - Measures across a range of speeds

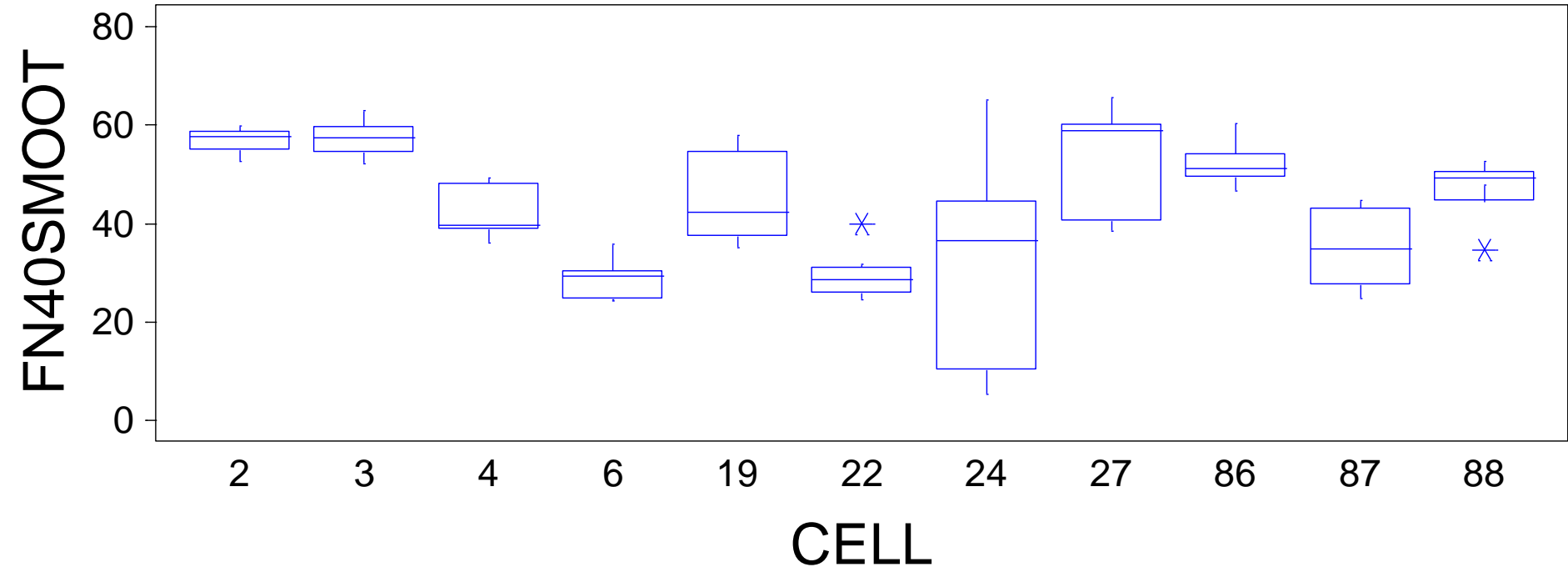


μ vs. Speed, kph: Cell 6 DL, BWP



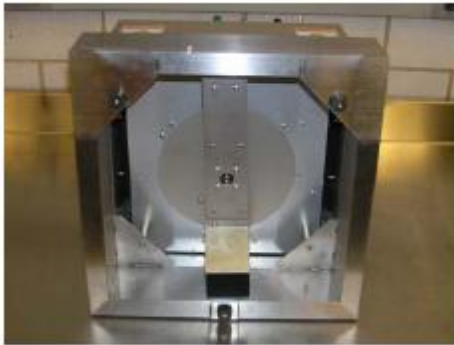
Tests & Monitoring: Friction

- Locked Wheel Skid Trailer
- Most Commonly Used
- Tested both Ribbed & Smooth

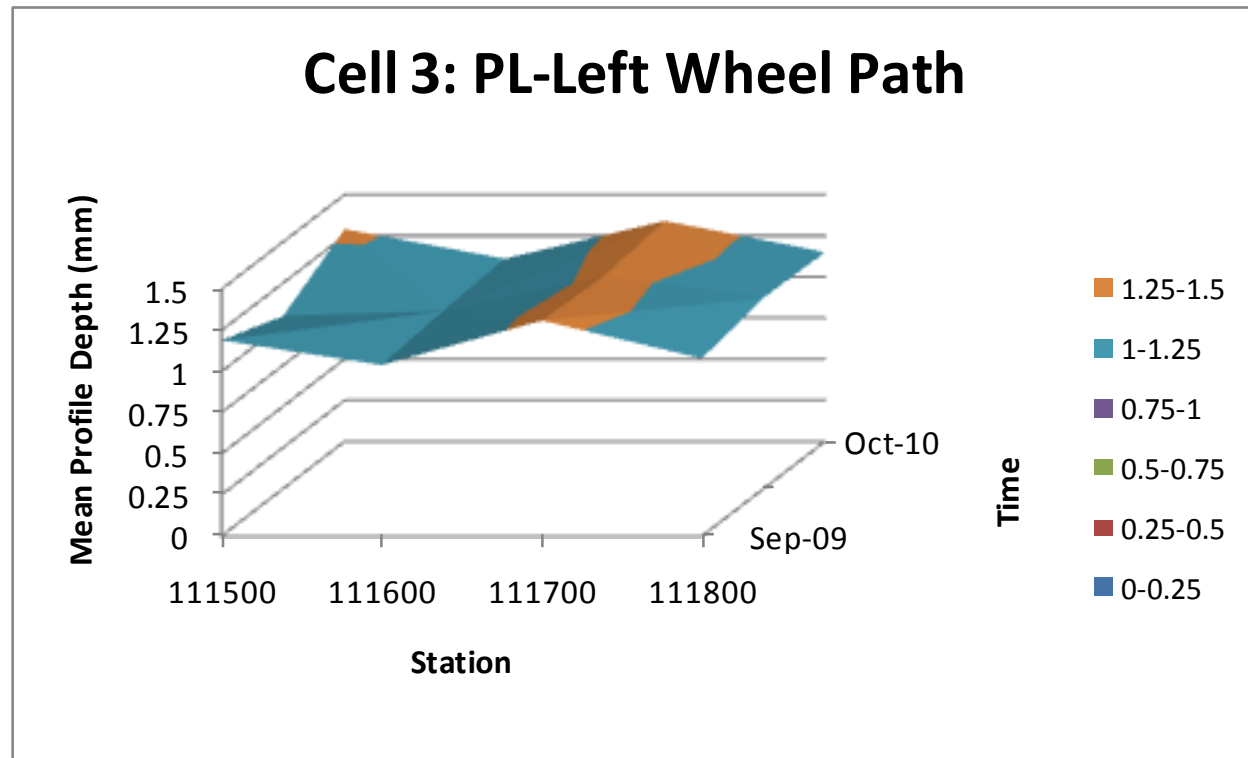


Tests & Monitoring: Texture

- Circular Texture Meter (CTM)
 - Measures mean profile depth with a laser

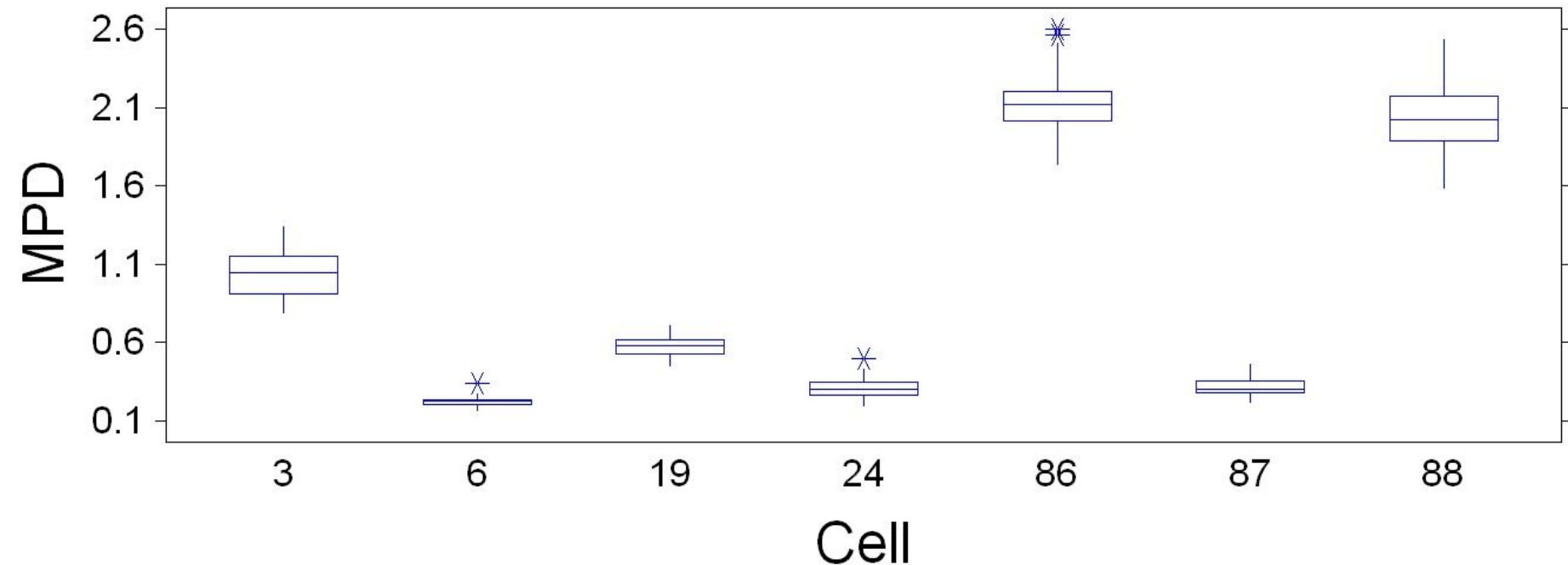


International
Fiction
Index



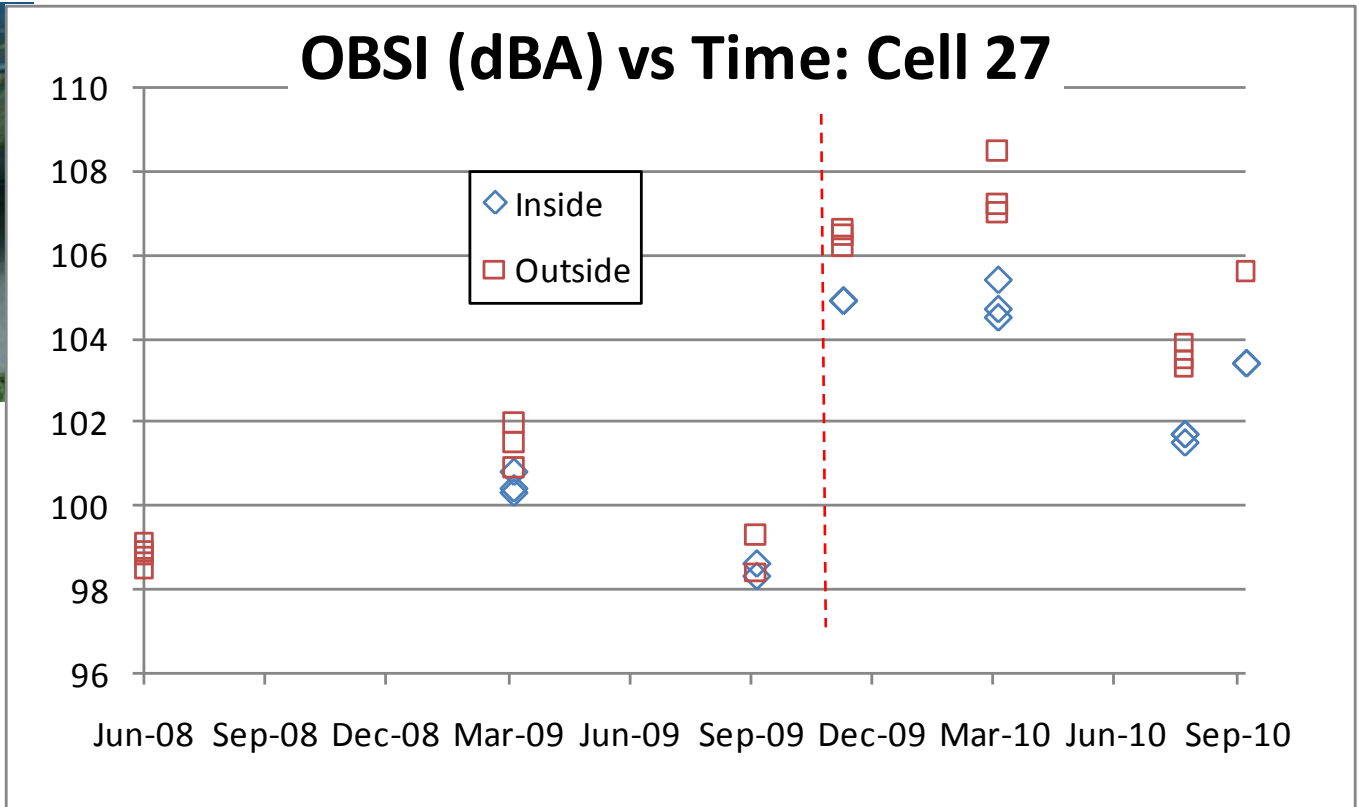
Tests & Monitoring: Texture

- Measurements over time
- Variations both within and between cells



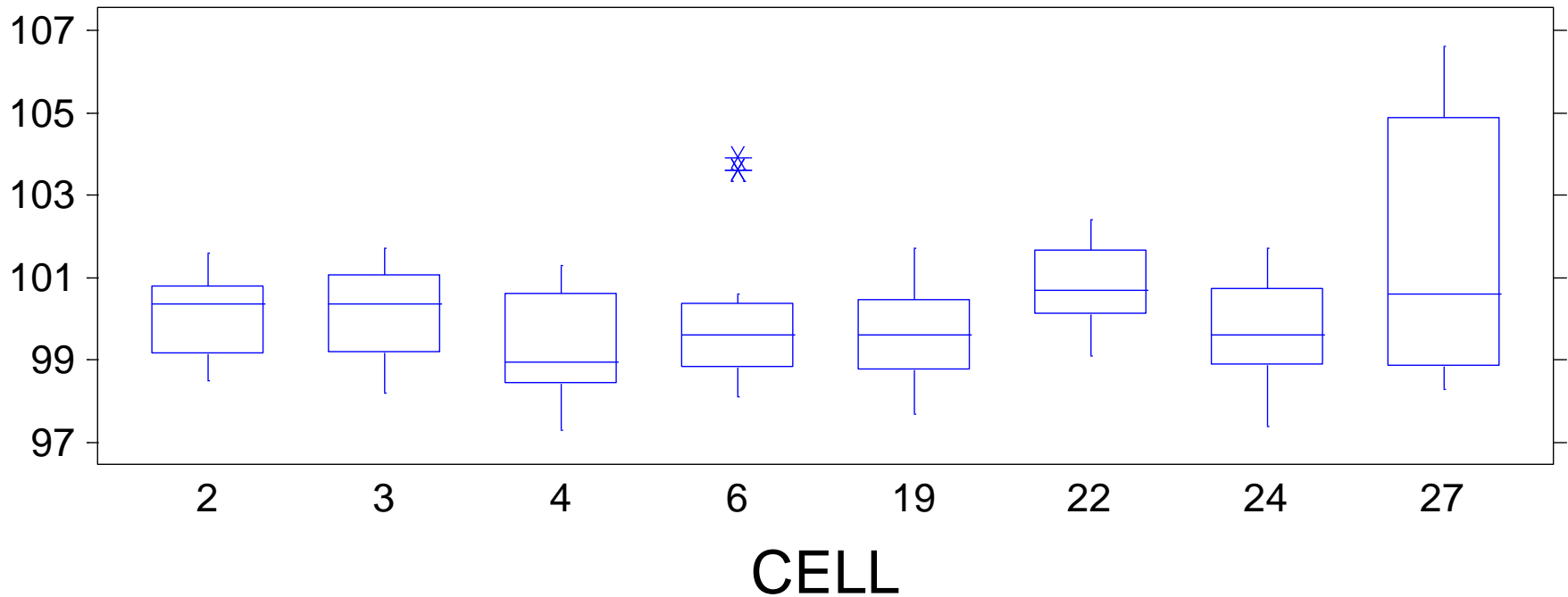
Tests & Monitoring: Noise

- On Board Sound Intensity (OBSI)
 - Measures Tire Pavement Interaction Noise



Tests & Monitoring: Noise

- Measurements over time
- Variations both within and between cells



193 cases 161 missing cases





Tests & Monitoring: Durability

- Method based on LTPP (17 distresses)
 - Trained Personal, Detailed Evaluations
- Cell 6 (4.75mm): Low Severity Reflective Cracking (Bit over PCC)
- Cells 86 & 88 (Porous HMA): Low Severity Raveling





Data, Data and Data

- **Contract Awarded to Purdue to:**
 1. **Review of Literature**
 2. **Effect of Changing Seasons on HMA Surface Characteristics**
 3. **ID of Significant Variables**
 4. **Model of Sound Intensity**
 5. **Draft Final Report**





Summary

- Surface Characteristics should be optimized with other HMA properties
- Study is producing valuable data
 - Analyzed for use in sound model
 - Aid in understanding of cost-benefits
 - Long Term & Consistent Monitoring





Thank You!

