ICT RESEARCH FOR IDOT
SOME QUICK TAKE-AWAYS

ILLINOIS BITUMINOUS PAVING CONFERENCE 12/10/2013

Matt Mueller, PE – Engineer of Tests

R55, R27-100 TACK COAT OPTIMIZATION FOR OVERLAYS, IMPLEMENTATION

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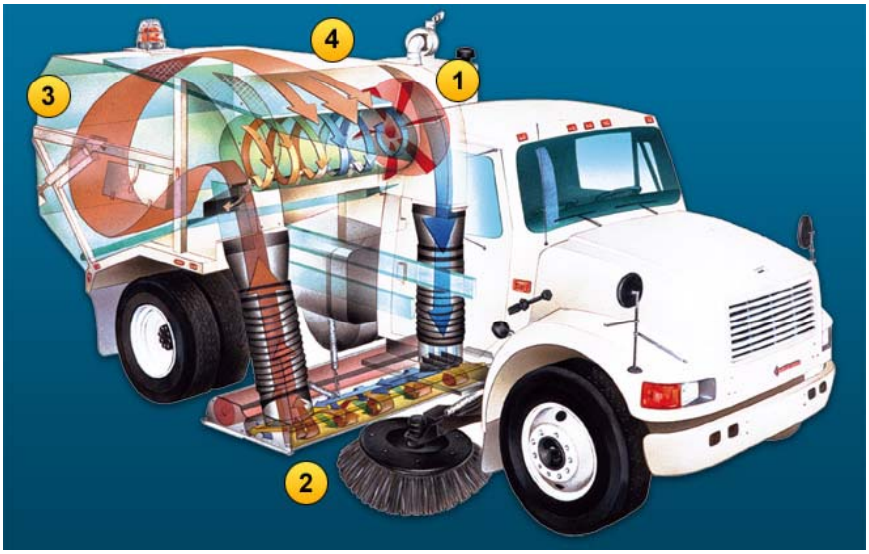
R55, R27-100 TACK COAT OPTIMIZATION FOR OVERLAYS, IMPLEMENTATION

- Principle Investigator: Professor Imad Al-Qadi
- IDOT TRP Chair: Jim Trepanier/Derek Parish
- Determined optimum application rates for maximum bond for all surfaces
- Evaluated time to “not tracking”
- Evaluated a “spray paver”
- BMPR Special Provision is available
- Several projects have been constructed
- The correct coating is “thicker than you would think”
- Industry pursing a method of certification of volumetric meters on distributor trucks
- Recently updated sweeper description to “regenerative air” with a minimum 6’ head

Regenerative Air Vacuum Sweeper

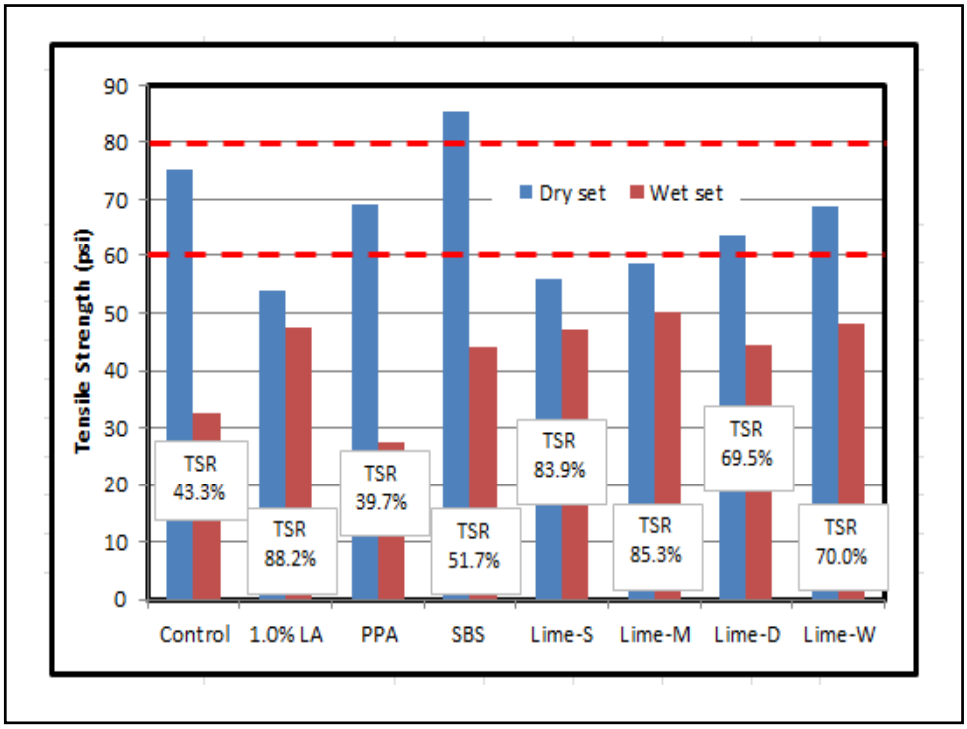


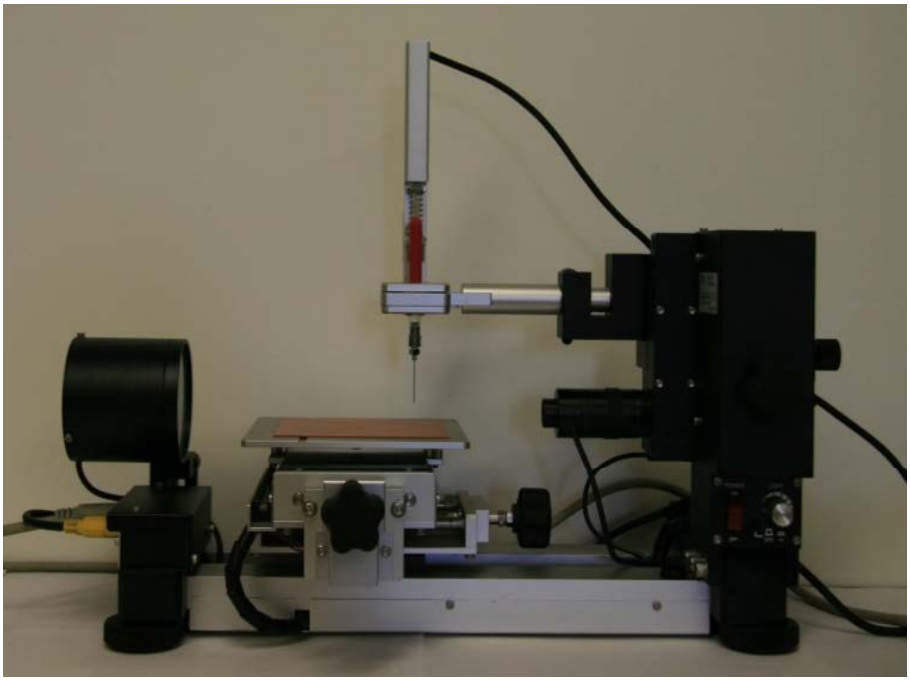
R27-60 MECHANISTIC-EMPERICAL DESIGN, IMPLEMENTING & MONITORING

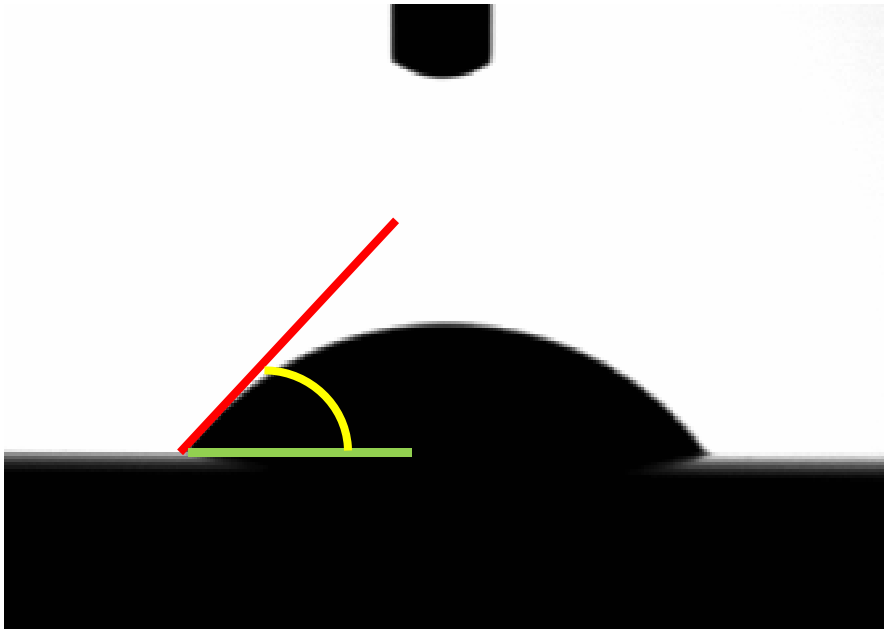
- Principle Investigator: Prof. Marshall Thompson
- IDOT TRP Chair: Charles Wienrank
- Developed a limiting strain for rubblization with HMA overlay procedure
- Analyzed contact pressure for the use of material transfer devices on all lifts of full depth HMA

R27-78 EFFECTS OF VARIOUS ASPHALT BINDER ADDITIVES/MODIFIERS ON HMA SENSITIVITY

- Principle Investigator: Prof. Imad Al-Qadi
- IDOT TRP Chair: Jim Trepanier
- SBS provides higher strengths but does not reduce stripping
- All forms of lime addition improve mix resistance to moisture damage
- Liquid anti-strip increases surface energy (for a time) to reduce moisture damage
- PPA addition to N70 and N90 mixes resulted in greater mix vulnerability to moisture damage
- Surface energy test results were encouraging and more testing is proposed


Tensile Strength (psi)
90
80
70
60
50
40
30
20
10
0
Dry set
Wet set
TSR 43.3%
TSR 88.2%
TSR 39.7%
TSR 51.7%
TSR 83.9%
TSR 85.3%
TSR 69.5%
TSR 70.0%
Control
1.0% LA
PPA
SBS
Lime-S
Lime-M
Lime-D
Lime-W





R27-079 DESIGNING, PRODUCING & CONSTRUCTING FINE-GRADED HOT MIX ASPHALT ON ILLINOIS ROADWAYS

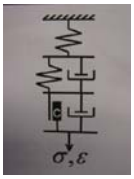
- Principle Investigator: Prof. Bill Buttlar
- IDOT TRP Chair: Matt Mueller
- Lab assembled “coarse” and “fine” graded mixes passed Hamburg Wheel testing
- ATLAS work showed stability of fine graded mixes
- Some Districts already “out of the gate” allowing contractors to construct fine graded mixes
- Surface texture can look fine or “tight”
- Recommendations imminent from PI team
- Probable specification changes for 2014

R27-108 IMPROVING THE EFFECTIVENESS OF NIGHTTIME TEMPORARY TRAFFIC CONTROL WARNING DEVICES

- Principle Investigator: Prof. Doug Steele
- IDOT TRP Chair: Tim Kell
- Observed and recorded driver behavior in actual work zones
- Motorists would like to know what is "going on" in the work zone
- Lights on drums provided negligible and possibly confounding information

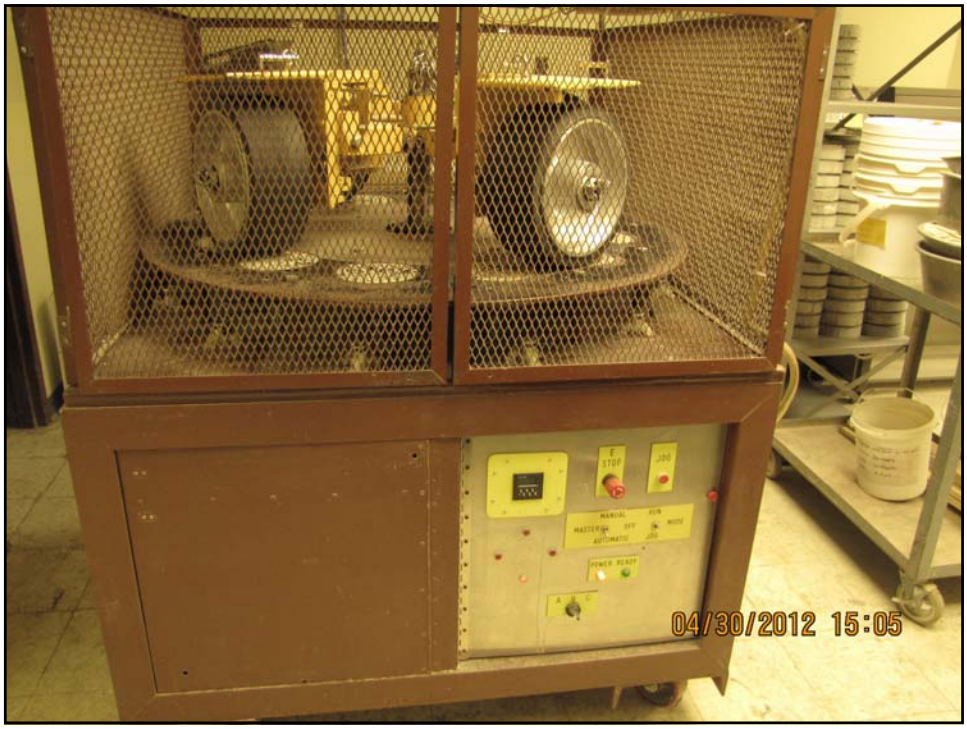
R27-128 TESTING PROTOCOLS TO ENSURE PERFORMANCE OF HIGH ASPHALT BINDER REPLACEMENT MIXES USING RAP & RAS

- Principle Investigator: Prof. Imad Al-Qadi
- IDOT TRP Chair: David Lippert
- Identify parameters of good performing mixes to cold weather cracking and fatigue
- Develop protocols, procedures and specifications – a rapid test
- Challenges due to viscoplasticity of HMA



R27-129 IMPLEMENTATION OF AIMS

- Principle Investigator: Prof. Enad Mahmoud
- IDOT TRP Chair: Sheila Beshears
- Measure aggregate shape characteristics
- Measure aggregate resistance to polishing, abrasion and breakage
- Evaluate the micro-duval in lieu of the “test track”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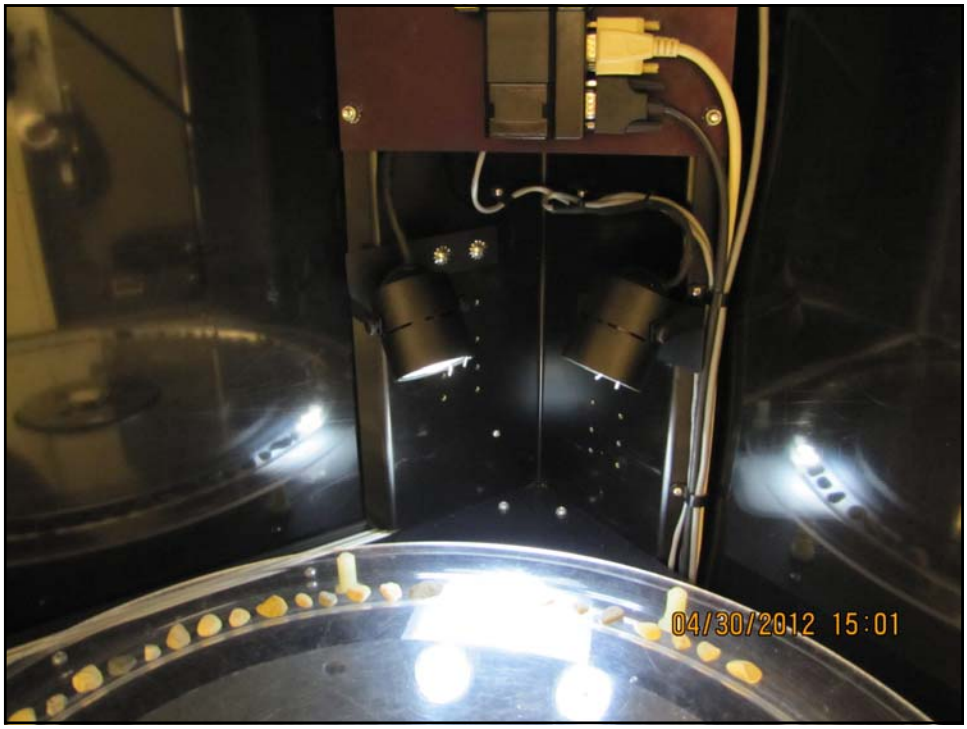
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R27-130 DEVELOPMENT OF IMPROVED OVERLAY THICKNESS DESIGN ALTERNATIVES FOR LOCAL ROADS

- Principle Investigator: Prof. Erol Tutumluer
- IDOT TRP Chair: Kevin Burke III
- Chapter 46 of the BLRS Manual –revised

R27-077 EVALUATING PAVEMENT MARKINGS ON PCCP & VARIOUS ASPHALT SURFACES

- Principle Investigator: Prof. Carmine Dwyer
- IDOT TRP Chair: Kelly Morse
- All exposed marking materials' retro-reflective glass beads are damaged by snow plows reducing night-time visibility
- Recessing the markings greatly improves durability to plowing
- A training class has been developed


CYCLES
090793 E-51
1000 CYCLES

R27-120 EVALUATING ALL-WEATHER PAVEMENT MARKINGS & LAB METHODS TO SIMULATE FIELD EXPOSURE

- Principle Investigator: Prof. Neal Hawkins
- IDOT TRP Chair: Kelly Morse
- Measuring in-pavement performance
- Developing lab protocols/test methods
- (Wet weather beads are not holding up)

EROSION AND SEDIMENT CONTROL TRAINING AND RESEARCH FACILITY

- Principle Investigator: Professor Prasanta Kalita
- IDOT TRP Chair: Joseph Vespa
- Location: University of Illinois Urbana-Champaign (South Race Street, N of West Curtis Road)
- Training: Three training workshops available, providing "hands-on" erosion and sediment control design, installation, and inspection.
- Research: Facility provides a location for controlled research of erosion and sediment control products.

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- Congratulations to the PI's and TRP's for the two tack coat studies which were recognized by AASHTO as 2013 SWEET SIXTEEN high value research projects in the nation!!

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- Congratulations to the PI's and TRP's for the two tack coat studies which were recognized by AASHTO as 2013 SWEET SIXTEEN high value research projects in the nation!!
- Thanks to Dave Lippert, Hal Wakefield and Marvin Traylor on all of their efforts to improve the quality, performance and cost effectiveness of HMA pavements!!!