

October 30, 2013  
Global Warm Mix Asphalt  
Workshop



# **Warm Mix Asphalt: Every Mixture, All of the Time**

Steve Jackson, P.E.  
NB West Contracting  
St. Louis, MO

# **N.B. West Contracting**

- ◆ Founded in 1956
- ◆ Two Offices –
  - St. Louis and Sullivan, MO
- ◆ 3 Asphalt Plants
  - 300,000 -500,000 Tons Annually
- ◆ Novachip, Warm Mix Asphalt, Chip and Seal, some HMA



# Steve Jackson



- ◆ B.S. of Civil Engineering
- ◆ B.S. of Economics
  - University of Missouri- Rolla
  
- ◆ Professional Engineer
- ◆ 23 years in construction
- ◆ 15 years in asphalt



# My WMA Experience

- ◆ 2005 – Hall Street in St. Louis, MO
  - ◆ Joint Bump problem
  - ◆ 3 different warm mix technologies
- ◆ 2006 – Warm Mix Asphalt used to help with joint bumps
- ◆ 2008 – NAPA 1<sup>st</sup> International Conference on Warm Mix Asphalt



# My WMA Experience

- ◆ 2009 – N.B. West
  - ◆ Warm Mix with RAP - Evotherm
  - ◆ Warm Mix with Shingles – Evotherm
  - ◆ Novachip – Foamer
  - ◆ Warm Mix with Wax - Asphamin
  
- ◆ 2010 – Warm Mix in everything
  - ◆ Bonded Dense Graded - Evotherm



# My WMA Experience

- ◆ 2011 – Speaker at the NAPA 2nd International Conference on Warm Mix Asphalt
- ◆ 2012 – Bonded Warm Mix Asphalt. New technology for increasing RAP/RAS



# Why Warm Mix? - 2008

- ◆ Joint bump prevention
- ◆ Reduced fuel consumption
- ◆ Higher recycled percentages
  - Cost of Asphalt Cement
- ◆ Longer haul distances
- ◆ Compaction aid

# Why Warm Mix? - 2008

- ◆ Reduced emissions
  - Non-Attainment Area
- ◆ Less heat on workers
- ◆ Consistency in Pay Factors
  - Missouri uses PWL – QC/QA
  - QC tests for pay



# Which Technology?

- ◆ **Steve Jackson's thought process\***
  - **Wax** – Difficult to switch back and forth between HMA and WMA. Equipment purchase.
- ◆ **Foamer** – Limited success, equipment purchase, anti-strip?, anti-foam?, quarry water and small nozzle openings, cold weather, mix design?. Pro – water is cheap

# Which Technology?

- ◆ **Surfactant** – Anti-strip, surfactant for wet weather paving, good for cold weather paving, energy savings, long haul, compaction aid, higher recycle contents, no equipment purchase, portable and proven.
  - Cons – Continuous cost, everybody else in Missouri was buying foamers.



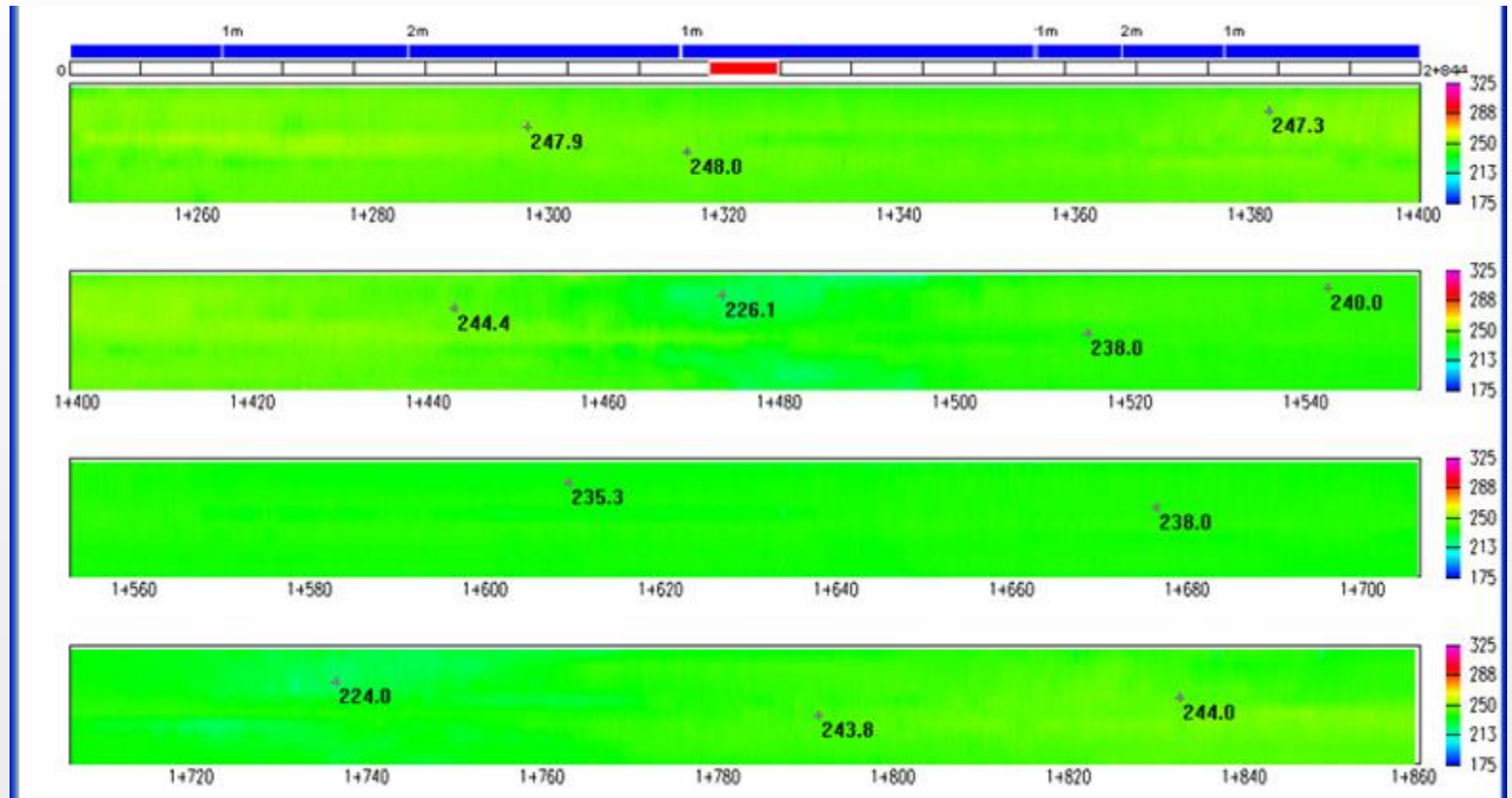
# Pro - Portability



# Density

- ◆ Consistent mat temperature gives more consistent density
  - Pay factor for MoDOT
- ◆ Unconfined joint density
  - Less heat – Less lateral movement
  - Longer lasting pavements

# No Thermal Segregation



# Increased Recycled Content

- ◆ MoDOT allows up to 40% **Effective Binder replacement**
  - PG 64-22 up to 30% replacement
  - PG 58-28 for 30-40% replacement
- ◆ No limit on the amount of RAP or RAS in a mix with binder blending charts

# WMA - Reduced Emissions



Hot Mix



**EVO**THERM



# Rte. 72 Phelps County March 2011

- ◆ Haul 1 hour 15 minutes
  
- ◆ Good Paving Practices
  - Job was bid with Evotherm 3G for density, long haul distance, high recycle content, plant preservation, and smoothness
  - Transfer Machine added to achieve smoothness bonus





# Route 72 Rolla

## March - April 2011

- ◆ 40% Effective Binder Replacement Mix
  - 26% RAP and 3% RAS
  - High moisture loving materials
  
- ◆ Started job March 6, 2011
  - March 2011 - 5.61" Precipitation
  - Feb. 2011 – 4.36" Precipitation
  - April 2011 – 6.56" Precipitation
  - May 2011 – 7.72" Precipitation





# Rte. 72 Phelps County

- ◆ 30% Ride Improvement required for bonus
- ◆ 39% – 56% Ride Improvement Achieved
- ◆ No failing cores
  - Mainline or joint cores
- ◆ Highlighted in the Asphalt Pro magazine



# Why Warm Mix? 2013

- ◆ **Compaction – Joint Compaction**
- ◆ **Moisture in RAP/RAS**
- ◆ **High RAP/RAS**
- ◆ **Lower temperatures in the drying drum – less plant wear**
- ◆ **Varying asphalt binder composition**
- ◆ **Less fuel consumption**
- ◆ **Lower consumption**



# State of the Art

- ◆ N.B. West paved Rte. 30 in Jefferson County, MO September 2012
- ◆ WMA through a spray paver was specified in the contract
- ◆ 1 ¼" Superpave 095CLP mix
- ◆ **Bonded to a concrete pavement**
- ◆ **No joint bumps**
- ◆ Bond Strength Testing with Road Science



# Spray Paver



# Spray Paver





# Cold Weather Paving

- ◆ City of Rolla
- ◆ December 2010
- ◆ Occupancy Permit needed to be issued for a new housing development
- ◆ On hour haul



# Fresh Concrete



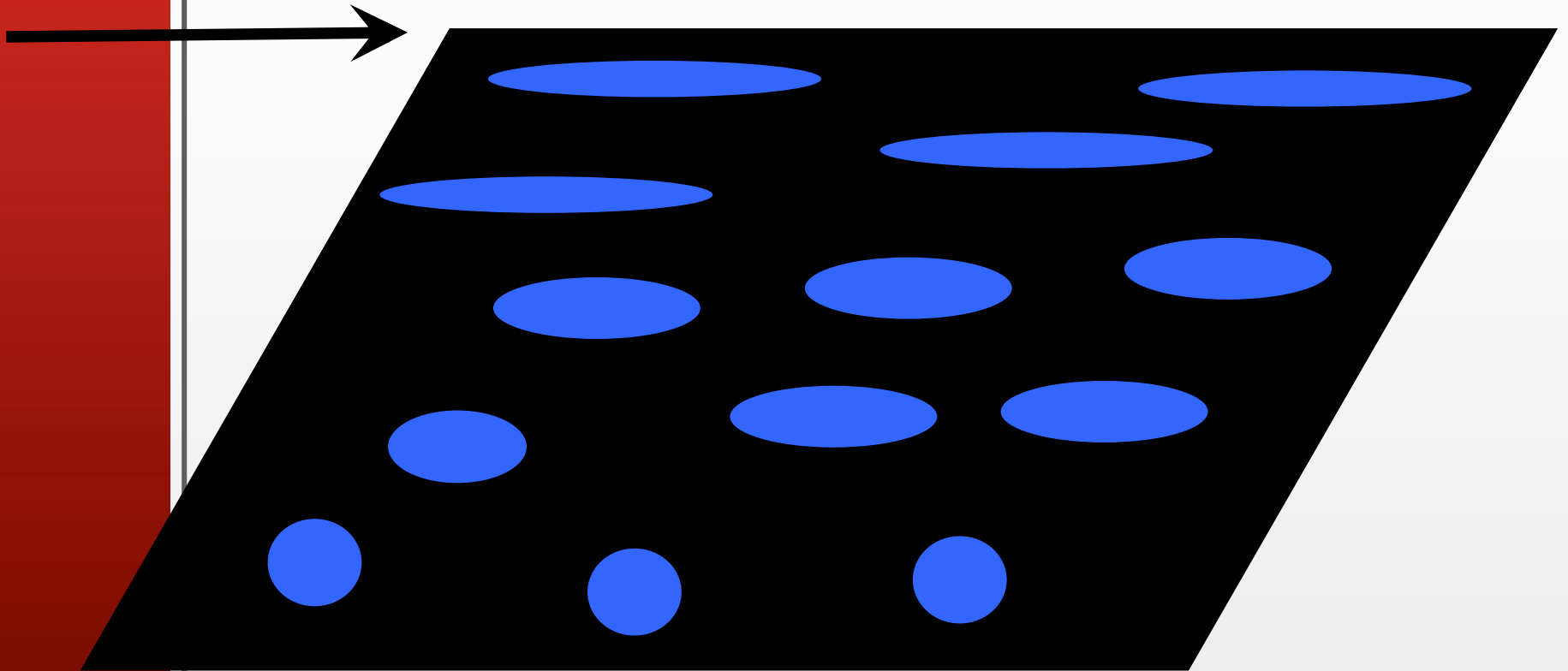
# -10° C at Start Up



# What do we need to fully implement WMA?

- ◆ Education – Commercial applicators, Cities and Counties
- ◆ Utilize the best paving practices
- ◆ WMA doesn't fix bad paving techniques

# High Shear Viscosity



# Proper Equipment



# NCAT March 2012



# Contact Information

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