Illinois Tollway – Materials Update

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Recycling Will Continue to Grow

Fractionated RAP (FRAP)

Recycled Asphalt Shingles (RAS)
“Selling” FRAP

Dr. Don Brock
2007 FRAP Research Goals and Results

- Quality control maintained
- Retain long-term performance at lower costs
  - Fatigue and Dynamic Modulus analysis
- Are mix properties compromised with higher RAP?
  - How soft for the PG? (64-22? vs. 58-22 vs. 58-28)
2011 – 2013 FRAP Research with Concrete

- Durability of concrete using Tollway FRAP will be adequate for composite pavement applications
- Durability of concrete using IDOT FRAP is currently being studied
Tollway RAS Research

- Collaborative effort
  - Illinois Environmental Protection Agency
  - U.S. Environmental Protection Agency
  - RAS FHWA Pooled Fund
- Field production tests
- Research results
IDOT RAS Research
Tollway Asphalt Binder Replacement

- SMA – 40 percent
- Shoulder Surface – 40 percent
- Shoulder Binder – 50 percent
- Asphalt Subbase – 65 percent
Tollway WMA - 2012

- 762,000+ total tons
- SMA mainline
  - 304,000 tons
- N50 Shoulder Binder
  - 204,000 tons
- N70 Shoulder Surface
  - 210,000 tons
- Stabilized Subbase
  - 8,400 tons
Tollway WMA - 2012

- 10 different plants
- 2 used chemicals
  - Evotherm (4)
  - Rediset LQ (3)
- 3 used water injection
  - ASTEC (1)
  - MAXAM AQUABlack (1)
  - Stansteel Accu-Shear (1)
Tollway WMA - 2012

- High recycle in Tollway WMA:
  - SMA
    - All used RAS (2 GTR, 7 SBS)
    - ABR – 31 to 38%
  - Shoulder Binder and Surface
    - ≈ Half used RAS
    - Binder ABR – 33 to 50%
    - Surface ABR – 30 to 40%
  - Stabilized Subbase
    - Both used RAS; both had 64% ABR
    - RAS needs higher temperature
WMA Lessons Learned

- Mix temperature ranges
  - Mix type
    - Shoulder mixes and moderate RAP: 250 - 270F
    - Shoulder mixes with RAS: 280 – 300 F
    - SMA with RAS: 280 – 320F
  - Plant and personnel
  - Weather (night, day, summer, fall)
WMA Lessons Learned

- Contractor Learning Curve – some: steep
- All technologies “performed” effectively
- Industry-wide: plant operations need reviewing to fully implement WMA
  - Flighting, air flow – for both WMA and high recycle
  - Combination of high recycle and lower temperatures
  - Stress on motors from stiff mixes (SMA + RAS + modified PG)

MOVE ILLINOIS
WMA – Moving Forward

- Contractor
  - Personnel need to become comfortable with the practice
  - Plant “optimization” to incorporate WMA and high recycle
- Investigation of benefits
  - Lower energy
  - Compaction aid
WMA – Moving Forward

- Suppliers
  - WMA processes have to be made more compatible with RAS containing mixes to make the materials more workable at lower temperatures
WMA – Moving Forward

- Agencies
  - Proven to improve performance
  - Better definition of “Warm Mix” needed
    - Temperature only?
    - Simply “use of the technology”? 
    - Mix variables (RAP, RAS, modified PG) 
  - Combination of Warm Mix and RAS 
    - Minimum temperature needed for RAS? 
    - RAS + Rejuvenators?
Tollway Reconstruction: I-90

- 2013-2014
  - I-39 to Elgin
- 2014-2016
  - Elgin to O’Hare
  - Asphalt Subbase
  - Asphalt Shoulders
2013 Veterans Memorial (I-355) Rehabilitation

- Between I-55 and 83rd Street
- Collector and distributor roads at Butterfield Road
- Mainline roadway in both directions between Army Trail Road and Fullerton Avenue
Elgin O’Hare Western Access

Elimination of existing traffic lights at Illinois Route 53, I-290 southbound exit ramp, I-290 northbound exit ramp and Park Boulevard.

Provides access to O’Hare from York Road.

Taft Avenue connector provides a link to Franklin Avenue and Irving Park Road allowing access to northbound I-294.

New southbound access to North Avenue from County Line Road

Construct new, full-access interchange at I-90 and Elmhurst Road

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LEGEND
- Resurface and Add Lane
- Widen and Add Lane
- System Interchange
- Full Interchange Improvements
- Partial Interchange Improvements
- Elgin O’Hare Extension and Western Access
Tri-State Tollway (I-294)/I-57 Interchange
NAPA Environmental Leadership Award

February 2013 - Presented to Illinois State Toll Highway Authority for leadership in implementing sustainable practices, including reclaimed asphalt pavement, recycled roofing shingles, and warm-mix asphalt, to minimize the environmental impact of roadway construction through the recycling and reuse of materials.

July 2012 - Presented to Chicago Department of Transportation, Arrow Road Construction Co., and S.T.A.T.E. Testing LLC for repaving Chicago’s Magnificent Mile with a technologically bold stone-matrix asphalt mixture containing high levels of reclaimed asphalt, recycled roofing shingles, and ground tire rubber.
THANK YOU