



Illinois Tollway

Open Roads for a Faster Future

Tollway Update on Green Initiatives

**IAPA Annual Meeting
March 8, 2010**

2005-2016 Congestion Relief Program

Program Element	Current Obligations	Current Budget
Open Road Tolling (ORT)	\$705.7	\$729.3
Tri-State Tollway (I-294/I-94/I-80)	\$	\$2,293.8
Jane Addams Memorial Tollway (I-90)	\$	\$772.7
Reagan Memorial Tollway (I-88)	\$	\$1,077.8
Veterans Memorial Tollway (I-355)	\$	\$124.4
Veterans Memorial Tollway (I-355 South Extension)	\$720.3	\$729.2
Systemwide Improvements (including Program Management Services)	\$	\$689.1
Subtotal	\$	\$6,386.0
Reimbursements (Local, Municipalities, State)	\$	\$115.0
Program Total	\$	\$6,129.0

AWARDS TO DATE
(thru December 2009)

\$3.78 Billion
construction

\$729.4 Million
engineering

\$160.5 Million other
(utilities, ROW, misc.)





Jobsite is Tollway's Materials
Research Laboratory



Green and Implemented

IDOT / Tollway

- Recycling Concrete as Aggregate
- Rubblization of Existing Concrete
- RAP Grindings for Capping Stone

Tollway

- Fractionated RAP
- Ground Tire Rubber in SMA

Jane Addams Memorial Tollway 2007-2009



- Contractors' cooperation vital
- 2007 Advance work
- Research test strips - short life and temp. sections
- 2007-2008: Used 1/2 million Tons of recycled materials

Jane Addams Laboratory



- 250K Tons recycled PCC
- GTR – >200K tires
- FRAP - >200K Tons millings
- RAS
- Alternate friction aggregate
- WMA demonstration

Veterans Memorial Tollway 2008-2009



- 25% FRAP in 4.75 mm Modified Level Binder
- GTR AC in SMA's
- Superb smoothness



Option to Fractionate RAP

- Better control
- Higher percentages



Ground Tire Rubber (GTR) AC

- \$\$ ≈ SBS-modified binder
- No draindown on SMA; Saves fiber \$
- Convenient - Terminal blended

FUTURE

- Optional in SMA or Open Graded Friction Courses (OGFC)
- SBS with fiber reinforcement other option



Tollway Looking for More Green

- RAS - Recycled Asphalt Roof Shingles
 - Focus on Tear-offs
- WMA - Warm Mix Asphalt additives in Modified HMA mixes
- Quieter pavements



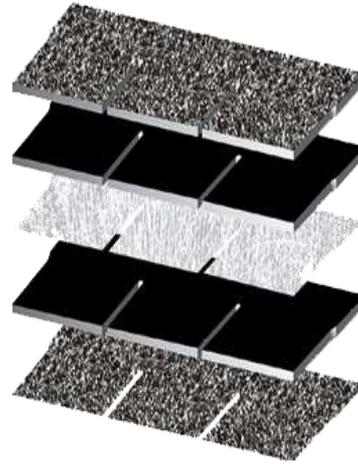
RAS – Recycling Green Trash

- Crude oil - \$40 to \$140
- Shingle Landfill Fees - \$15-\$120/T
- Lime dust (~20%) as anti-strip agent
- Replaces virgin AC
- Replaces fibers in SMA
- Quality fine aggregate for higher mix VMA



Mining Tear Off Shingles

- 20+% Hi Quality Asphalt Cement
- 30+% High Quality Fine Aggregate
- Mineral/Organic Fibers
- ~ 20% Lime Dust / Mineral Filler



Controlled RAS Processing

- Remove Non-Shingle material
- <1.5% Deleterious
- <1% Asbestos
- Grind and process for HMA



2009 RAS Demonstration Projects

- Dense Graded, low traffic mixes
- Each with RAS + FRAP
- 3.5 miles outside shoulder I-90
- July-August 2009
- 8 test sections + 3 control sections
- 850 to 1300 tons each



JANE ADDAMS
MEMORIAL TOLLWAY

Tollway Demonstration Projects

High FRAP + RAS

- 5 mix designs
 - 5% RAS each
 - 20-45% FRAP
- 3 control mixes
- Lab and plant mixes analyzed for performance and field properties
- Supports Iowa State & FHWA Pooled Fund Study



Mix Design Details

Mix Type	% FRAP	% RAS	Control Mix
Base Mix	25%	5%	N50 Base Cse. 40% FRAP
N50	35%		
2% voids	45%		
PG 58-28			N50 Binder Cse.
Shoulder Binder	35%		40% FRAP
N50, 3% voids			N70 Surface
PG 58-22		25% FRAP	
Shoulder Surface	20%		
N70, PG 58-22			

Planning Pays Off



	Standard Shoulder Surface 25% FRAP	RAS Shoulder Surface 5% RAS / 20% FRAP	Standard Shoulder Surface 25% FRAP	
RAS Subbase 5% RAS / 25% FRAP	RAS Subbase 5% RAS / 35% FRAP	RAS Subbase 5% RAS / 45% FRAP	RAS Shoulder Binder 5% RAS / 35% FRAP	

SMA Surface/RAS Demonstration

- SMA Surface Course, IL-12.5 mm, N80 mix
- 5% RAS - No fiber reinforcement
- 15% fine portion FRAP
- SBS PG 76-22 binder
- Diabase coarse friction aggregate
- U of IL performance testing



Performance Tests on RAS Test Mixes

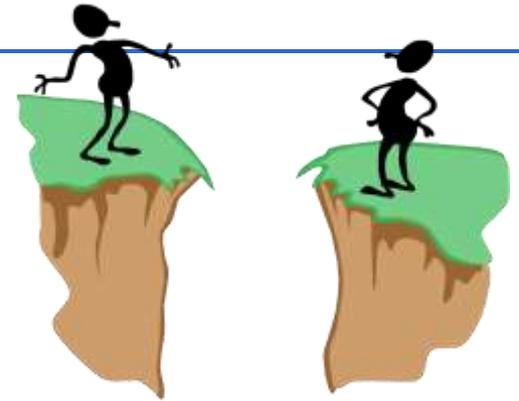
- Binder extraction and grading of residual asphalt.
- Dynamic Modulus
- Flow Number
- Beam Fatigue
- Disc Compact Tension (Fracture)

Status of RAS

Research Results (Iowa State)

- Binder extraction / testing not effective for determining binder grade
 - Portion of shingle binder not like asphalt binder
 - Does not capture the value of fibers
- Mix Testing
 - Dynamic modulus (complete with positive results)
 - Flow number (in progress)
 - Beam fatigue (in progress)
 - Disc compact tension (near future)

Mainstreaming RAS Tollway + IEPA



- Illinois was not a “RAS State”
- 3-month Concentrated Task Force Effort
- Now Accepted by IEPA
- Developed “Best Practices” Guide for RAS Processing in Illinois
- Details on Tollway Web-site
- Public Workshop March 12th

Tollway OK's RAS



- **Permit in Polymer-AC SMA as a substitute for virgin fiber reinforcement**
- **Optional for nearly 250,000 tons of HMA in 2010. Much more in 2011.**
- **RAS Special Provision - Sets limits for total binder replacement with RAS and/or RAP**

Next Big Green Step Warm Mix Asphalt



Pros of WMA

- Performance as advertised
- Lower temps / Lower energy
- Lower emissions
- Wider window for compaction
- Minimal plant modification



WMA Plant Modification



WMA Questions

- Develop workable specification
- Evaluate methods
 - Additive
 - Foam
 - Wax
- Evaluate extra costs
- Research moisture damage potential
- Study early rutting potential



GTR+FRAP+RAS+WMA = All Green SMA



Tollway Green SMA Mix

- Fine portion FRAP (up to 20%?)
- Ground Tire Rubber (GTR) Modified AC
 - No fibers required
- RAS option as fiber source (with SBS-Modified AC)
- Friction aggregate options
- Tollway 2009 prices \$105-112/T
- Look at WMA to extend season

Tollway/UI Study

WMA Early Age Rutting Potential

- **Field Lab for immediate sampling**
- **Compact specimens within 4 hrs of production without reheating**
- **Follow up with tests 2 hr, 4 hr, 8 hr, 24 hr, 3 days, and 7 days after compaction**
- **Evaluate rutting, fracture, and moisture susceptibility**
- **Propose optimum curing (opening) time**



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THANK YOU