



I-90 / I-39 Full Depth Asphalt – 7 Year Performance

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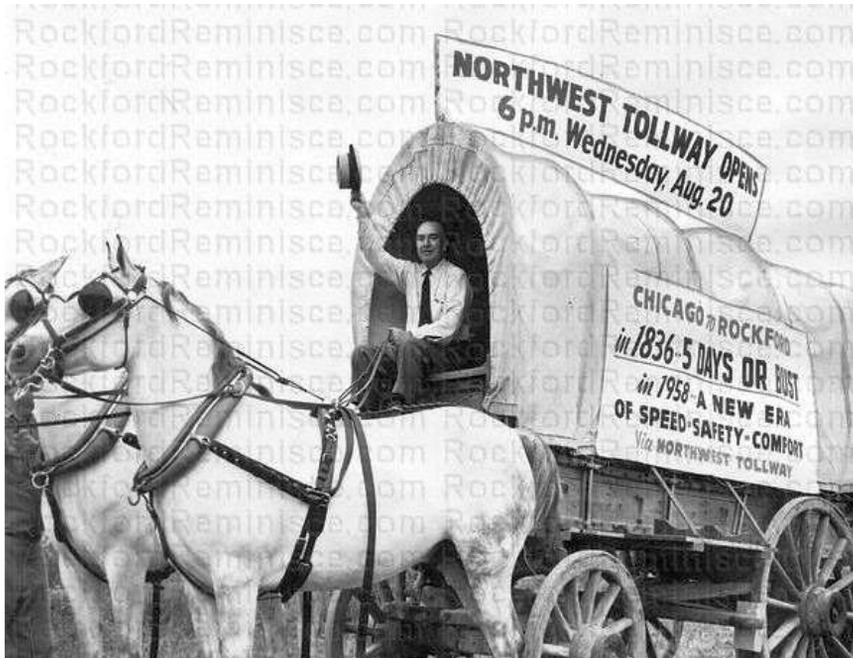
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Congestion-Relief Program 2009

**Nearly \$5 Billion
Committed**
80% complete

- Completed Rebuild & Widen Projects systemwide
- Built 12.5-mile I-355 South Extension
- Converted 20 barrier toll plazas to Open Road Tolling





The I-90 Corridor Has Progressed

Full Depth Asphalt Started the Latest
Progression of the Corridor





Summary of I-90 /I-39 Full Depth Asphalt



- **Pre-Stage construction work started in 2007**



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Summary of Total Asphalt Production

- **Jane Addams MP 62 to MP 77 (7 Contracts over 3 years)**
 - 12" Full-depth HMA (**281,838** sq. yds)
 - 15" Full-depth HMA (**388,944** sq. yds)
 - 6-in HMA Shoulders (**235,728** sq. yds)
 - 9-in HMA Shoulders (**227,242** sq. yds)
 - Other mixes (**81,769** tons)
 - Total asphalt production of tons (**801,674** tons)

Tollway's Green Initiatives With I-90 / I-39 Full Depth Asphalt Pavements

- Recycling concrete
- Rubblization of existing concrete
- RAP grindings for capping stone
- Fractionation for increased RAP in mixes
- Ground tire rubber use in SMA mixes
- Warm mix additives in SMA mixes
- Recycled shingles

Contractor Cooperation and Industry Support Was Critical – Thank You!



Examples of Asphalt Mixtures Applied to I-90

Mix Type	AC Grade	FRAP % Fine/Coarse	Total FRAP %	Max RAP% Allowed	Approx ABR %	Coarse Agg. Type
SMA Binder, N80	GTR 76-22	15 / 0	15	0	15	Gravel
SMA Surface, N80	GTR 76-22	15 / 0	15	0	15	Trap Rock
SMA Surface, N80	GTR 76-22	15 / 0	15	0	15	Steel Slag
HMA Binder, N70	PG 58-22	25 / 15	40	20	38-42	Gravel & Stone
HMA Surface, N70	PG 64-22	15 / 10	25	10	23-27	Dolomite
HMA Binder, N50	PG 58-28	10 / 30	40	25	38-42	Dolomite
HMA Binder, N50	PG 58-22	10 / 30	40	15	38-42	Dolomite
HMA Base Course, N50	PG 58-28	10 / 30	40-50	40	38-52	Dolomite
HMA Base Course, N50	PG 58-22	10 / 30	40-50	20	38-52	Dolomite



High ABR SMA's Tested in Eastbound Lanes

- **400 tons of surface course SMA w/ slag, 15% fine FRAP & 5% RAS (36% ABR) placed in lane 3 north of I-39 exit ramp in 2009**
- **440 tons of surface course SMA w/ quartzite & high FRAP (19% ABR) placed on I-39 ramp in 2009**



Condition Rating Survey (CRS)

- Pavement rating methodology used to assess the overall functional condition of a highway surface
- Computerized model used to calculate CRS value
 - Inputs include visual distresses, roughness, rutting, and faulting
- CRS values can range from 1.0 (totally failed) to 9.0 (new pavement)

CRS Range	General Pavement Condition
9.0 – 7.5	Excellent
7.4 – 6.6	Acceptable
6.5 – 6.0	Transitional
5.9 – 4.5	Fair
4.4 – 1.0	Poor



Video: EB I-90 MP 16.5-17.5



Condition of Mainline I-90 Pavements: MP 2.5-18

➤ CRS (2010-2014)

➤ Eastbound (diabase aggregate, 2.5-18)

➤ Decreased from 8.3 to 7.8

➤ Westbound (standard aggregate, 18-7.5)

➤ Decreased from 8.7 to 8.1

➤ Westbound (slag aggregate, 7.5-2.5)

➤ Decreased from 8.7 to 8.1

Condition of Mainline I-90 Pavements: MP 2.5-18

➤ IRI (2010-2014)

➤ Eastbound (diabase aggregate, 2.5-18)

➤ Increased from 63 to 74

➤ Westbound (standard aggregate, 18-7.5)

➤ Increased from 49 to 58

➤ Westbound (slag aggregate, 7.5-2.5)

➤ Increased from 56 to 65

Condition of Mainline I-90 Pavements: EB MP 2.5-18

- **Distresses**
 - **Minor transverse and longitudinal cracking**
 - **Minor to moderate longitudinal joint cracking/seam separation**
 - **All longitudinal joints to be routed & sealed in 2015**



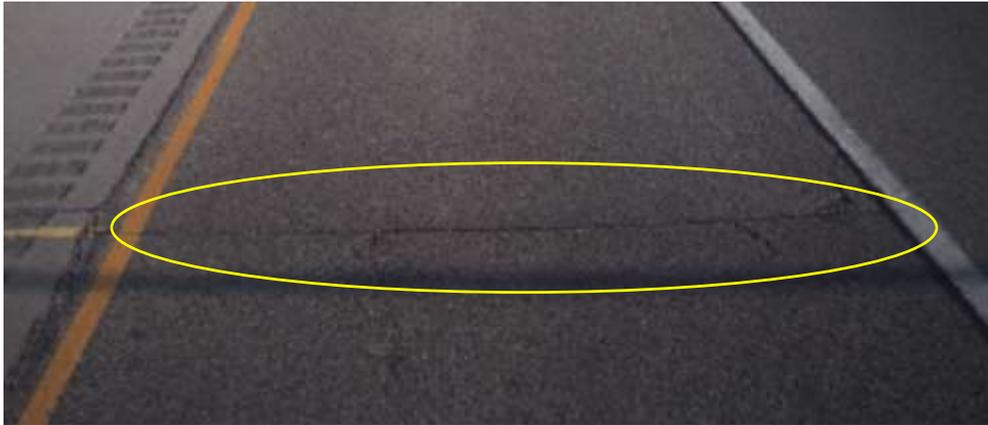
Minor longitudinal joint cracking & separation

Condition of Mainline I-90 Pavements: WB MP 18-7.5

➤ Distresses

➤ Standard aggregate

- Minor & isolated transverse cracking
- Minor to moderate longitudinal joint cracking/separation



Minor transverse cracking

Condition of Mainline I-90 Pavements: WB MP 7.5-2.5

➤ Distresses

➤ Slag aggregate

- Minor transverse and longitudinal cracking
- Minor to moderate longitudinal joint cracking/separation



Minor longitudinal cracking

RAS and FRAP Combined in Numerous Test Strips and Evaluated

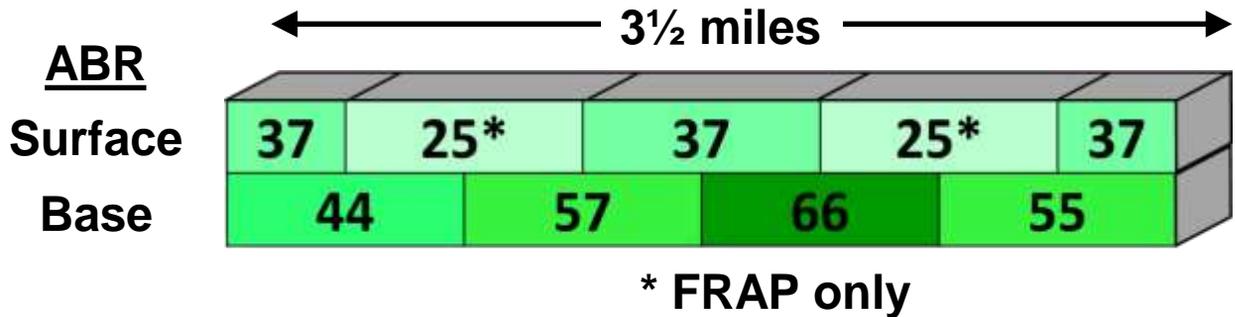
- HMA dense graded high ABR mixes placed on WB outside shoulder for 4 miles
- SMA high ABR surface friction course mix placed on EB I-90 to SB I-39 exit ramp
- Performance of many lab and all field mixes tested at Iowa State University and U of I

Mix	FRAP %	RAS %	Approx ABR %	Location
<i>FRAP – RAS Mixes</i>				
Binder Course, N50	35	5	55	Shoulder
Base Course, N50	35	5	57	Shoulder
Base Course, N50	40	5	66	Shoulder
Base Course, N50	25	5	44	Shoulder
Surface, N70	20	5	37	Shoulder
SMA Surface, N80	15	5	30	Mainline
<i>Control Mixes</i>				
Base Course, N50	40	0	25	Shoulder
Binder Course, N50	40	0	25	Shoulder
Surface, N70	15	0	10	Shoulder



RAS Shoulder Test Section

- 5 percent RAS in each mix; varying percentages of FRAP



Condition of RAS test strips on WB I-90 outside shoulders: MP 7.5-4.0

➤ Distresses

- Minor but consistent transverse and longitudinal cracking
- Minor to moderate longitudinal joint cracking/spalling



Moderate longitudinal joint cracking/spalling



Map Cracking

Video: WB I-90 MP 7.75-4.0



Initial WMA Test Bed Project Placed on I-90 / Irene Road Ramp in 2008

- GTR modified fine FRAP SMA surface course (15 % ABR) used
- Evotherm chemical additive used
- 600 tons produced and compacted at 2 temperatures (230° F to 305° F) with no problem
- Plant samples bagged and shipped to U of I for long term performance analysis



Condition of I-90 WB Exit Ramp at Irene Road

➤ Distresses

- **2009: No visible distresses**
- **2012: Minor longitudinal cracking in a couple of spots**

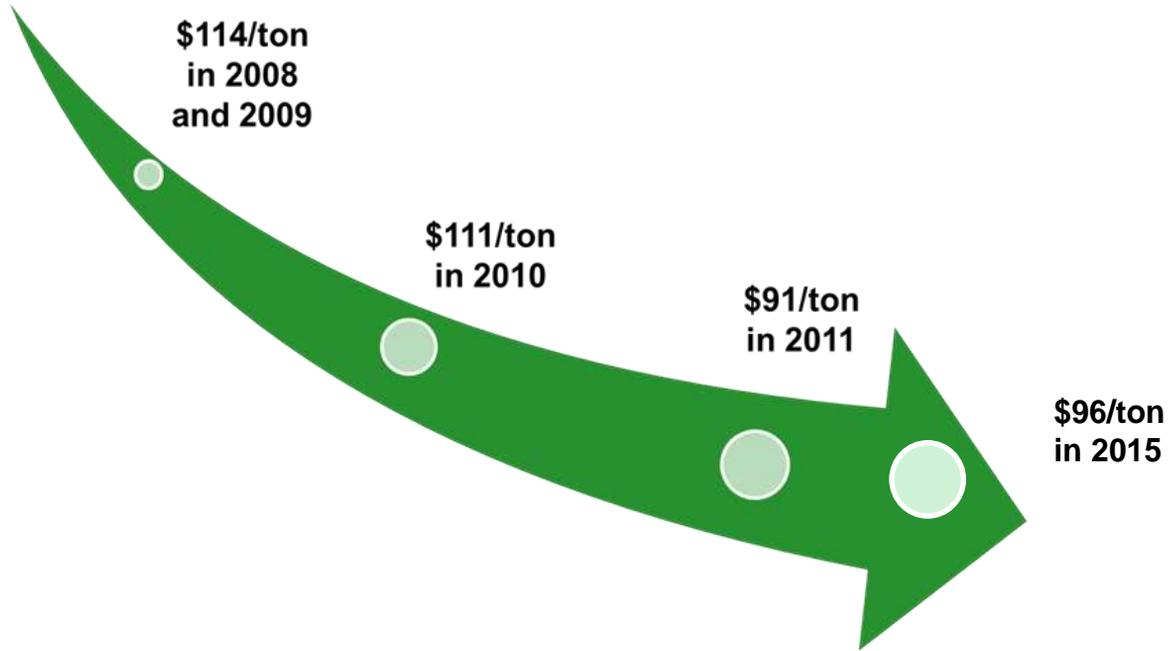


Minor longitudinal cracking

Video: I-90 WB Exit Ramp at Irene Road



Cost Savings





Thank you