

Technical Memo

Project 0-6132: Task 6 – Test Sections in the Districts

To: Dale Rand, Frank Espinosa, & Ramon J. Rodriguez
Dale.Rand@dot.state.tx.us; Frank.Espinosa@txdot.gov; Ramon.J.Rodriguez@txdot.gov

From: Lubinda F. Walubita

CC: Tom Scullion (t-scullion@tamu.edu)

Date: May 6th, 2011

Subject: Field Performance Monitoring Report# 01 for the TTI Sections on US 83, Loop 20, US 59, & Spur 400 (Webb County, Laredo District)



Summary

This Tech Memo presents a summary of the field performance evaluation of the TTI sections in Laredo District (Webb County) that was conducted at the end of winter on May 3rd 2011; eight months after HMA overlay placement. Field performance tests included visual/walking crack surveys, photographs, surface rut measurements with a straightedge, and high-speed profiles.

The Mixes: The *Modified TTI mix-design* (5.0% PG 64-22 + Crushed Gravel + 20% RAP) was used on three highways, namely Loop 20, US 59, and Spur 400. The *Control (original) mix-design* (4.8% PG 70-22 + Crushed Gravel + 20% RAP) was placed on US 83. All mixes were placed as a 2 inches thick overlay by Anderson Colombia Company in August 2010.

Field Performance: So far, all the Hwy Test Sections are performing very well with *no* cracking or rutting problems; the average rut depth measured was only 0.08 inches (i.e., about 1.95 mm). Details of the performance evaluation are included in the subsequent appendices. The next performance evaluation is scheduled after this summer 2011.

Acknowledgements: Special thanks go to Ramon J. Rodriguez, his team, and the traffic crew (TxDOT) for permitting and assisting TTI Researchers conduct the field tests.

APPENDIX I: HMA MIX-DESIGN AND HWY SECTION DETAILS

Table I-1: HMA Mix-Design Details and Lab Test Results.

Item	Control (Original) Mix-Design	TTI Modified Mix-Design
Mix type	Type C (Item 341)	Type C (Item 341)
Materials	4.8% PG 70-22 (Valero) + Crushed gravel (A.C) + 1% lime + 20% RAP (fine)	5.0% PG 64-22 (Valero) + Crushed gravel (A.C) + 1% lime + 20% RAP (fine)
Avg. core density	96.5% (design TGC = 96.5%)	96.3% (design TGC = 96.5%)
Avg. AC extraction (Ignition oven)	5.0% (design = 4.8%)	5.2% (design = 5.0%)
Hamburg @ 20 000 load passes	2.9 mm	6.0 mm
Overlay on cores	158 cycles	297 cycles
IDT (85 – 200 psi)	141 psi	122 psi
SCB strength	156 psi	148 psi
Test section designation	Control	Modified
Highway where placed as 2 inch thick HMA overlay.	US 83 (≅ 6 miles long)	1) Loop 20(≅ 1miles long) , 2) US 59 (≅ 3 miles long), & 3) Spur 400 (≅ 1mile long)

Table I-2. Hwy Construction Details and Field Performance Test Data.

Item	Loop 20	Spur 400	US 59	US 83
HMA overlay thickness	2 inch	2 inch	2 inch	2 inch
Date of HMA placement	August, 2010	August, 2010	August, 2010	Sumer 2010
Date of 1 st field performance evaluation	May 3 rd , 2011	May 3 rd , 2011	May 3 rd , 2011	May 3 rd 2011
Cracking (05/11)	None	None	None	None
Avg. surface rutting in wheel path (inches) (05/11)	0.07	0.06	0.10	≅ 0.10
Avg. IRI (in/mi) (05/11)	83	89	78	-
Other distresses (05/11)	≅ 0.38 inch rut depth @ HMA-bridge transition point on WB outside lane	-	-	-

Table I-3. Hwy Project and Test Section Location Details.

#	Hwy	Project TRM Limits		Length (miles)	TTI Test Section Location (≥ 1 000 ft)		
		Start	End		Start GPS	End GPS	Comment
1	US 59	826 + 1.843	828 + 1.495	≅ 3	N 27° 31' 49.8" W 099° 28' 47.7"	N 27° 31' 49.9" W 099° 28' 37.0"	EB outside lane; opposite Laredo Hospital
2	Spur 400	432 + 0.014	432 + 1.140	≅ 1	N 27° 31' 00.9" W 099° 27' 07.7"	N 27° 31' 00.9" W 099° 27' 18.8"	WB outside lane; starting by Wal Mart
3	Loop 20	430 + 0.894	430 + 1.569	≅ 1	N 27° 30' 58.0" W 099° 26' 56.7"	N 27° 30' 48.2" W 099° 26' 56.8"	SB outside lane, opposite TxDOT offices!
4	US 83	720 + 1.359	726 + 2.004	≅ 6	-	-	-

APPENDIX II: SURFACE RUT MEASUREMENTS (MAY 2011)



Figure II-1. Surface Rut Measurements with a Straightedge on US 59.

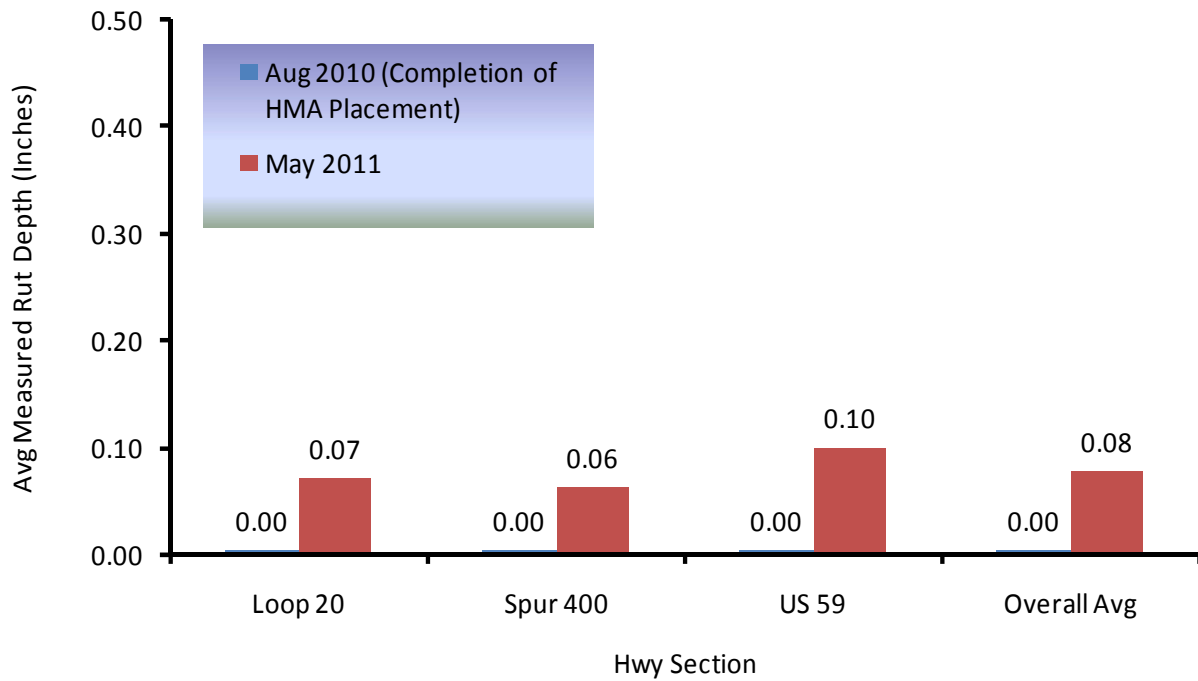


Figure II-2. Comparison of Surface Rut Measurements.

APPENDIX III: VISUAL CRACK SURVEY (MAY 2011)



Figure III-1. Loop 20 SB Direction – No Cracking or Rutting Observed.



Figure III-2. Spur 400 WB Direction – No Cracking or Rutting Observed.

APPENDIX III (CONTINUED): VISUAL CRACK SURVEY (MAY 2011)



Figure III-3. US 59 EB Direction – No Cracking or Rutting Observed.



Figure III-4. US 83 SB Direction (Control) – No Cracking or Rutting Observed.

APPENDIX IV: SURFACE PROFILES (MAY 2011)

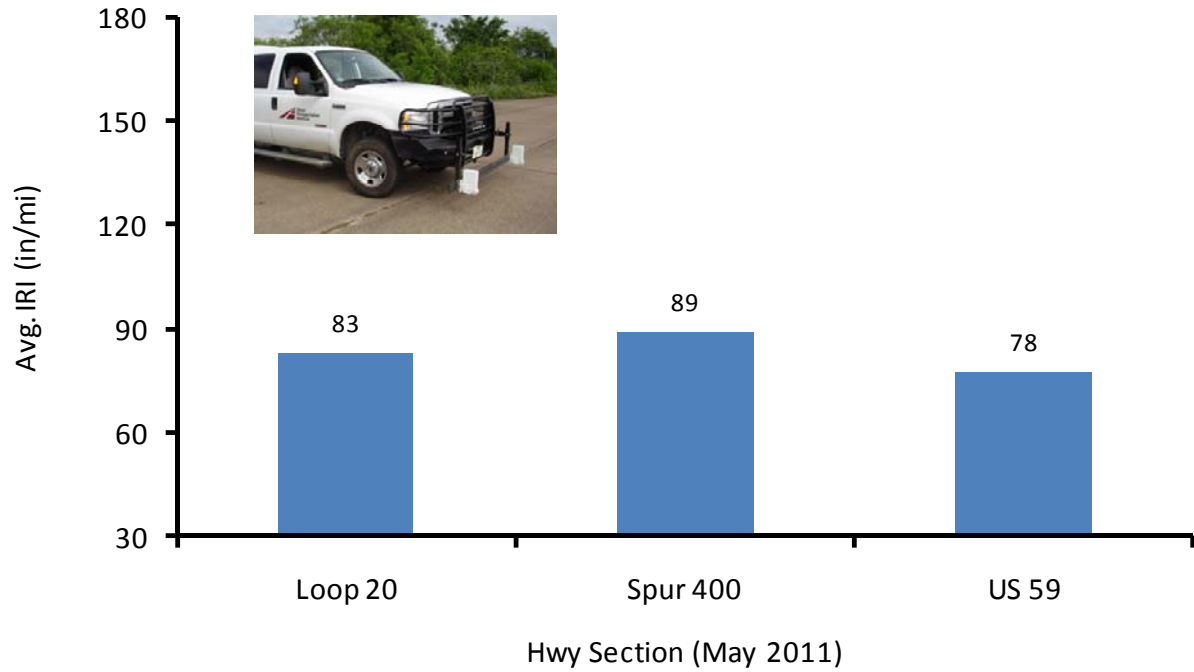


Figure IV-1. Surface Profiles (Outside Lane) – Avg IRI (RWP+LWP) as of May 2011.

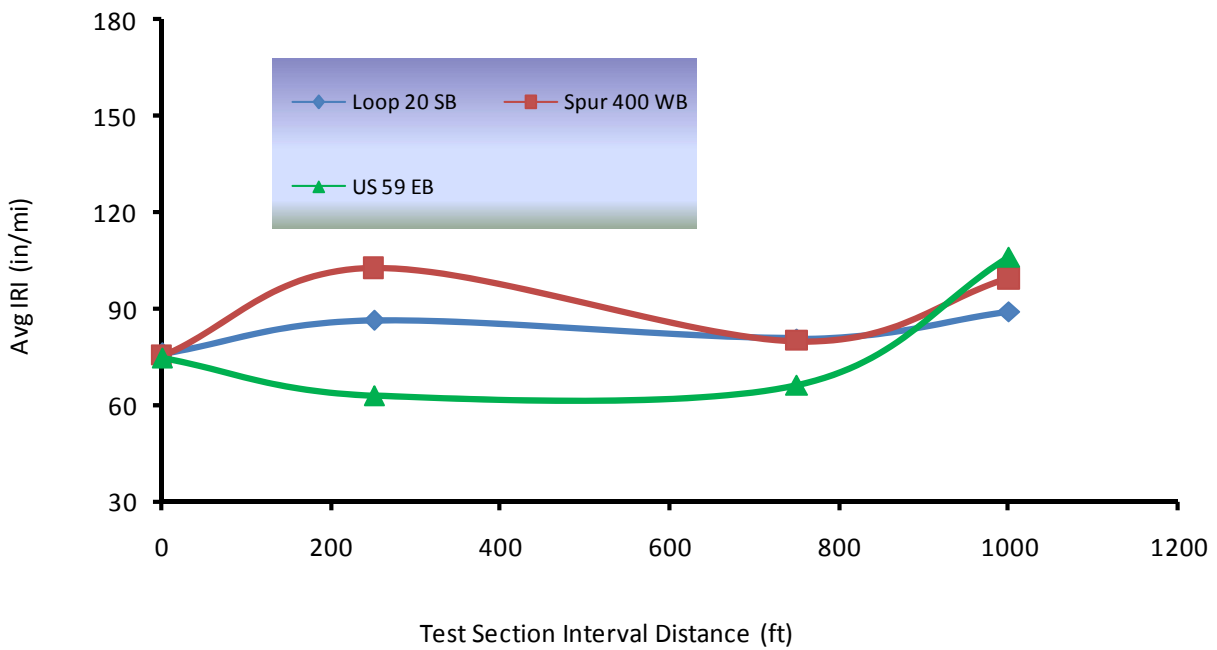


Figure IV-2. Surface Profiles (Outside Lane) – Avg IRI (RWP+LWP) Plot as a Function of Test Section Length (May 2011).

APPENDIX V: OTHER ISSUES OBSERVED (MAY 2011)

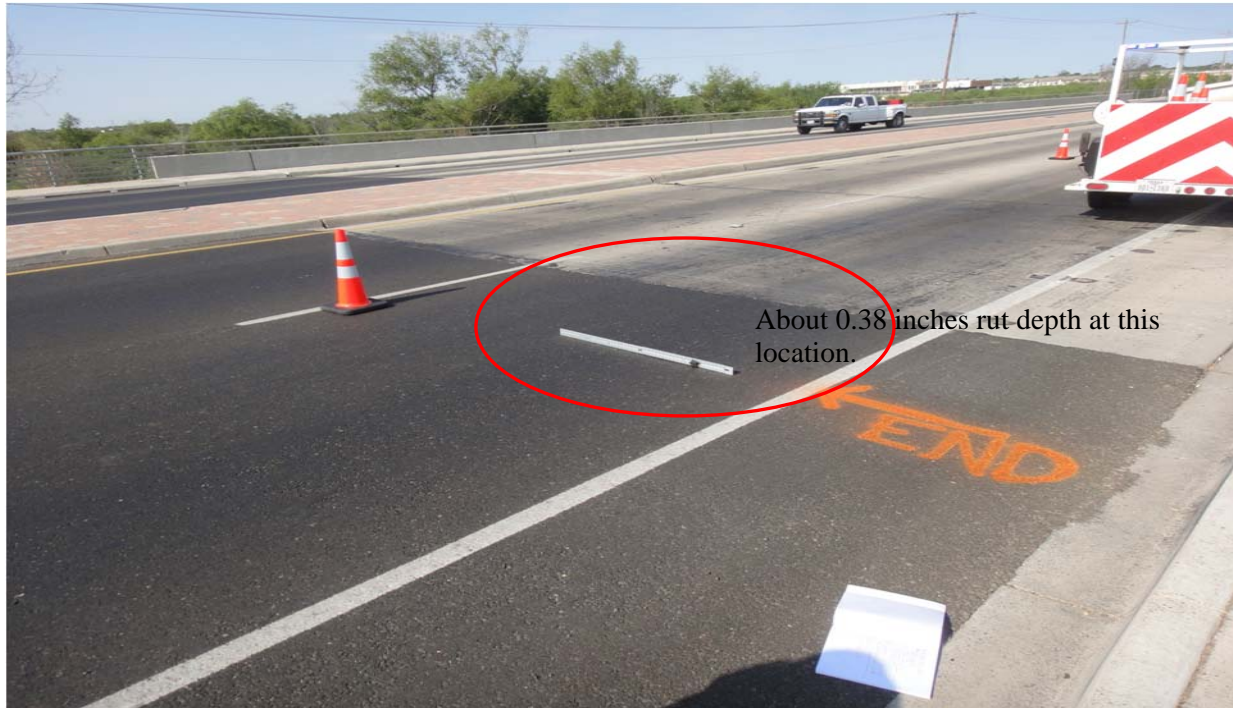


Figure V-1. HMA to Bridge Concrete Deck Transition \cong 0.38 Inches Rut Depth (Spur 400).

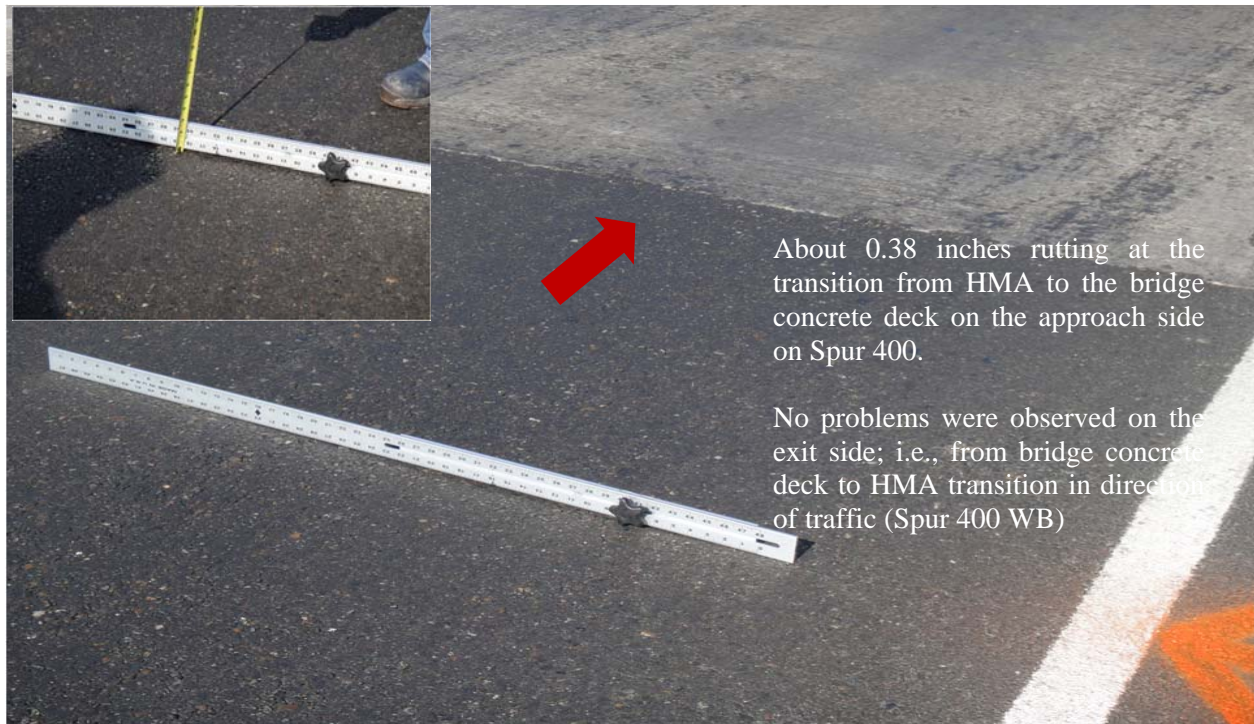


Figure V-2: Rut Measurements at the HMA-Bridge Transition on Spur 400 on the Traffic Approach Side; No Problems were Observed on the Traffic Exit Side.