Missouri's Full Depth Reclamation Experience

Rte. 71, Nodaway County

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Missouri Department of Transportation

Full Depth Reclamation

- Plus
  - Material Never Leaves Roadway
  - Existing Asphalt Rejuvenated
  - No Unprotected Edge
  - Provides Uniform Layer
- Minus
  - Requires Stable Subgrade

FDR Candidate

Specification

GBS – For mixtures containing >10 percent passing No. 200 or for all granular mixtures	
150 mm diameter specimens shall be prepared in a Superpave gyratory compactor	
Property	**Criteria**
Superpave gyratory compaction, 1.25˚ angle, 600 kPa, gyrations	30
Short-term strength test – modified cohesiometer, ASTM D 1560-92 (Part 13), g/25mm of width (see Appendix 1 for modifications)	150 Min.
Indirect tensile strength (ITS), ASTM D 4867 Part 8.11.1, 25˚ C, psi	40 Min.
Conditioned ITS, ASTM D 4867 (see Note 1), psi	20 Min.
Resilient modulus, ASTM D 4123, 25˚ C, psi	175,000 Min.
Thermal cracking (IDT), AASHTO TP 9-96 (Based on LTPPBind for climate)	-28

Mix Design

Emulsion, %	5.0
Optimum Water, %	4.0
Short-term Strength, g/25mm of width	156
Indirect Tensile Strength (ITS), psi	55
Conditioned ITS, psi	33
Resilient Modulus, psi	226,000
Thermal Cracking, ° C	-30.8

Before

After

Traffic on FDR

3 Years Old - 2008

MODOT District 1 Hwy. 71 Reflex/Fortress Project Cost Analysis

Alternative #1: **4" CIR of main driving lanes, 6" FDR of shoulders**
Alternative #2: **2" 19mm Superpave on main driving lanes, 4" 19mm Superpave on shoulders**
******Surface for both alternatives will be a 1.75" 12.5mm Superpave******

Alternative #1		*Cold In Place Recycling and Full Depth Reclamation/Granular Base Stabilization*					
		$/UOM	UOM	Actual Quantity	Total cost	Avg. $/SY	Avg $/lane mile (7040 SY)
Main Driving Lanes	CIR	$3.36	SY	100,371	$337,246.56	$5.43	$38,240
Shoulders	GBS	$3.00	SY	56,082	$168,246.00	$7.74	$54,498
	Reflex	$1.35	Gal	154,042	$207,956.70		
	Fortress	$1.35	Gal	196,957	$265,891.95		
					$473,848.65		

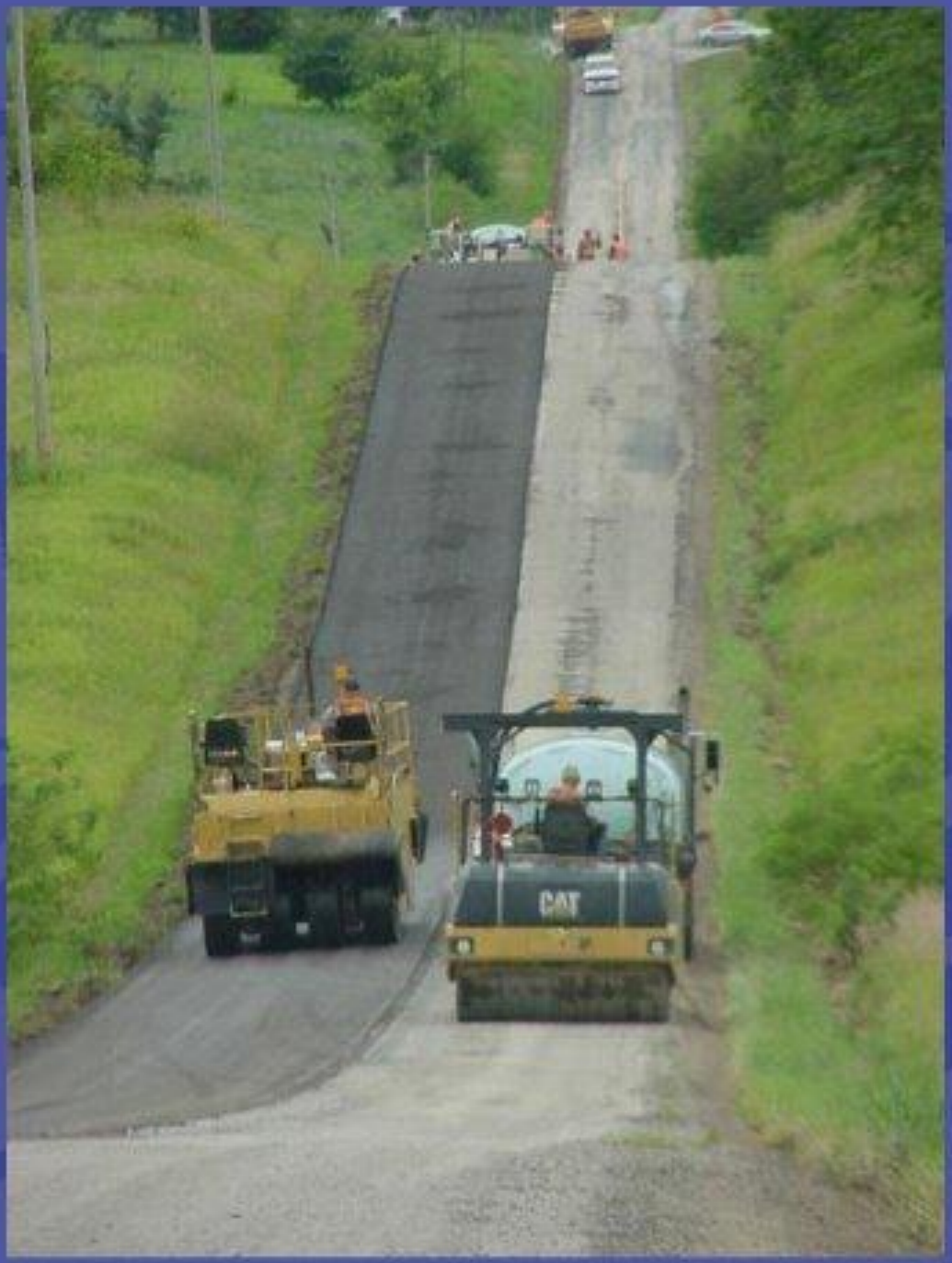
Alternative #2		*Superpave 19mm overlay*					
		$/UOM	UOM	Actual Quantity	Total cost	Avg. $/SY	Avg $/lane mile (7040 SY)
Main Driving Lanes	2" SP 190	$45.00	Ton	11,041	$496,822.50	$4.95	$34,847
Shoulders	4" SP 190	$45.00	Ton	12,338	$555,210.00	$9.90	$69,696
	Milling	$1.25	SY	156,453	$195,566.25	$1.25	$8,800
					$1,247,598.75		

Cost Savings by Recycling vs. Overlay	
Total Project Cost Savings	$773,750.10

Road Science, LLC™

Site Selection

- Pavement Engineers - Education
- Traffic Level
- Forensic Evaluation
  - Cores
  - Layer Depths
  - Gradations
  - Subgrade Soil Survey (May include DCP)
- Alternates
- It's All About the Dollars


CAT

Challenges

- Skepticism
- Lack of Experience with Stabilizers
- Poor Subgrade
- Lots of Miles
  - Interstates 1,181 miles
  - U.S. Routes 3,615 miles
  - State Routes 8,249 miles
  - Lettered Routes 19,063 miles
  - Other* 315 miles

Biggest Challenges

- Cultural Change
- $25,000 per mile?

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