HIR on Oklahoma Turnpikes

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HIR on Oklahoma Turnpikes

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Turner Turnpike

- I-44 Between Tulsa and Oklahoma City
- Opened to traffic May 1953, 29,000 ADT
- Full-depth asphalt, 86 miles in length
Will Rogers Turnpike

- I-44 Between Tulsa and Joplin, MO
- Opened to traffic June 1957; 34,000 ADT
- Full-depth asphalt, 88.5 miles in length
Turner & Will Rogers Turnpikes

• Average HMA thickness 14 inches, portions 24 inches thick
• No longer use thick HMA overlays - bridge clearance issues
• Managed as perpetual pavements
• Both won Perpetual Pavement Awards
• Use Ultra-Thin Bonded Wearing Course (UTBWC) due to minimal cross slope
OTA Maintenance Contract Design Selection Process

• Performs detailed Engineering Report

• Report typically includes options for:
  ✓ 10, 15 and 20 year pavement life
  ✓ Reconstruction Option, typically 35-40 year pavement life
OTA Maintenance Contract
Design Selection Process

• Engineering Obstacles:
  ✓ Concrete median barrier with limited area for “build up”
  ✓ Maintenance of existing bridge clearances
  ✓ Limited Funding Available
June 2006, 1-mile HIR Demo
Turner Turnpike, MP 194

- HIR WB Driving Lane
- Mill & Fill (inlay) WB Passing Lane
- Both Lanes Capped Ultra-Thin Bonded Wearing Course
Surface Recycling

- Small milling drums removed ¼ inch material each unit
- Emulsified asphalt recycling agent
Surface Recycling

- Placed using paver windrow elevator
- Compacted using HMA procedures
HIR Demo Performance

• Turner Turnpike experiences heavy truck traffic ~ 20%

• 2 years after the Demo
  ✓ Passing Lane (MF) shows a crack thru the UTBWC
  ✓ Outside/Driving Lane (HIR) did not exhibit any signs of crack propagation
Why consider HIR?

- Ability to Utilize Short-term Lane Closures
- Elimination of Edge Drop-offs
- Reduced Exposure of Milled Surfaces to Elements
- Cost Comparison
- Speed of Construction
Potential Obstacles ....

- Requires suitable base to support equipment
- OTA considers this option on preservation/rehabilitation contracts that will receive a wearing course.
When HIR becomes desirable...

- **2” (MF) inlay of driving lanes using Virgin Mix**
  - Superpave S4 (PG 76-28 OK), NMS = ½ inch (12.5 mm)
  - Average Cost = $68/ton
  - Average cost 2” inlay, 13 ft wide, 1 mile long: ~ $58,100

- **2” inlay (MF) of driving lanes using HIR**
  - Hot-in-Place Recycled Asphalt Concrete = $3.75/SY
  - Hot-in-Place Asphalt Emulsion = $750/ton
  - Average cost of 2” HIR, 13 ft wide, 1 mile long: ~ $41,500

- Both would receive UTBWC
When HIR becomes desirable...

- Cost Savings on a 5 mile contract, 4 lanes wide
  - $332,000 savings
  - 30% reduction in cost
- 100% Recycled Material
How does OTA ensure quality?

- **Quality Control Testing**
  - ✓ Asphalt Emulsion Content
  - ✓ Maximum Specific Gravity ($G_{mm}$)
  - ✓ Depth Checks every ¼ mile

- **Compaction Requirement**
  - ✓ Require same compaction as HMA
  - ✓ Minimum 92.0% of $G_{mm}$ at JMF emulsion content
  - ✓ Test by cores or nuclear gauge
$$\text{Time is Money}$$

- Utilize temporary lane closures, working hours only
- 3.5 lane miles/day HIR vs. 1-1.5 lane miles/day of inlay (MF)
- Weather event: can pick up equipment and move off road quickly
- Return traffic 45 minutes to 1 hour
HIR Contracts

• Performed HIR on 25% of T and WR Turnpikes

• Completed Contracts
  ✓ T-MC-96, 40 lane miles
  ✓ T-MC-97, 24 lane miles
  ✓ WR-MC-112, 38 lane miles
  ✓ WR-MC-113A, 27 lane miles

• Current Contracts
  ✓ WR-MC-117, 19 lane miles

• Upcoming Contracts
  ✓ WR-MC-113B, 17 lane miles
  ✓ Considering inclusion on other maint. contracts
Questions ???

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