On-Board Sound Intensity Tests on Quieter Pavements in Austin, Texas

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Austin District Study

• TxDOT Austin District interest for quieter pavements
• Tire/pavement noise tests (OBSI) from 2014 to present
• Thin overlay mixes (TOM) placed for noise reduction purposes
• OGAC surfaces also placed to reduce noise
• Concern for louder surfaces (e.g., seal coats)
Thin Overlay Mixes

• Non-structural hot-mix asphalt mixes placed in thin lifts of about 2.5 cm (1 in.) thick, although some are as thin as 1.25 cm (0.5 in.)
• Used by TxDOT in various districts
• Used by the Austin District for noise abatement purposes
Conventional Overlay Mixes

• Typical HMA overlays are about 5-cm (2-in.) thick
• Rehabilitation technique for all pavement types
• Improve surface characteristics
• Extend pavement service life
Thin Overlay Mixes

• Developed as an alternative to conventional overlays for reducing life-cycle costs

• Preserve pavements exhibiting surface distresses such as raveling, aging, bleeding, minor cracking, minor disintegration, texture loss, skid resistance loss

• Enhance pavement performance and extend its service life
Thin Overlay Mixes

• Benefits:
  – Improve user serviceability (i.e., smoothness and comfort)
  – Skid resistance
  – Splash and spray reduction
  – Noise reduction
  – Reduced life-cycle costs
  – No loose stones
  – No curing time required
Thin Overlay Mixes

• High-quality aggregate
• Polymer-modified asphalt
• High asphalt content
• Excellent cracking resistance
• Acceptable rutting resistance
• Noise generation is not overly sensitive to aggregate gradation or asphalt content
Thin Overlay Mixes

• In Texas, used in:
Thin Overlay Mixes

- In Texas, used in:
  - Austin
  - Beaumont
  - Houston
  - Tyler
  - Wichita Falls
Permeable Friction Courses (PFC)

• Open-graded asphalt pavements
• Normally considered the quietest pavement type
• Some PFCs do not maintain their porosity over time due to clogging and compaction
• May have a reduced service life because of raveling and surface aggregate loss
• Cannot be used in areas subjected to freezing
Pavements Studied

• Thin Overlay Mixes (TOM):
  – Interstate 35
  – RM 12
  – RM 3238
  – US 183A FR

• PFC
  – Interstate 35
  – FM 1431
  – SH 195

• DGAC
  – Ronald Reagan Blvd.
Pavements Studied

- IH-35
- SH 195
- US 183A
- IH-35
- R.Reagan
- FM 1431
- RM 3238
- RM 12

Map data ©2017 Google 10 km
IH-35 TOM

• 21.5-km (13.36-mi)
• From the Bell/Williamson County line to Lakeway Dr., near Georgetown
IH-35 TOM
IH-35 TOM
IH-35 TOM
RM 12

- Ultra-thin overlay: 1.25 cm (0.5-in.) thick
- 10 km (6.21 mi) – from just south of US 290 to Wimberley city limits
- Originally resurfaced with a seal coat. Replaced with the ultra-thin pavement.
RM 12
RM 3238

- 12.9-km (8-mi)
- North of US 290, between Bee Cave and Dripping Springs
RM 3238
RM 3238
US 183A Frontage Road

- New toll road near Leander, north of Austin
- Tested shortly after TOM was paved
US 183A Frontage Road

Photo by John Wirth
US 183A Frontage Road

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On-Board Sound Intensity
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Austin District OBSI Results

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<td>TOM US 183A-FR</td>
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- TOM
- PFC
- DGAC
TOM Frequency Spectra

IH-35 TOM

US 183A

RM 12

RM 3238
PFC and DGAC Frequency Spectra

FM 1431 PFC

SH 195 PFC

IH-35 PFC

R. Reagan DGAC
Discussion of Results

- TOM average noise level: 98.5 dBA
- PFC average noise level: 102.0 dBA
- TOMs have become the quietest pavement type in the Austin area
- TOMs have kept their noise reduction properties over time
- Seal coats are the loudest pavement (106.4 dBA on average)
Acknowledgement

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