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Southeastern Asphalt User/Producer Group

## Tack Coats

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[www.asphaltinstitute.org](http://www.asphaltinstitute.org)

 **Previous References to Tack Coats**

- Vince Hafeli, Ajax Paving Industries, FL
  - Re: importance of tack coats with respect to successful compaction
- Dale Rand, TxDOT
  - Re: problems observed on projects attributed to “non tacky” tack coat materials


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 **Topics**

- Definition
- Observations
- Reactions




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 **What is a Tack Coat?**


- A light, uniform application of liquid asphalt to promote bonding between a new asphalt mixture and an existing bound surface
- Typical materials: Asphalt emulsions (normally, mixing grades), asphalt cements
- Application rate: Usually 0.03 – 0.05 gal/sy residual asphalt
  - A lower rate for overlays of freshly placed HMA, while a higher application rate may be required for milled or absorptive surfaces

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 **Observations**

- In recent years, more premature failures have been attributed to delamination
- Possible causes:
  - Improper tack coat application/materials
  - More night work, cold weather paving
  - Inadequate surface preparation
  - “Bony” mixtures, with stiff, modified asphalt binders

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 **Distress Types Possibly Associated with Delamination**


- Slippage cracks
- Permanent deformation
  - Shoving
  - Rutting
- Premature cracking in the wheelpaths
  - Could “top down” cracking be confused with cracking beginning at the interface between lifts?
- Distress related to poor compaction

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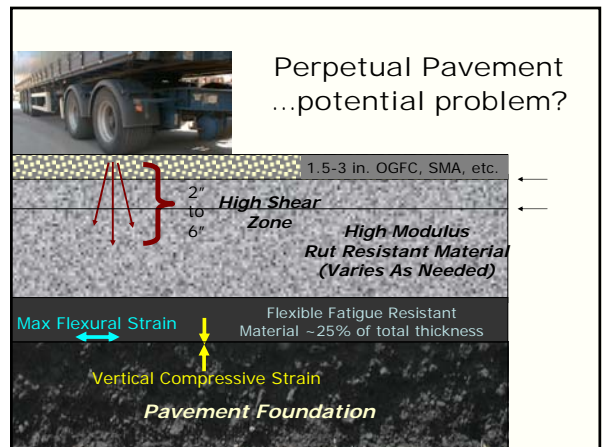
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**Poor Bonding**


- Placed in wet, cool conditions
- Failed to achieve in-place density
  - Apparent "tender zone" during compaction
- Area removed with a front-end loader



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 **Caltrans-UC Berkeley  
HVS Test Sections**


- Dramatically different fatigue life of sections tested with HVS for well-bonded vs. poorly bonded surfaces
- Also observed much higher in-place air void content for poorly bonded surface

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 **Recent Research**


- Evaluating shear strength at interface and techniques for measuring this
  - Japan
  - LTRC (LSU)
  - CTR (UT-looking at bonding to concrete pavement)
  - Florida DOT
- Evaluating methods to measure adhesive characteristics of tack coat in the field
  - TEX-243-F (under development at UTEP)
    - *Texas Tackiness Test?*

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 **General Conclusions:**


- Tack coats may not substantially improve the bond strength for an overlay placed over newly placed HMA
  - Excessive or soft binder may reduce it!
- Properly applied (and cured) tack coats improve the bond to aged surfaces
  - Application rate near lower end of normal range
  - Moisture remaining on the surface largely negates the benefits of tack coats
- Stiffness of tack coat material, HMA gradation characteristics affect bond strength

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 **Materials/Construction Issues**

- Stiffness of residual asphalt
  - Stiffer materials result in higher shear strength at interface
- Surface conditions (moisture, dust, contaminants)
  - Can be a problem when using asphalt emulsions when conditions are unfavorable for evaporation
    - High relative humidity, low temperatures, no sunlight
- Uniformity of application
  - Can be difficult to apply low rates consistently with (hot) paving asphalts

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 **Preliminary Investigation of a Test Method to Evaluate Bond Strength of Bituminous Tack Coats**


Research Report  
FL/DOT/SMO/02-459

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 **Thanks!**



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