What is a Tack Coat?

- Light application of asphalt, usually asphalt diluted with water.
- Used to ensure a bond between the surface being paved and the overlying course.
What is NOT A BOND?

Loss of **ADHESION** and/or **INTERLOCK** at the interface:

Long term pavement **performance** and **durability** can be affected by **Debonding** as well as **Rutting** and **Cracking**.
Common Tack Coat Materials

- Hot AC (AC-20, AC-30, ...)
- Emulsified Asphalts (SS-1, SS-1h, CRS-2, CSS-1h, ...)
- Cutback Asphalts (RC-70, RC-250, ...)
Why is Tack Coat Used?

- Bind two pavement layers
- Monolithic structure
  - withstand/transfer shear stresses from traffic loading
- Lack of bond between the wearing and binding layers
  - Cause slippage
  - activate distress mechanisms and rapidly lead to total failure
Objective

- Determine for the various uses of tack coats
  - optimum application methods,
  - equipment type and calibration procedures,
  - application rates, and
  - asphalt binder materials

- Recommend revisions to relevant AASHTO methods and practices related to tack coats
Worldwide survey was conducted to determine various tack coat practices.

Sections:
- Tack Coat Materials
- Tack Coat Application Methods
- Characterization of Tack Coat Application

27 Questions
Literature Review - States Responded

- 46 state DOTs, Washington D.C.
- 5 Provinces in Canada.
- Other countries
  - Denmark
  - Finland
  - South Africa
  - Netherlands

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Development of Test Equipment

- **Tack Coat Quality**
  - Equipment Development

- **Interface Bond Strength**
  - Equipment Development
Characterization of Tack Coat Quality

Torsion

Tension
Characterization of Tack Coat Quality
Louisiana Tack Coat Quality Tester -- LTCQT

- Developed equipment
  - Tack coat quality -- residual
  - Tension
- User friendly, Easy to use
- Laboratory and field
- Draft test method in AASHTO format
- Tensile load
  - Displacement
  - Tensile Force
  - Time
Characterization of Interface Bond Strength
Characterization of Interface Bond Strength

Direct Shear

Torsion
Interface Bond Strength Test – Louisiana Interlayer Shear Strength Tester (LISST)

- Developed equipment
  - Interface Bond Strength Shear
- Easy to use
- Portable
- Adoptable to exiting load frames
- Reasonable cost
- Accommodate both 100 and 150-mm sample diameter
- Draft test method in AASHTO format
Factors Considered
Experiment To Study Tack Coat

- Pavement surface types:
  - existing HMA, milled HMA, and PCC

- Surface Condition:
  - clean and dirty/dusty
  - Wet and Dry

- Tack coat material types
  - Hot AC
    » PG 64-22
  - Emulsion
    » CRS-1, Trackless, SS-1h, SS-1

- Application rates (residual):
  - high, medium, and low

- Surface coverages by tack coat:
  - 100% and 50%
**Factors Considered**  
**Experiment To Study Tack Coat**

<table>
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<tr>
<th>Surface Type:</th>
<th>HMA</th>
<th>PCC</th>
<th>Milled</th>
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<td><strong>Tack Coat Type</strong></td>
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<td>PG 64-22</td>
<td>SS-1h</td>
<td>CRS-1</td>
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<td>Coverage Rate</td>
<td>2</td>
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<tr>
<td>50 &amp; 100%</td>
<td>50 &amp; 100%</td>
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<td><strong>Residual Rate (gal/yd²)</strong></td>
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<td>0.031</td>
<td>0.062</td>
<td>0.155</td>
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<td>Wet &amp; Dry</td>
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<tr>
<td>High &amp; Low</td>
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<tr>
<td><strong>Total</strong></td>
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<td><strong>Grand Total</strong></td>
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</table>
Experiment To Study Tack Coat

LTRC Pavement Research Facility
Pavement Analysis Layout
February 2006

No Tack
Adj. Area
Dry Tack Surface

No Testing Area
Random Sampling

High
Low
Cleanliness
Survey of Test Lanes

- Surface texture measurement

Sand Patch Method,
Road Surface Profiler,
Circular Texture (CT) Meter
Distributor Truck Calibration

- Equipments
  - Asphalt Products Unlimited, Inc
  - Computerized tack coat distributor truck
  - Etnyre, Model 2000
Geotextile Pad layout
- ASTM 2995
- One transverse direction and two longitudinal directions
Distributor Truck Calibration

Direction of Truck

48.1
Spray of Emulsion

100% Coverage

50% Coverage
Overlay Construction

Material Transfer Vehicle
Video Presentation

- Emulsion Spray
- Tack Coat Quality Testing
- Overlay Construction
- Coring
  - Interface Bond Strength testing
Interface Shear Strength – 25C
Existing HMA Surface, 100% Coverage

Shear Strength (psi)

- CRS-1
- SS-1H
- Trackless

No Tack - Low - Med - High
Acknowledgement

- APU
  - Distributor Truck
  - SS-1h, CRS-1
- Costal
  - HMA Overlay
- Blacklidge
  - Trackless