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He spends time helping agencies ask for better concrete and helping contractors deliver it.

Geotextile Interlayer for Overlays

Peter Taylor, Yifeng Ling
Background

- How does the geotextile influence vertical deflections in the system?
- Does this tendency change over time?
- Does the thickness of the textile matter?
- Is the risk of slab migration changed?
- Are there any other impacts of reduced friction between layers?
- Are the layers effective at providing drainage and does it change over time?
- Does the risk of cracking change?
- Does the color of the textile affect thermal performance of the slab?

Lab work

- **Variables**
  - Fabric thickness – 5-7 oz. (1 mm) and 13-15 oz. (3-3.5 mm)
  - Black and white fabric
Lab work

• Measure temperature rise behind sample exposed to a heat lamp
• Investigate thermal mass of the interlayer
• Load deflection plot for bare textile
• Load deflection test on composite sample

Results

<table>
<thead>
<tr>
<th></th>
<th>Exposed face, °F</th>
<th>Shadowed face, °F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thick Black</td>
<td>105</td>
<td>112</td>
</tr>
<tr>
<td>Thick White</td>
<td>105</td>
<td>98</td>
</tr>
<tr>
<td>Thin Black</td>
<td>110</td>
<td>115</td>
</tr>
</tbody>
</table>

• Black material does get hotter
• Mass is so low, effect on concrete is small
Results

<table>
<thead>
<tr>
<th>Material</th>
<th>Exposed face, °F</th>
<th>Shadowed face, °F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thick Black</td>
<td>111</td>
<td>87</td>
</tr>
<tr>
<td>Thick White</td>
<td>102</td>
<td>90</td>
</tr>
<tr>
<td>Thin Black</td>
<td>105</td>
<td>104</td>
</tr>
</tbody>
</table>

- Black material surface does get hotter
- Both colors insulate about the same
- Increasing thickness = better insulation

Results

- Using specific heat capacity from published data
  - For 6” concrete overlay
  - Start with separator layer at 120°F and concrete at 70°F
  - Concrete temperature increase
    - 1” Asphalt – 8.0°F
    - 3 mm Textile – 0.3°F

- Still need to account for base temperature
Results

• Load deflection plot for bare textile between metal plattens

![Load deflection plot for bare textile between metal plattens](image)

Results

• Load deflection plot in concrete

![Load deflection plot in concrete](image)

<table>
<thead>
<tr>
<th>Concrete Sample</th>
<th>Concrete Modulus of Elasticity, ksi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black Concrete 3</td>
<td>1,739</td>
</tr>
<tr>
<td>White Concrete 3</td>
<td>1,889</td>
</tr>
<tr>
<td>Black Concrete 1</td>
<td>3,467</td>
</tr>
</tbody>
</table>
Results

- Textile vertical movement <0.05” (~1 mm)
- System stiffness is reduced with thicker textile

Field Work

- ...