Long-Term Performances of Rail/Highway At-Grade Crossings Containing Enhanced Trackbed Support

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Presented at Session # 724, January 14, 2009
Transportation Research Board 88th Annual Meeting
Included in the Annual Meeting Compendium of Papers DVD
Roughness

Immediate Crossing Area
Roughness

Approaches
VERTICAL PROFILE GEOMETRY ROUGHNESS

**CREST**

**SAG**
Objectives

• Minimize Subsequent Settlement

• Use “Fast-Track” Method

• Cooperative Practice
Dumping asphalt 10:15

Spreading asphalt

Compacting asphalt and dumping ballast

Dumping and spreading ballast
Tamping ballast

Positioning new panel

Spreading cribbing rock 11:30

Tamping ballast
3 weeks later
Compacting hand-spread approaches

Regulating ballast 12:40

Finished compacting asphalt approaches 16:50

3 weeks later
Longitudinal view of highway/rail crossing containing asphalt underlayment

<----Approach---->  <-----Extent of asphalt underlayment---->  <----Approach---->

<----------Crossing---------->

<table>
<thead>
<tr>
<th>Station 1</th>
<th>Station 9</th>
<th>Station 12</th>
<th>Station 20</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Crossing Surface</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Asphalt Underlayment</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Station 8</td>
<td>RoadBed</td>
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<table>
<thead>
<tr>
<th>Station 13</th>
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Cincinnati Sub. 4 All-Granular
Three other Subs. 14 Asphalt
Michigan 2 Asphalt
Top of Rail Elevations for Flagspring NO ASPHALT

<table>
<thead>
<tr>
<th>Station</th>
<th>Elevation (ft)</th>
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<tr>
<td>5/13/02</td>
<td></td>
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<td>7/25/02</td>
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<td>6/09/03</td>
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<td>2/10/04</td>
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<td>2/2/2005</td>
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<td>3/14/2006</td>
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</table>

Installed 5/13/2002
Average Asphalt/Approach Settlement for Flag Spring (no underlayment)

Installed 5/13/2002
Top of Rail Elevations for South Portsmouth

Installed 6/11/2002
1.53 in.  0.53 in.  1.53 in.

Crossing Surface

Asphalt Underlayment
(42 Months in service)

1.50 in.  1.29 in.  1.50 in.

Crossing Surface

All-Granular
(33 Months in service)

1.0 in. = 25.4 mm
KY Coal Term
Top of Rail Elevations for KY Coal Terminal #2 Track

- Installed 11/14/02
Average Asphalt/Approach Settlement for KY Coal Terminal #2

Installed 11/14/2002
Average top of Rail Elevations for KY 7 - No Name

Note:
- Installed 10/14/2005
- South Approach
- Surfaced 10/18/2005
- New Rail West side

Stations 1-6, 21-26, 5/7/07

Asphalt Underlayment stations 8-21 (Bold Lines)
Stanley
Average Top of Rail Elevations for US 60 Stanley

Installed 5/16/2002
<table>
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<tr>
<th>All Twenty Crossings</th>
<th>t-statistic</th>
<th>Significant Difference?</th>
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Advantages of Enhanced Support

- Clearly Demonstrated
- Minimize Long-Term Settlement
• Settlement Asphalt Crossings was 41% of non-Asphalt Crossings
• Settlement Asphalt Crossings was 44% of Abutting Approaches
• Settlement of Non-Asphalt Crossings & Approaches – Similar
• Fast-Track is Feasible
• Cooperative Approach is Desirable
Acknowledgements

Paul Tucker
Tom Schmidt

Steve Farmer

Lindsay Walker
Bei Su
Jason Stith
Joel Adwell
Nithin Agarwal