EME demonstration project Q – March 2014

Delivering the job
(Field Operations)
Paul Horn
Boral Asphalt

Overview
• Back ground
• Planning
• Site layout
• Site preparation
• Equipment used
• Placement
• Compaction
• Surface texture
• Key observations

Background: EME2 site
Site Details:
• The site is the existing access road to Boral Asphalt Whinstanes.
• The site was selected due to the available knowledge of the road loading, the ability to incorporate temperature and strain monitoring devices.
• Existing road condition was poor with multiple pavement failures.
• Existing pavement consisted of approx. 100mm asphalt (only half width) and underlying 500mm unbound granular base (adopted CBR of 6%).

Planning the demonstration project
Developed a plan to:
• Seek BBC approval & funding
• Accommodate commercial traffic & activities
• Excavate & prepare base course
• Install stress and temperature gauges
• Placement of DG20 & EME mixes
• Prepare nuclear density curve
• FWD testing on in situ base and finished layers
• Inspect and test materials based on ARRB proposal for validation trail
• Deal with weather and breakdowns

Preparation of site
• Locating services
• Level survey - BCC
• Excavate – South East profiling
• Installation of strain gauges
• Installation of temperature gauges & weather station
• Broom & tack

Site layout

Page 1
EME demonstration project Q – March 2014

Equipment used

The asphalt paving equipment utilised for this works was standard to any current TMR project undertaken by Boral

Equipment used:
- Paver: RP190 & RP170
- Steel: 7T tandem vibrating steel – lead and back roll
- Multi: 9T vibrating multi
- Grit Spreader – typical SMA equivalent grit spreader
- Shuttle Buggy not used.
- Standard 18T asphalt delivery trucks

Placement of EME2

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>EME Trial (Actual)</th>
<th>DG20 (TMR Spec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spreading Temp</td>
<td>160 - 180°C</td>
<td>160 - 180°C</td>
</tr>
<tr>
<td>Layer Thickness</td>
<td>50mm</td>
<td>50mm</td>
</tr>
<tr>
<td>Paving Machines</td>
<td>Standard TMR</td>
<td>Standard TMR</td>
</tr>
<tr>
<td>Other Factors</td>
<td>Constructability</td>
<td></td>
</tr>
</tbody>
</table>

Note: The construction and testing program involved detailed planning and collaboration from all stakeholders across multiple businesses and the trial outcomes were a success as a result of this.

Field compaction

<table>
<thead>
<tr>
<th>EQUIPMENT</th>
<th>ROLLING PATTERNS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EME Run 1</td>
</tr>
<tr>
<td>Steel</td>
<td>2 x static</td>
</tr>
<tr>
<td></td>
<td>8 passes</td>
</tr>
<tr>
<td>Backfill</td>
<td>6 static</td>
</tr>
<tr>
<td>Upper Compaction Sand</td>
<td>100%</td>
</tr>
<tr>
<td>Lower Compaction Sand</td>
<td>10%</td>
</tr>
</tbody>
</table>

Testing

- Density Curves completed and a substantial sampling and testing regime undertaken
- Field compaction results
- Typical paving processes and equipment apply to placement of EME

Surface texture

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>EME Actual</th>
<th>DG20 Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bitumen</td>
<td>BPN 43</td>
<td>BPN 43</td>
</tr>
<tr>
<td>Non-Grit</td>
<td>No Grit</td>
<td>No Grit</td>
</tr>
<tr>
<td>Production Mike</td>
<td>5.6%</td>
<td>5.6%</td>
</tr>
<tr>
<td>Grit Application</td>
<td>No Grit</td>
<td>No Grit</td>
</tr>
</tbody>
</table>

Key observations

1. Typical paving processes and equipment apply to placement of EME
2. Rolling patterns need to take into consideration:
   - high production temp (100°C)
   - high bitumen content (5.6%)
   - fine grading (8.5% passing 75um)

   Note: very similar compaction results achieved with 2 very different rolling patterns
3. Further analysis is required in determining a practical production and placement temperature. From our trial we found multiple constructability concerns:
   - The asphalt was still soft after a couple of hours, therefore leaving roller marks and also rolling when used by construction traffic
   - Issues with level control and reliability due to asphalt still pushing around in front of back roll
   - Multiple layers would not have been able to be placed in 1 shift
   - We would not have been able to facilitate a traffic switch
4. Skid resistance to be considered during construction