Delivering the job
(Field Operations)

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Boral Asphalt
Overview

- Background
- 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 5%).

CULLEN AVE WEST, EAGLE FARM

BEFORE TRIAL

POST TRIAL
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 insitu 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
CULLEN AVE WEST, EAGLE FARM – EME TRIAL PAVEMENT DETAILS

Site layout

TRIAL QTYS
EME – 315T
DG20HM – 350T
DG10 – to be completed

Notes
- OG10 by BCC
- Cover strain gauges with 5mm A/C
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

#### EME2 vs DG20

<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 (UK EME Spec min 140°C)</td>
<td>Typical: 140 - 150°C Minimum: 135°C</td>
</tr>
<tr>
<td>Layer Thickness</td>
<td>100mm (30m section @ 150mm)</td>
<td>50 – 80mm (100mm on approval)</td>
</tr>
<tr>
<td>Paving Practices</td>
<td>Standard TMR</td>
<td>Standard TMR</td>
</tr>
<tr>
<td>Other Factors</td>
<td>Constructability of a project requires additional consideration for EME2 compared to DG20.</td>
<td></td>
</tr>
</tbody>
</table>

Key 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

**Temperatures**
- Target Production Temp: 185°C, Actual: 175 - 185°C
- Actual Rolling temp @ commencement of rolling: 160 - 170°C
  - Asphalt Plant Located 200m from site and air temperature during paving was 31°C

**Rolling Patterns**

<table>
<thead>
<tr>
<th>EQUIPMENT</th>
<th>ROLLING PATTERNS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EME Run 1</td>
</tr>
<tr>
<td>Lead Steel</td>
<td>2 static &amp; 2 vib (High Freq)</td>
</tr>
<tr>
<td>Multi</td>
<td>8 passes (High Freq)</td>
</tr>
<tr>
<td>Backroll</td>
<td>6 static</td>
</tr>
</tbody>
</table>

| Mean Compaction Standard (vs. Max Density) | 99.02 | 98.75 | 96 |
| Joint Compaction Standard (Mean)           | 93.43 |       |    |

**Testing**
- Density Curves completed and a substantial sampling and testing regime undertaken
## Surface texture

<table>
<thead>
<tr>
<th></th>
<th>EME Actual</th>
<th>DG20 Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Surface Texture</strong></td>
<td>Ave: 0.64</td>
<td>Ave: 1.01</td>
</tr>
<tr>
<td><strong>BPT (Skid Resistance)</strong></td>
<td>Gritted – BPN 63</td>
<td>BPN 59</td>
</tr>
<tr>
<td></td>
<td>Non Grit – BPN 56</td>
<td></td>
</tr>
<tr>
<td><strong>Production Mix Results</strong></td>
<td>BC – centre Line</td>
<td>BC - centre line,</td>
</tr>
<tr>
<td></td>
<td>Grading - close to</td>
<td>Grading – course</td>
</tr>
<tr>
<td></td>
<td>target</td>
<td></td>
</tr>
<tr>
<td><strong>Grit Application</strong></td>
<td>Gritting as per SMA specification MDSS548</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nov 11</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sand application rate :</td>
<td></td>
</tr>
</tbody>
</table>

Clause from UK EME Spec: “EME is designed as a binder rich low permeability mixture. It should be expected to have a rich finish on completion of compaction and some ‘fattening up’ is normal and not an indication of problems.”
Key observations

1. Typical paving processes and equipment apply to placement of EME
2. Rolling patterns need to take into consideration
   - high production temp (185°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 rutting when used by construction traffic
   - Issues with level control and rideability due to asphalt still pushing around in front of back roller
   - 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