The Durability of Thin Surfacing Course Systems (TSCS)
Interim Advice Note

Donald Burton
Introduction

• This IAN is to provide advice for engineers responsible for maintaining the HA network
• To help achieve the maximum life from TSCS
• To help recognise warning signs that a TSCS is reaching the end of its life
What is a TSCS?

Thin surface course systems (TSCS) are proprietary systems in which a hot bituminous bound mixture is machine-laid with a controlled screed paver onto a bond or tack coat to form, after compaction and cooling, a textured surface course less than 50mm in thickness.
What is a TSCS?

Mixtures consist of aggregate, filler and bituminous binder which may be modified by the addition of polymers, rubber, resins, fibres or fillers such as hydrated lime or cement. The bond or tack coat may be polymer-modified and sprayed hot or cold depending on the proprietary system used.
What is a TSCS?

• On the HA network they must
  • Comply with SHW clause 942
  • Be HAPAS or similar approved
  • Be guaranteed for 5 years

• HAPAS covers
  • Material Mixture
  • Installation
  • 2 year trial
What is a TSCS?

- Developed in France and Germany 20 years ago
- UK Variant has higher texture depth
  - Proxy for high speed skid resistance
- Texture Depth requirement being reduced as experience grows
What is NOT covered by this IAN

• Surface Dressing
• Slurry Seal
TSCS Advantages

- Quieter – negative texture
- Quick to replace
- Requires less road space for surfacing than HRA
- Reduced spray
- Rut Resistant
- Lower cost than HRA
TSCS Limitations

• Uses premium aggregates throughout
• Can have reduced early life skid resistance
• Needs sound substrate
• Durability 8 to 15 years
TSCS Limitations

• Rapid deterioration towards end of life
  • 6 months to 5 years
  • (HA scheme cycle is 2 years)
• Large aggregate size varieties vulnerable on high-stress sites
TSCS Do not Rut
TSCS require sound substrate
TSCS require sound substrate
TSCS and white lines
TSCS and detector loops
TSCS Deterioration Stage 1
TSCS Deterioration Stage 2
TSCS Deterioration Stage 3
TSCS Deterioration - Stress
TSCS End of Life
Stage 1 to stage 3
• Reported as 6 months to 5 years
• Dependent on weather conditions
TSCS End of Life

November 2010
TSCS End of Life

November 2010

December 2010
TSCS End of Life

November 2010   December 2010
TSCS Patches cause deterioration
TSCS life Expectancy
• 8 to 15 years

Durability of thin surfacing systems, Part 4: Final report after nine years monitoring by J C Nicholls, I Carswell, C Thomas and B Sexton
RPN902
Task 2/462_077
## TSCS life Expectancy

<table>
<thead>
<tr>
<th>Thin surfacing system</th>
<th>Nom. size (mm)</th>
<th>No. of sites</th>
<th>No. of obs.</th>
<th>Rigorous statistical analysis Estimated serviceable lives (years)</th>
<th>95 % confidence limits (years)</th>
<th>Combined estimate for serviceable lives (years)</th>
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<tbody>
<tr>
<td>PLSD</td>
<td>14</td>
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<td>32</td>
<td>12</td>
<td>9.1 – 15*</td>
<td>13</td>
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<td>10</td>
<td>7</td>
<td>33</td>
<td>11</td>
<td>9.5 – 13</td>
<td>9½</td>
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<td>6</td>
<td>1</td>
<td>6</td>
<td>5.5</td>
<td>4.7 – 6.5</td>
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<td>82</td>
<td>16*</td>
<td>14* – 19*</td>
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<td></td>
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<td>33</td>
<td>134</td>
<td>17*</td>
<td>16 – 18*</td>
<td>&gt;16</td>
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<tr>
<td></td>
<td>6</td>
<td>8</td>
<td>34</td>
<td>14*</td>
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<td>49</td>
<td>197</td>
<td>19*</td>
<td>16* – 21*</td>
<td>&gt;14</td>
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<td>9</td>
<td>30</td>
<td>26*</td>
<td>16* – 38*</td>
<td>&gt;14</td>
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<tr>
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<td>6</td>
<td>4</td>
<td>22</td>
<td>7.8</td>
<td>2.8 – 13*</td>
<td>8½</td>
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</table>

Many of these values are extrapolations, being greater than the oldest site observation. These values are indicated with the addition of an asterisk.
How to get a longer life?

• Lay in optimum conditions
  • Warm weather
  • Day time
  • Good working space
  • Good substrate
HA usual laying conditions

- December to February
- Overnight possession
- Often raining/damp or icy
- Live Traffic in reduced width adjacent lane
- No time to repair weak spots found during planing
- Generally good substrate
Improved laying conditions

- Must have forecast temperature of 5°C
- If likely to be below that must have pavement heaters and driers on site
- Plan for laying in spring/summer/autumn
- Consider weekend possessions
- Check condition of substrate when planning works
- Live Traffic in reduced width adjacent lane
- No time to repair weak spots found during planing
- Generally good substrate
- Use max 10mm aggregate on high stress sites
Improving Durability of TSCS

- Lay during optimum conditions
- Avoid longitudinal joints
Improving Durability of TSCS
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- Avoid longitudinal joints
- Compact edges
Improving Durability of TSCS
Improving Durability of TSCS

• Lay during optimum conditions
• Avoid longitudinal joints
• Compact edges
• Avoid disturbing the surface
• Avoid removing white lines
• Ensure substrate is sound
• Do not lay over cracks
• Joint HA/MPA research project into TSCS durability
TSD Progress Summary

- The TSD and its support systems has been successfully developed into a system capable of delivering routine network level surveys.
- Over 12000km of structural condition information was delivered in 2010/11 under TRASS1 and 7500km in 2011/12 under TRASS2.
- Service Providers will be able to identify and prioritise potential maintenance schemes on the basis of structural as well as surface condition.
- Reduced reliance on disruptive and expensive deflectograph surveys.
- The HA intends to continue annual network level condition assessment surveys under TRASS3.
- A programme is in place to develop the TSD into a tool capable of assisting in scheme-level by 2016.
Thank you for listening.
Comfort Break
General Discussion and Close

Ramesh Sinhal and Donna James