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Traffic Noise

U.K. Perspective on Surfaces

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Introduction

- **For clarity this presentation only covers the strategic road network, operated by the Highways Agency.**
- Highways Agency: An Executive Agency of the Department for Transport (DfT), responsible for operating, maintaining and improving the strategic road network in England on behalf of the Secretary of State for Transport.
- The strategic road network in England consists of
 - Approximately 36000 lane km of trunk road network (including motorways)
 - The network carries a third of all traffic and two thirds of all heavy freight traffic
 - The network ranges from single carriageway routes carrying 10,000 vehicles a day to the M25, which serves more than 250,000 vehicles

HA drivers behind surface selection

- Main drivers for the selection of surfaces
 - Safety
 - Durability
 - Environment
 - Cost
- *Key Performance Indicator for Environment:* "Mitigate the potentially adverse impact of strategic roads and take opportunities to enhance the environment taking into account value for money."
- This KPI applies over many aspects of the environment which are affected by the construction, maintenance and operation of England's strategic road network, including traffic noise.

Current policy on reducing traffic noise

- In 1998, the UK Government committed to use low-noise surfacing materials for both new roads and existing roads when requiring resurfacing.

Following this, in 2000 the government agreed, under the 10 year plan to:

- **Target:** Resurface 60% of the network with a low noise surface 2.5 – 3.5dBA by 2011. The trunk road network comprises of approximately 5% of concrete surface which are to be covered by quieter surfaces by 2011 under the 10 year plan
- **Current status:** At the end of March 2006, approximately 30% of the strategic road network had been resurfaced with low-noise materials.

Current policy on reducing traffic noise

- Additionally, a £5m (7m Euros) budget per annum has been used to address the most serious and pressing cases of high traffic noise levels on the existing strategic road network, for which there was no early prospect of low-noise surfacing due to the lack of maintenance need.
 - Noise barriers have been identified as the most cost-effective means of reducing traffic noise in many of the cases, the latter which all need to be addressed by March 2011.

HA surface selection policy

- To maintain an appropriate balance between safety (UK has casualty reduction targets in place), durability (hence network availability / congestion) and environment, HA imposes restrictions on the type of materials that can be used
- Different surfacing materials have different noise characteristics
 - Main influencing factors: type of surface and texture depth
- Follow the guidelines in DMRB Volume 7 section 5 HD36/99

HA recommended surfaces

- **THIN SURFACINGS**
- **Description:** A range of materials, usually proprietary, that can restore skidding resistance and ride quality. Spray may also be reduced. Many surfaces are quieter than conventional material such as HRA. The range includes thin proprietary SMAs.
- **Recommended because:** Thin surfacing currently offer the best balance between speed of laying, durability while providing good safety and environmental (noise) performance.

HA restricted surfaces

- **POROUS ASPHALT**
- **Description:** A mix in which the aggregates form a skeletal structure with interconnecting voids in excess of 20% allowing water to drain away within its thickness. Usually used for its noise suppression properties in the UK, it also reduces spray in wet weather. Note: *This surface is not used on the trunk road network.*
- **Restricted because:** Experience in the UK has been that the durability requires ideal laying conditions, whereas maintenance is frequently conducted at night to minimise congestion. For the same reason, maintenance is often carried out to only one or two lanes at a time - this has undesirable implications for drainage of water through a semi-porous thin surfacing across the carriageway.

Existing HA part-funded research

- **SILVIA (Silenda Via): Sustainable road surfaces for traffic noise control**
 - EU 5th framework project (2002-05)
 - Consortium of 15 partners from 12 countries participated
- **The problem**
 - 80 million people affected in Europe
 - Traffic growth means an increasing number of people are affected
 - OECD thresholds for noise nuisance:
 - Threshold for annoyance: 55 dB(A)
 - Threshold for unacceptability: 65 dB(A)
 - The road surface can make the difference on its own
- **The objective**
 - To provide a tool to rationally plan traffic noise control measures including low-noise road surfaces

Existing HA part-funded research

- **SILVIA Project Outputs**
 - Guidance on measurement methods (WP2)
 - Classification method for road surfaces (WP2)
 - Cost/Benefit Analysis tool (WP3)
 - Guidance on “sustainable” solutions (WP4)
 - Advice on the integration of different noise-reduction measures and their interaction (WP5)
 - Guidance Manual (WP6)
- **TRL were the Editors of the Guidance Manual**
- See www.trl.co.uk/silvia for further information

Background to proposed HA research

- Thin surfacing materials are typically laid with 14 mm or 10 mm coarse aggregate to maintain current UK requirements for texture depth of road surfaces on high speed roads
- There would be both tyre noise and sustainability benefits in using smaller aggregate (6 mm)
 - Small aggregate is produced as a by-product of producing the larger sizes but there is currently no market for this material, even though this may be the precious high PSV rock (resistant to polishing under traffic)
- Smaller aggregate cannot be laid in such a way as to give a high texture depth AND good durability
 - To obtain the texture, it is necessary to reduce the binder content so that there are more voids. Therefore there is less material holding it together which will reduce durability

Background to proposed HA research

- There is anecdotal evidence that surfaces with small aggregate may perform better under traffic, possibly because there is a greater contact area and lower contact stresses. Trials are currently underway to understand the benefits other than noise.

Proposed HA research

- Monitor the performance of trial surfaces laid with 6 mm coarse aggregate
- Re-examine the trade off between road surface texture depth and tyre tread depth, in the presence of different amounts of water, to determine whether the texture depth requirements can be relaxed.
 - Climate change is also relevant to this as it could mean that rain becomes more frequent and heavier than it has been in the past.

Wider noise issues

- The EU Directive 2002/49/EC on the assessment and management of environmental noise requires Member States to produce noise maps by July 2007 and action plans by July 2008 and then at 5 year intervals
- In England, the Secretary of State is the “competent authority” for roads, responsible for the first round of noise mapping and action plans
- Defra (Department for Environment, Food and Rural Affairs) has therefore commissioned research to map out noise levels along major roads and over 20 major towns, cities and regions across England.
- The research marks a key phase in the Government's plan to map noise from roads, railways, airports and industrial sites across England.

Wider noise issues

- The Noise Mapping England Project is part of the first stage of the implementation of the Environmental noise Directive and will also contribute to the development of a National Noise Strategy. The idea is to identify, in simple terms, where people are affected by noise, how many are affected and what the source of the noise is.
- The findings from the mapping project will then be evaluated against economic, social and environmental factors before agreeing the necessary action required and final strategy.

The way forward in the UK

- Further development of low-noise surfaces can only be achieved through active collaboration and discussion with
 - Aggregate manufacturers and suppliers
 - Surface contractors (paving and construction)
- Collaboration with other countries to enhance existing knowledge and experience of surfaces already in use in the UK
- Collaboration with other countries to gain experience with surfaces not currently used in the UK
- From a wider perspective, the greatest gains can only be achieved through communication with all relevant parties (surface industry, tyre industry and vehicle industry)



End of Presentation

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