Netherlands is Dense Populated

16.3 million people on 34,000 km² land, i.e. 480 inhabitants km⁻²
3000 km “Heart to Heart” main road network

i.e. major roads penetrate urban areas

High number of persons hindered by traffic noise on main network

In western part the four major cities are connected by a ring “Holland Avenue”

Example:
Rotterdam Overschie appr. 75,000 vehicles per day
As seen from the Road

A13 at Rotterdam
Overschie
As seen by the inhabitants

A13 at Rotterdam
Overschie
Current situation

High number of expensive noise barriers are required

Solution

IPG (Noise Innovation Program) research of 50 million Euro to

- Implement
- Cost effective
- Source oriented (preferably)
- Innovative noise reducing measures
IPG products
(examples)

Barrier Tops
1 – 2 dB(A)

Two Layer Porous Asphalt
6 dB(A)

Third Generation Noise Reducing Pavement
8 dB(A)
Two Layer Porous Asphalt (TLPA)

Goal

Implementation TLPA from 2006 on Dutch main network
IPG – Activities TLPA

Construction TLPA Test Sections
2002 – 2004 Zebra test sections (approval)
2004 -2006 Improved sections (improval)

Monitoring
2004 – 2006 (approval)

Lab. studies
2004- 2006 Regulations
2004 – 2006 Improval (basic knowledge)
Performance is strongly influenced by:
1. Construction process
2. Climate during construction
3. Materials

Therefore:
• Construction only allowed between 1 May – 1 October
• No construction during rain
• Not laid in sharp curves
• Laid on all lanes at same time
• Polymer Modified Bitumen used
Maintenance

**Current ideas**

- **Clogging.**
  Based on SLPA: equipment with water injection and suction

- **Repair**
  After 8 years heaviest loaded lane only top layer
  After 12 years all lanes both layers
## Performance

*(indicative)*

<table>
<thead>
<tr>
<th></th>
<th>AC</th>
<th>SLPA</th>
<th>TLPA</th>
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<tbody>
<tr>
<td>• Initial Noise Reduction [dB(A)]</td>
<td>0</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>• Constructive Durability [years]</td>
<td>12</td>
<td>10</td>
<td>7 - 8</td>
</tr>
<tr>
<td>• Initial Skid Resistance</td>
<td>+</td>
<td>0</td>
<td>o</td>
</tr>
<tr>
<td>• Rutting Resistance</td>
<td>-</td>
<td>+</td>
<td>+</td>
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<tr>
<td>• Splash and spray</td>
<td>-</td>
<td>+</td>
<td>+/+++</td>
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1. Additional measures might be necessary
Improved TLPA on three points:

Type A: improved Acoustic durability  LTA 5-6 dB(A)

Type B: improved durability  two years more
increased ravelling resistance

Type C: less critical construction process
Less Critical Process

Less influenced by the climate

Conventional

Warm-in-Warm
Improved Durability

Improvement through understanding failure mechanism

DRI (DK)-DWW (NL) cooperation: use of advanced techniques

CT-scan

Thin section analysis