Asphalt recycling in the Netherlands

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• Development / history
• Facts and figures
• Technique
• Requirements

Year 2010

<table>
<thead>
<tr>
<th></th>
<th>Production HMA</th>
<th>RAP in HMA</th>
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<tbody>
<tr>
<td></td>
<td>million tons</td>
<td>%</td>
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<tr>
<td>Spain</td>
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<tr>
<td>France</td>
<td>39</td>
<td>7</td>
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<td>Austria</td>
<td>8</td>
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<tr>
<td>USA</td>
<td>327</td>
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<td>Germany</td>
<td>45</td>
<td>26</td>
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<tr>
<td>The Netherlands</td>
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History

- technique
- economy
- policy

Circumstances in the Netherlands
Technique
- available technique
- support by the client
- Dutch standard specifications

Environmental Circumstances
- global environmental awareness
- scarcity of quarry materials
- alternative construction materials
Economic Circumstances
- oil crisis
- high bitumen prices
- return on investment
- min. 50% reclaimed asphalt in specs

Summarising
- accepted technology
- co-operation client - industry
- environmental policy
- scarcity of natural aggregates
- waste reduction
- oil crises

Today's incentives
- Dumping not allowed
- Economic value
- Mixing plants equipped
- Standard technical specifications
- Green Procurement

Facts and figures
- production HMA 8 - 9 million tns/yr
- 40 asphalt mixing plants equipped for recycling
- RAP 3.5 - 4 million tns/yr
**Availability**
- right place
- right time
- right quantity
- right quality

**Requirements for RAP**
- reclaimed bitumen quality
- aggregate size
- aggregate shape
- no pollution
- no tar
- homogeneity

**Quality!**
**Pavement demolition**
= **Preparing valuable material**

**No Waste!!**

**RAP = Reclaimed Asphalt Pavement**

**Quality test on existing pavement**

**RAP = Reclaimed Asphalt Pavement**

**Cold Milling:**
Possibly in layers

**Crushing**
Percentage RAP in Mix

- Subbase > 50% (98%)
- Binder 45% (90%)
- Wearing course 35% (50%)
- Porous asphalt 30% (20%)
- Stonemastic asphalt 25% (1%)

Requirements for hot mix with reclaimed asphalt = hot mix with 100% new materials

Possible solution - Recipe approach
Performance based requirements

Conclusions
Success-factors
- acceptance of technique
- environ-mentality
- co-operation
- return on investment
- market