COST Action 348 - REIPAS

REINFORCEMENT OF PAVEMENTS WITH STEEL MESHES AND GEOSYNTHETICS

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BACKGROUND
The purpose/ function of using reinforcement is to

- reduce rutting – surface and subgrade,
- increase bearing capacity,
- increase resistance to cracking due to frost heave,
- prohibit or limit reflective cracking,
- increase pavement fatigue life,
- minimize differential and total settlement,
- enable bridging over voids,
- enable economic construction platforms.
MATERIALS APPLIED IN THE DIFFERENT TECHNOLOGIES

- steel grids, glass fibre grids
- plastics - grids and meshes
- woven geotextiles
- nonwoven geotextiles.
ADVANTAGES of using reinforcement

ECONOMICAL ADVANTAGES
- thinner road structures
- cost-effective solution for rehabilitation
- longer life cycles
- reduction in maintenance costs

ENVIRONMENTAL ADVANTAGES
- savings in natural resources due to prolonged service intervals
PREVIOUS & RELATED ACTIVITIES

• R.I.L.E.M. ACTIVITIES
• REFLEX
• MSU / SINTEF Nordic coop. "GeoRePave"
• CEN TC 189
CEN standardisation

- CEN TC 189 “Geosynthetics”
  former: "Geotextiles and geotextile-related products”

- prEN 15381 (Wi 00189038, Wi00189120)
  "Required characteristics for geotextiles and geotextile-related products in asphalt overlays"
  draft standard prepared by the AHG-asphalt in WG1
Problem Statement for COST REIPAS

- Lack of general guidelines for
  - the structural design and
  - the execution of reinforced pavements and road sub-bases
- Missing consensus on the methods to determine relevant material parameters
  - for analysing or
  - predicting the behaviour of the reinforced structures
Terminology of pavement structures (COST 348)
### Function, location and type of reinforcement in unbound layers

<table>
<thead>
<tr>
<th>Function Avoidance of</th>
<th>Base Course</th>
<th>Subbase Course</th>
<th>Capping Layer</th>
<th>Stabilised Subgrade</th>
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<tr>
<td><strong>Rutting</strong></td>
<td>Polymer grids &lt;br&gt;Steel fabrics &lt;br&gt;Composite polymer grids/geotextiles. &lt;br&gt;Geotextiles</td>
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<td><strong>Cracking - Frost Heave</strong></td>
<td>Steel fabrics &lt;br&gt;Polymers grids</td>
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<td><strong>Reflective Cracking in areas of road widening</strong></td>
<td>Polymer grids &lt;br&gt;Steel fabrics &lt;br&gt;Composite polymer grids/geotextiles. &lt;br&gt;Geotextiles</td>
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<td><strong>Fatigue Cracking</strong></td>
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<td><strong>Increase of Bearing Capacity</strong></td>
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Conclusions

Experience with pavement reinforcement in Europe
- for geosynthetics > 40 years,
- for steel reinforcement > 2 decades.

The utilisation of reinforcement in road pavements has a promising potential and
- the beneficial effects of the reinforcement may reduce construction costs and
- enhance the road performance.

However, despite the good experience, pavement reinforcement is still not recognised as a solution at the same level with conventional methods.

There is still a lack of technically sound but simple models for the function mechanisms of the reinforcement and non product related design models.

Currently general road design is to a large extent based on semi empirical methods and differs countrywise; this complicates the inclusion of new materials and methods.
Conclusions, ctd.

The benefits of using geosynthetics and steel meshes in new constructions and maintenance of road pavements pay off for road administrations & policy makers for the environment, the industries and for road users.

The work done in this COST Action confirmed in all aspects the beneficial effects of pavement reinforcement.

Utilisation of reinforcement as an alternative will reduce frequency of maintenance operations
• result in reduced maintenance costs
• provide easily accessible roads with minimum delay due to maintenance operations
• result in a safer road network.