Summary

Sétra, CSEP and DGPI,
Structural design of pavement,
Performances of national road pavements

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Sétra

Technical service of the French Ministry of sustainable development for:
- Transport,
- Roads and bridges engineering
- Road safety.

It provides expertise, methodologies, guidelines as well as software and information systems.

DGPI

Road asset management division

Objects:
- Road water management,
- Earthworks,
- Pavements.

Issues:
- Pavement design, techniques for construction, reinforcing or maintenance,
- Asset management: assessment, auscultation, programming, continued viability,
- Materials (components, processing, implementation),
- Surface performances (skid resistance, evenness, noise, ...),

DGPI (2/2)

Transversal tasks:
- Assessment of national road network (without toll roads),
- Innovative techniques: check of performances,
- Reducing environmental impacts of road works,
- New one: sanitary impacts of road works.
4 iterative phases:
- Subgrade and capping layer:
  - Bearing capacity,
  - Modeling effect of standard axle on entire structure,
- Fatigue behavior,
- Frost/thaw verification.

- Strain (bituminous) / stress (hydraulic) of base layers,
- Vertical strain of subgrade,
- Fatigue behavior:
  - Number of standard axles during life of pavement,
  - Service level,
  - Strain or stress for 1 000 000 standard axles,
- Frost/thaw verification:
  - °C*jours of a chosen winter.
Structural design of pavement

Road owners choices:
- Life,
- Service level,
- Reference winter,
- Minimum bearing capacity of capping layer.

National Roads Network (non toll roads)

Road owners choices:
- Life: 30 years
- Service level: very high (risk ~2%),
- Reference winter (exceptional),
- Minimum bearing capacity of capping layer (>120Mpa).

National Roads Network (non toll roads)

Historic goals in sixties/seventies:
- Traffic under all conditions:
  - Winter protection,
  - Good behavior under heavy goods vehicles,
- Huge amount of road works in a small time:
  - Use of available aggregates and binders,
  - Efficient industry.

National Roads Network (non toll roads)

Historic choices in sixties/seventies:
- Bound layers with low rate of binders and high compactness,
  - high bearing capacity upon capping layer in order to have high compactness,
  - high stiffness of the entire structure.

National Roads Network (non toll roads)

HGV Lane, date of the last reinforcing.
Average 26 years (1986)

<table>
<thead>
<tr>
<th>Reinforcement</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Sixties</td>
<td>3 %</td>
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<tr>
<td>Seventies</td>
<td>35 %</td>
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<tr>
<td>Eighties</td>
<td>19 %</td>
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<tr>
<td>Nineties</td>
<td>26 %</td>
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<tr>
<td>After 2000</td>
<td>17 %</td>
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