TYROSAFE WP3 workshop
Brussels

Task 3.2 Parameters influencing rolling resistance

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Content

- Contemporary status
- Results of literature survey
- Rolling resistance as a part of total energy loss
- Suggestion of reduction possibilities
- Influence of road surface on rolling resistance
- Results of questionnaire
Neither any policies nor any regulations/standards regarding the tyres’ rolling resistance on real pavements exist.

But rolling resistance is directly linked with fuel consumption and therefore with CO$_2$-emission.
Results of literature survey

• Road surface characteristics have an influence on rolling resistance and therefore on fuel consumption and CO₂-emission

• Until now it is not sure which road characteristics are influencing pavements’ rolling resistance at the most

• A conflict between good skid resistance, low rolling noise and low rolling resistance [13] could not be detected in the literature survey
Rolling resistance as a part of total energy loss

- Driving resistance
  - Resistance of tyre/wheel
    - Flexing resistance
    - Deflection of pavement
    - Damping of unevenness
    - Bearing friction
    - Aerodynamic resistance
    - Friction and adhesion
  - Aerodynamic resistance
  - Climbing resistance
  - Resistance of acceleration
Suggestion of reduction possibilities of RR

<table>
<thead>
<tr>
<th>Pavement</th>
<th>Tyres</th>
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<tbody>
<tr>
<td>texture characteristics:</td>
<td>• Temperature</td>
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<tr>
<td>• micro-texture</td>
<td>• Geometry</td>
</tr>
<tr>
<td>• macro-texture</td>
<td>• Size</td>
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<tr>
<td>• mega-texture</td>
<td>• speed index</td>
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<tr>
<td>• road-surface roughness</td>
<td>• height-to-width ratio</td>
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<td>• longitudinal eveness</td>
<td>• rim size/-width</td>
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<td>• grip</td>
<td>• material:</td>
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<tr>
<td>surface temperature</td>
<td>• rubber compound</td>
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<td>• carcass</td>
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<td>• belt</td>
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</tbody>
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Influence of road surface on rolling resistance

• Characteristics of road surface have an influence on road’s rolling resistance
  – unevenness
  – megatexture
  – macrotexture
  – microtexture

• Question: What influences road surface’s rolling resistance at the most?

• → Questionnaire for experts in this research field
• → This workshop
Results of questionnaire

• Questionnaire consisted of 9 questions regarding the influence of road pavements on tyres’ rolling resistance

• Most important results of questionnaire:
  – Tyre and pavement industry shall develop measures to reduce rolling resistance and therefore the CO₂-emissions
  – Ranking of most important texture influences on rolling resistance:
    1. macrotexture/megatexture
    2. unevenness (might be not a part of rolling resistance per definition as soon as unevenness results in body vibrations but is also a part of energy loss caused by the road surface)
    3. microtexture
thank you for your attention