Traffic safety gains with attention to subjective aspects of surface characteristics

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Contents

• Traffic safety in NL, and trends
• Perceptible and imperceptible road surface properties
• Skid resistance and traffic safety
• Intended new approach for skid resistance management on Dutch state highways
Traffic accidents NL vs other countries

[Graph showing traffic accident rates in various countries compared to the EU and US.]
Traffic casualties NL over time
Increasing traffic safety

- Safer cars (ABS, ESP, etc)
- Safety belts
- Motorcycle helmets
- Anti-alcohol campaigns
- Crossings => roundabouts
- Road condition
- ...

Traffic safety and road surface characteristics

- 85-95% of accidents due to human errors
  - safety estimation or risk perception
    - overrating own capabilities
    - and/or vehicle capacities
    - perception of “environment”, a.o. road
  - perceptible and imperceptible properties of road surface
    - (un)evenness
    - skid resistance
Traffic safety vs rut depth, wet road
Traffic casualties vs road condition

- **Dry**: 70% casualties, 80% time
- **Wet**: 10% casualties, 20% time
- **Snow, pollution, etc.**: 0% casualties, 0% time
Traffic safety and wet grip

NL: RWS/SWOV (1973)

- Accidents vs wet grip
- Intervention level, warning level, acceptance level

![Graph showing accident ratio vs friction class for motorways and other roads.]

- The graph compares accident ratios for motorways and other roads across different friction classes.
- Higher friction classes generally correspond to lower accident ratios, indicating better safety performance for wet conditions.
UK: TRL 2004

The graph shows the mean accident risk versus skid resistance for different types of roads:

- **Motorway**: Represented by pink squares.
- **Dual c/way non-event**: Represented by blue circles.
- **Single c/way non-event**: Represented by dark blue triangles.

The y-axis represents the mean accident risk, and the x-axis represents skid resistance. The lines indicate a decreasing trend in accident risk as skid resistance increases.
UK: Investigatory levels

<table>
<thead>
<tr>
<th>Site category and definition</th>
<th>Investigatory level at 50km/h</th>
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<tbody>
<tr>
<td></td>
<td>0.30</td>
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<tr>
<td>A Motorway class</td>
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<tr>
<td>B Dual carriageway non-event</td>
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<td>C Single carriageway non-event</td>
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<td>Q Approaches to and across minor and major junctions, approaches to roundabouts</td>
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<td>K Approaches to pedestrian crossings and other high risk situations</td>
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<td>R Roundabout</td>
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<tr>
<td>G1 Gradient 5 to 10% longer than 50m</td>
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<tr>
<td>G2 Gradient &gt;10% longer than 50m</td>
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<tr>
<td>S1 Bend radius &lt;500m – dual carriageway</td>
<td></td>
</tr>
<tr>
<td>S2 Bend radius &lt;500m – single carriageway</td>
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</tbody>
</table>

2004 categories and investigatory levels for wet grip
(dark gray is normal range, light grey are exceptions for low-risk situations)
NL Skid resistance policy

Until recently:

• Yearly monitoring state highways network
• Use only this year’s data
• 1 threshold level for all road types
• Fairly binary judgment: OK / not OK (“green / red”)

Drawbacks:

• Data fluctuations (seasonal variation, spatial variation, equipment reproducibility)
• Gradual, not binary, influence of skid resistance on traffic safety
Seasonal trend in skid resistance
NL Skid resistance policy

New approach:

• Use weighted multi-year data, with seasonal correction
• Investigatory level: “Orange” zone
• Investigate norm level and possible differentiation for road categories, e.g:
  • Motorways: main carriageways, no events
  • Motorways: slip roads, merging sections
  • Single carriageway highways
Intended new approach for skid resistance policy

- Measurement
- "Real" development of skid resistance, including seasonal variance
- Model for long term trend
- Measurement outside normal variance, prompting new measurement
- Different investigation and action levels for different road categories
- Time (years)
Traffic safety and wet grip
NL: RWS/TNO (2008)

Porous asphalt

- blue: motorway main carriageway
- red: mtrwy merging lanes / links
- yellow: single carriageway
- black: intervention level

Friction coefficient NL method @ 70 km/h
Traffic safety and wet grip

Porous asphalt

- Motorway main carriageway
- Mtrwy merging lanes / links
- Single carriageway
- Intervention level

Accident risk vs. friction coefficient NL meth. @ 70 km/h
Thank you for your attention!

Questions?

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