Safer Trucks

The potential for improved crash compatibility

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Truck Safety in context

- In 2013 4,021 Fatalities from accidents involving HGV: Source CARE/Road Safety Observatory
- 50% car occupants, 21% VRU, 15% truck occupants
- Within this, frequency of car to truck head-on collisions is falling, progress slowing
- Suggestion that fatal and serious cases falling less quickly than slight injury cases (Source: GB National Accident Database Stats 19)
- Expectation would have been for reducing severity after introduction of Front Underrun Protection in 2003
Crashworthy design of cars
Crashworthy design of cars

Good Structural Interaction

Poor Structural Interaction
Car to truck collisions: Structural Interaction
Solving the problem - Underrun protection

- Sufficient strength
- Good structural interaction
  - Horizontal
  - Vertical
- Energy Absorption
The Opportunity of additional length

- Move FUP away from chassis & other stiff components – better interaction
- Allow controlled deformation over a longer distance – energy absorption
- Potential to improve direct vision of pedestrians
- Potential for preventing pedestrian run-over by deflection
Passive Pedestrian Protection

- Potential to adapt or extend UNECE R127
- Requires relative small amount of soft structure across the front of the vehicle
- Head-Injuries dominant with flat front but may change
Barriers to overcome (FUP)

- UNECE R93 could be a constraint
  - Requirement for full width coverage combined with manoeuvrability requirements suggest curved or angled FUP
  - Current test would not work well for curved FUP
  - Curved FUP may have some structural interaction risks
Options for consideration (FUP)

- Revised Quasi-Static test
  - No Curved FUP, limiting length
  - Minimum energy absorbed
  - Design requirements controlling structural interaction

- Introduce dynamic test using progressive deformable barrier
- Max acceleration criteria
- Design requirements controlling structural interaction

### Deformation (mm)
<table>
<thead>
<tr>
<th>Length extension (mm)</th>
<th>Deformation length available (mm)</th>
<th>Proposed test speed (km/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-200</td>
<td>200-400</td>
<td>70</td>
</tr>
<tr>
<td>201-400</td>
<td>400-600</td>
<td>80</td>
</tr>
<tr>
<td>401-600</td>
<td>600-800</td>
<td>85</td>
</tr>
<tr>
<td>601-800</td>
<td>800-1000</td>
<td>90</td>
</tr>
</tbody>
</table>
Conclusions

- Fatalities from HGV collisions reducing but still significant
- Car occupants most frequently killed, followed by vulnerable road users
- Deaths from head-on collisions remain a problem despite legislation requiring FUP. Improvements are feasible:
  - Structural interaction
  - Energy absorption
- Permitting additional length provides an opportunity for improvement
  - Car occupants & Front Underrun protection
  - Also for Vulnerable Road Users
- Amendments to Regulation required to overcome barriers
- Initial proposals for potential regulatory tests have been developed but require validation
Any Questions??

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