Good practices to improve level crossing safety

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Data

• Survey
  • Expert opinions
  • Partly depending on the organisation of respondent
• Finnish study
  • 37 measures
  • Data on safety impact collected from international research
  • Target groups (all road users/motor vehicle drivers/pedestrians and bicyclists/(school) children)
  • Stability of measures (stable effect/stable if maintained/novelty effect/not known)
  • Types of measures (warning devices/warning lights/signs and signals/changes on road/risk analyses/awareness and education/regulation/other measures)
Data (cont.)

• Classification of measures (low tech engineering/high tech engineering/constructual measure/signs and opasteet/awareness and education/tool, process, procedure/other)

• Applicability (passive/crossings equipped with barriers/crossings equipped with lights and voice signals/crossings equipped with other warnign devices/crossings with traffic signals/low traffic volume on road/high traffic volume on road/paved road/unpaved road/electricity supply available/level crossing not in use or very seldomly used/other)

• Effectivity in different conditions (day light/dark/dusk/rain/snow fall/slippery/poor visibility)

• Costs (low, under EUR 5,000/intermediate, EUR 5,000-25,000/high, over EUR 25,000)
Data (cont.)

- Need of maintenance (only some maintenance needed/maintenance costs low compared to total costs/maintenance costs significant)
- Maturity of technology (available now/available in near future/development phase)
- Acceptability for road users, railway staff and inhabitants nearby (not opposed considerably/opposing possible/opposing probable)
Safety model (risks, accidents...)

Resources
Road user

- Knowledge
  - Education at school
  - Education at driving school
  - Reminding
- Awareness campaigns
  - Leaflets etc
- Enforcement
Level crossing

- Approach
  - Understandable signs and markings
- At crossing
  - Passive and active signs
  - Markings
  - Speed humps
- Warning of approaching train
  - Barriers
  - Warning lights and signals
  - In-vehicle warning
Recommendations and next steps
<table>
<thead>
<tr>
<th>Good Practice</th>
<th>Specific Measures (if applicable)</th>
<th>Pros</th>
<th>Cons</th>
<th>Other Relevant Factors or Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Removal of level crossings</td>
<td>Not applicable</td>
<td>Removes the safety problem locally</td>
<td>Very expensive; May not be physically possible considering the local road conditions etc</td>
<td>For safety impact the high risk crossings need to be removed. Assuring that the safety of nearby crossings or road network is not decreased.</td>
</tr>
<tr>
<td>Passive crossings updated to active</td>
<td>Passive to double barriers Passive to half-barriers Passive to active with low cost measure New technology solutions (e.g. in-vehicle warning)</td>
<td>Safety is improved Low cost measures working e.g. with solar panels</td>
<td>First two are expensive and need power supply</td>
<td>The safety impact is different for different types of warning devices. Double and half-barriers not applicable for small rural roads Research on new technology solutions needed</td>
</tr>
<tr>
<td>Making road users aware of proper behaviour at level crossings</td>
<td>Education at schools and driving schools Awareness campaigns Social media campaigns Leaflets etc. Giving information at fairs and other mass gatherings</td>
<td>Effect on the behaviour of the road users</td>
<td>Target groups need to be considered carefully Safety impact not really known, more research needed</td>
<td></td>
</tr>
<tr>
<td>Good Practice (this is where the broad headings go)</td>
<td>Specific Measures (if applicable)</td>
<td>Pros</td>
<td>Cons</td>
<td>Other Relevant Factors or Comments (Subgroup and GE.1 to suggest)</td>
</tr>
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</table>
| Improving the surroundings at level crossing        | Preventing driving around the barriers  
Having separate pedestrian and bicycle ways  
Speed humps                                     |      |      | Safety impact and costs depend highly on the measure         |
| Enforcement                                          | Police presence  
Speed cameras at crossing  
Red light cameras at crossing  
Speed and/or red light cameras in the police vehicle |      |      | Quite new measure, safety impact not known, needs research   |
Next steps

- Possible addition of new measures from HF subgroup
- Updating and finalising the recommendations table
- Updationg and finalising the report based on the comments received
Thank you!

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