Statistical data on Level Crossings and on their safety in EU countries

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• Safety at level crossings continue to represent a challenge to authorities in the EU
• Interest in Level crossing safety statistics at the EU level from both road (CARE db) and rail side (ERAIL-CSI db)
• UNECE pilot data questionnaire provides a new insight into the safety performance of LCs in the EU.
Introduction

Problem and problem drivers

Too frequent accidents at level crossing (threat to the competitiveness and efficiency of the rail)

1. Too many LCs, passive LCs, or poorly protected active LCs
   - Technical solution too expensive / no single market / no common technical requirements

2. Insufficient evidence on problems, causes and costs
   - Insufficient statistical data / insufficient independent accident investigation

3. Ineffective risk assessment and management
   - Lack of knowledge, capacity, methods

4. Poor safety culture at IM
   - Lack of awareness of underlying cause, responsibility on road users / Insufficient accident investigation
Active level crossings now outweigh the passive crossings
User-side protected represent 36% of all LCs

Note: EUAR countries = EU-28+CH+NO
LC safety performance – EU countries

- A decreasing trend, but numbers and economic impact remain high
Further insight provided by CARE statistical data (road safety)
- No all MS have LC accidents data on the road accidents police reports
- Several countries provided no data, some others partial data

**Fatalities per road user type (2016)**

- Driver: 70%
- Passenger: 22%
- Pedestrian: 8%

**Fatalities at LCs by transport mode (2016)**

- Agricultural tractor: 66%
- Bus or coach: 4%
- Car + taxi: 4%
- Heavy goods vehicle: 4%
- Lorry, under 3.5 tonnes: 0%
- Moped: 10%
- Motor cycle: 0%
- Other: 8%
- Pedestrian: 6%

Sample includes data from 12 countries
LC safety performance – EU countries

- LC safety statistical data possibly underestimated in road safety statistics
  - *Marginal area of interest for road authorities*

<table>
<thead>
<tr>
<th>LC users killed (EU in 2016)</th>
<th>Killed on</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>257</td>
<td>- railways</td>
<td>970</td>
</tr>
<tr>
<td></td>
<td>- roads</td>
<td>26,100</td>
</tr>
</tbody>
</table>

Road users killed in LC accidents (CARE vs. ERAIL-CSI)
• Density of LCs vary considerably, likely linked to urbanization levels
• Share of active LCs seems to reflect national strategies, partly GDP
Safety performance – UNECE countries

- Safety performance using different normalizers
- Only fatalities are available and comparable
  - Likely under-reporting of injuries

![Graph showing normalised fatalities at level crossings](image)

- **Killed per train-km (million)**
- **Killed per line-km (thousand)**
- **Killed per number of level crossings (thousand)**
Conclusions

- International comparison of LC infrastructure and LC safety performance allows to identify countries with working strategies and good practices.
- Poor availability of data broke down to accident type and road user represent certain limitation to determining an effective strategy.
- Common mismatch between road and rail data may call for a transversal approach with a unique database filled by road and rail authorities in concert.
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Types of LCs

Table: Level crossing types classification matrix

<table>
<thead>
<tr>
<th>Level crossing (LC)</th>
<th>Automatic system</th>
<th>Active warning to user</th>
<th>Active (barriers) protection of user</th>
<th>Rail-side protection</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>User-side protection? (railway controlled or automatic barriers at user-side)</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Rail-side protection?</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>• interlocked rail-side signal or train protection,</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>• full user-side protection and</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>• checked to be free from incursion</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

N/A or 'not applicable' indicates that the indicated logical conditions do not agree with each other.

32+ combinations

1. Manual LC

Passive LC

Active LC

4. Rail-side protected LC