An End User Perspective
SAFER-LC, Network Rail - UK

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What is a level crossing?

1 – Conflict Zone
2 – Rail Approach
3 – Road Approach
4 – Rail Exit
5 – Road exit
6 – Neighbours
# Types and Risk Properties

<table>
<thead>
<tr>
<th>Source – ALCRM, August 2015</th>
<th>Crossing core type</th>
<th>Number of level crossings on the network</th>
<th>FWI (as calculated by ALCRM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passive level crossings</td>
<td>UWC/Bridleway (with telephone)</td>
<td>1717</td>
<td>1.1</td>
</tr>
<tr>
<td></td>
<td>Footpath/bridleway/station</td>
<td>2246</td>
<td>2.8</td>
</tr>
<tr>
<td></td>
<td>UWC</td>
<td>686</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>Open crossing</td>
<td>48</td>
<td>0.1</td>
</tr>
<tr>
<td>Automatic level crossings</td>
<td>AHB</td>
<td>443</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>ABCL/AOCL+B</td>
<td>119</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>ADCL/R</td>
<td>39</td>
<td>0.6</td>
</tr>
<tr>
<td></td>
<td>MSL</td>
<td>174</td>
<td>0.6</td>
</tr>
<tr>
<td>Protected level crossings</td>
<td>MCB CCTV</td>
<td>425</td>
<td>2.2</td>
</tr>
<tr>
<td></td>
<td>MCB OD</td>
<td>55</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td>MCB</td>
<td>185</td>
<td>0.6</td>
</tr>
<tr>
<td></td>
<td>MCB/Train Crew Operated</td>
<td>154</td>
<td>0.1</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>6291</td>
<td>15</td>
</tr>
</tbody>
</table>

## Safety, Technical and Engineering

- **Safety, Technical and Engineering**
- Quality, Health, Safety & Environment
- Operations, Security & Information
- Engineering
- Asset Management
- Research & Technology
- Innovation

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So we know all about safety?

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Which are the big risk types?

Automatic Half Barriers (Public roads)
Footpath/Bridleway/Station Crossings (Public pedestrians)

Full Barrier Crossings – Supervised through CCTV (Public roads)

User Worked Crossings with telephone (Private vehicles)
User Worked Crossings – Direct observation by User (Private)
Half barriers; Why not?

Automatic Half Barriers
- Weaving (Misuse)
- Pedestrians/Cyclists (Human error, misuse)
- Barrier strikes
- Vehicle stranded (No rail signal)

Current design
- ‘Unfenced’ off side
- Pedestrian facilities

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Where does the risk come from?

**Footpath/Bridleway/Station Crossings** – ‘Stop, Look and Listen’

- Fail to look each way (Distracted)
- Night time quiet period (No train horn)
- Impaired view (Line curves, vegetation, poor weather)
- Encumbered by the gate system
Risk, What risk?

User Worked Crossings with telephone
User Worked Crossings – Direct observation by User
Failure to use the telephone
Telephone not answered
Telephone not working
Misunderstand instructions
Frustration (Long wait for permission)

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Why are they higher risk?

Full Barrier Crossings – Supervised through CCTV

► Signaller training (Effective observation – Figure of 8)
► Signaller error (Workload)
► Poor equipment (Picture quality)
► Poor contrast (User clothing/background)
Equal access for all

Protected characteristics

- Mobility impaired (Older population)
- Loss of hearing
- Sight impairment
- Mobility scooters
  - Angle of approach/turning
  - Speed

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What are we doing?

**Technical**
- Brighter LED displays
- Ambient noise compensation
- Overlay systems (No connection to signalling)

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Compare!

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What are we doing?

Human factors

► Clear simple signs
► Spoken warnings/warble
► Second train warning
► Pulsating boom lighting?
► Deterrent (Red Light Enforcement)

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What are we doing?

Automation/Assistance
- Obstacle detection
- RADAR/LIDAR
- Next generation products
- CCTV – Video analytics?
- SMART Sensing?

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The Law?

- **Legal requirements - UK**
  - Level crossings are ‘Authorised’ through a Level Crossing Order
    - Now made under the Level Crossings Act 1983
  
- Legal obligation, (Secretary of State when making an Order’),

  ‘To consider the **safety and convenience** of all users’
The Digital Railway

► New opportunities
  ► Speed supervision,
  ► Near continuous train location reporting to radio block centre

► Internet of Things – Smart access systems

► Can the train and the user interact directly?
Convenience – What can we do?

Provide/Maintain fast operation cycle times
- AHB+ Full barriers, no signals, limited obstacle detection, retrofit

Consistent accurate warning times
- Project ‘Meerkat’, Dependable sound/light, Novel train detection?

Easy to use gates
- Remote power operation, solar/wind energy source

Reliability/Cost effectiveness
What should we do?

Horizon scanning: What are the emerging risks?
Does convenience = safety?

Value: How do we know when we have done enough?
- The ‘As low as reasonably practical’ question
- What are the cost drivers for your company?

Reputation: A better business case than ‘Safety’?
Performance: Delay minutes have cost/value.

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