SAFETY WEBINAR
Objects left on the Line

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Objects on the line: Understanding risk and priorities for the railway in Great Britain
Context: how companies in GB rail work together to manage health and safety
The GB Rail Industry's Health and Safety Strategy

- Sets the future vision for health and safety in GB rail
- Identifies strategic improvement priorities
- Encourages collaboration between companies

- Updated strategy to be launched in January 2024:
  - Supported by detailed road maps for each key risk area
  - Includes a call to action for industry leaders
The Strategy's Structure and Collaboration Framework
The Strategy's Structure and Collaboration Framework

Duty holder companies

Industry risk groups

System-wide safety monitoring

Prioritising and planning cross-industry improvement activity

Supporting and embedding change

Taking Safe Decisions
Train Accident Risk Group: monitoring

FWI data: Regional level by precursor group, 2018/19 Period 01 to 2023/24 Period 07

- Precursor group:
  1. Track
  2. Structures
  3. Earthworks
  4. Signalling
  5. SPAD and Adhesion
  6. Infrastructure Operations
  7. Level Crossings
  8. Objects on the Line
  9. Train Operations and Failures
## Train Accident Risk Group: risk profile

<table>
<thead>
<tr>
<th>Group</th>
<th>Includes</th>
<th>Risk (FWI/year)</th>
<th>% of TARG risk scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objects on the line</td>
<td>Collisions with non-rail vehicles that egress the line by means other than level crossings, animals, trees, items blown onto the line, items left on the line by maintenance staff, items placed on the line by vandals, snow and ice. Also derailments following collisions with these objects.</td>
<td>0.838</td>
<td>37.5%</td>
</tr>
<tr>
<td>Signal passed at danger</td>
<td>All causes of collisions and derailments following signals not protecting level crossings which are passed at danger.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Incidents</td>
<td>Collisions following misroutes or On-Track Plant (OTP) outside possession limits. Permissive working collisions due to operating staff errors. Buffer stop strikes due to operating staff errors. Derailments due to shunter errors, train marshalling errors, severe braking/snatch, and running into maintenance vehicles.</td>
<td>0.654</td>
<td>29.2%</td>
</tr>
<tr>
<td>Runaway trains</td>
<td>Derailments and collisions following runaways due to human error.</td>
<td>0.374</td>
<td>16.8%</td>
</tr>
<tr>
<td>Speeding†</td>
<td>Speeding leading to a derailment or a collision between a train and an OTP incorrectly outside of possession limits.</td>
<td>0.267</td>
<td>12.0%</td>
</tr>
<tr>
<td>Adhesion</td>
<td>Buffer stop strikes and permissive working collisions due to low adhesion.</td>
<td>0.002</td>
<td>0.1%</td>
</tr>
<tr>
<td><strong>Total TARG risk (FWI/year)</strong></td>
<td></td>
<td>2.23</td>
<td></td>
</tr>
<tr>
<td><strong>As a % of all potentially high risk train accidents</strong></td>
<td></td>
<td>41%</td>
<td></td>
</tr>
<tr>
<td><strong>As a % of all accidental risk</strong></td>
<td></td>
<td>2%</td>
<td></td>
</tr>
</tbody>
</table>
Risk from objects on the line
# Major accidents

<table>
<thead>
<tr>
<th>Location</th>
<th>Year</th>
<th>Fatalities</th>
<th>Cause of Derailment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carmont</td>
<td>2020</td>
<td>3</td>
<td>Derailed running over debris washed from a drain during heavy rain.</td>
</tr>
<tr>
<td>Great Heck</td>
<td>2001</td>
<td>10</td>
<td>Derailed after striking a road vehicle that had run down a motorway embankment onto the railway.</td>
</tr>
<tr>
<td>Polmont</td>
<td>1984</td>
<td>13</td>
<td>Derailed after striking a cow, which had probably accessed the railway via fencing damaged by trespassers.</td>
</tr>
</tbody>
</table>
The Safety Risk Model (SRM)

Supporting a risk and evidence-based approach to safety management

- Provides structured, quantified estimates of underlying safety risk
- Common approach: pooling data and experience from across GB rail
- Consistent means of assessing risk from different hazards
- Grounded by the reality of events that have happened, but not constrained by the past
<table>
<thead>
<tr>
<th>Derailment risk</th>
<th>Fatalities and weighted injuries per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Running into obstructions, 0.000</td>
<td></td>
</tr>
<tr>
<td>Earthwork failures, 0.000</td>
<td></td>
</tr>
<tr>
<td>Rolling stock faults, 0.000</td>
<td></td>
</tr>
<tr>
<td>Track faults, 0.000</td>
<td></td>
</tr>
<tr>
<td>Switches and crossings, 0.000</td>
<td></td>
</tr>
<tr>
<td>Overspeeding, 0.000</td>
<td></td>
</tr>
<tr>
<td>SPADs, 0.000</td>
<td></td>
</tr>
<tr>
<td>Shunter error, 0.000</td>
<td></td>
</tr>
<tr>
<td>Structural failures, 0.000</td>
<td></td>
</tr>
<tr>
<td>Wind loading, 0.002</td>
<td></td>
</tr>
<tr>
<td>Signaller/crossing keeper error, 0.000</td>
<td></td>
</tr>
<tr>
<td>Human error at S&amp;C, 0.000</td>
<td></td>
</tr>
<tr>
<td>Track maintenance error, 0.000</td>
<td></td>
</tr>
<tr>
<td>Misc. unknown causes, 0.000</td>
<td></td>
</tr>
<tr>
<td>Runaway, 0.000</td>
<td></td>
</tr>
<tr>
<td>Incorrect shunt and clip of points, 0.000</td>
<td></td>
</tr>
<tr>
<td>Train marshalling error, 0.000</td>
<td></td>
</tr>
</tbody>
</table>
Derailment risk from running into obstructions (fatalities and weighted injuries per year)

- Vehicle through boundary, 0.000
- Trees, 0.000
- Snow/Ice, 0.000
- Vehicle from overbridge, 0.000
- Object fallen from train, 0.000
- Debris from structures, 0.000
- From building site, 0.000
- Placed by vandals, 0.000
- Large animals, 0.000
- Fallen onto line, 0.000
- Blown onto line, 0.000
- Engineering equip left foul, 0.000
- into derailed train, 0.000
- Maintenance vehicles, 0.001
Strategic review of objects on the line
Strategic Review of objects on the line

RSSB is undertaking work for the industry’s Train Accident Risk Group to:
• Review how we categorise and structure risk from objects on the line
• Clarify arrangements for monitoring and reducing risk from objects on the line within the cross-industry collaboration framework
• Further investigate the risk and opportunities for safety improvement:
  – Accidents, incidents and precursor events
  – Key risk controls
  – Risk influencing factors and how they vary across the network
  – Changes over time
• Enhance the Safety Risk Model and Precursor Indicator Model
Understanding and improving risk controls

**Threats**

Preventing objects from obstructing a line open to traffic.
- E.g. project on maintenance equipment left foul

**Prevention barriers**

Identifying when objects are on the line (or there is a heightened risk) and putting operational mitigations in place.
- E.g. optimising the operational response to extreme weather events

**Top event**

Reducing consequences if a train runs into an object.
- E.g. research on guidance for derailed trains

**Mitigation barriers**

**Consequences**
Conclusions

• Objects on the line make a significant contribution to train accident risk in GB.
• Diverse range of causes with different controls and different “risk owners”.
• Risk can be reduced through prevention, identification and response, and consequence mitigation.
• GB rail benefits from a risk and evidence-based approach to safety management. RSSB is improving the structure and granularity of risk information to better support management of objects on the line.
• Understanding risk and prioritising improvement requires systems thinking and collaboration between functions, organisations and industry groups.
8 November 2023

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THANK YOU FOR YOUR PARTICIPATION!