This is a collation of some of the world's railway formal inquiry reports. It includes a brief incident synopsis, along with the main causes and recommendations from each investigation.

Readers may find some of the actions and recommendations useful to their own operations.

Co-ordinated by Greg Morse, RSSB

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Key issues in this edition:

- Environmental conditions
- Risk assessment (earthworks – failure to follow procedure)
- Driver error
- Driver training
- Trainee supervision
- Train dispatch procedures
- Lack of train protection
For the full report, click [here](#). 

In response to six landslips that occurred on Network Rail managed infrastructure between June 2012 and February 2013, RAIB undertook a wider review of earthwork issues related to land neighbouring the railway and to risk management during adverse weather. The landslips concerned occurred at Loch Treig (near Tulloch) on 28 June 2012, Falls of Cruachan (18 July 2012), Rosyth (18 July 2012), St Bees (30 August 2012), Bargoed (30 January 2013) and Hatfield Colliery (11 February 2013).

The landslips were caused by factors including heavy rain, absent or ineffective drainage and activities undertaken, or not undertaken, on neighbouring land. In several instances, trains were being operated without special precautions when there was a significant risk of encountering a landslip. Many of Network Rail’s earthworks were constructed with steeper slopes (and therefore a greater likelihood of landslips) than would be achieved with modern design procedures. Network Rail’s on-going earthwork improvement programme is unlikely to achieve modern criteria in the foreseeable future.

Network Rail’s process for managing the resulting earthwork risk includes consideration of risk arising outside the railway boundary. RAIB has found that, in some circumstances, key information provided by specialist staff examining earthworks is not considered when the slope management strategy is determined during evaluation. There is a lack of clarity about who should be carrying out visual checks for risks which can develop on neighbouring land between examinations which take place at intervals of up to ten years.

The mandated process for collecting information about neighbouring land is, in parts, difficult to implement and not usually followed. Recent technological developments could offer means of improving the collection of this information. The location and timing of landslips is difficult to predict but they are almost always triggered by relatively high rainfall. When the landslips described in this report took place, Network Rail’s adverse weather risk management process used forecasts of heavy rainfall to implement special precautions at locations where landslips were considered relatively likely. During the investigation, Network Rail has introduced a new process which also takes account of ground saturation and (in addition to likelihood) the possible consequence of a landslip.

**Recommendations**

- Network Rail should review and improve its processes for managing earthwork-related risk arising from neighbouring land, including associated drainage issues. This should provide a documented process which takes account of the extent to which it is practical and proportionate for Network Rail to review and/or rely on land management activities undertaken by neighbours. The new process should, where reasonably practicable:
  - Obtain relevant information from other sources where it cannot be collected by earthwork examiners (e.g., where examiners are unable to view areas due to access constraints, fences, etc);
  - Take advantage of opportunities offered by current technology to assess areas at risk from ground movement and areas where ground movements are occurring;
  - Provide a robust process for identifying, and responding appropriately, to activities on neighbouring land which have the potential to significantly increase risk to the railway between routine earthwork examinations; and
  - Take advantage of opportunities offered by real-time rainfall monitoring to issue alerts identifying heavy rainfall when this has not been forecast.
• Network Rail should review and improve its processes so that due consideration is given to all safety related information provided by earthwork examiners and earthwork engineers, including that associated with slopes categorised as marginal or serviceable.

• Network Rail should implement a process for the real-time collection (and appropriate use) of intelligence about very unusual rainfall or flooding conditions. Development of this process should take into account the differing risk levels on different parts of the infrastructure and should consider using the following information sources:
  o Emergency service control centres;
  o Other organisations involved in the provision and management of rail and non-rail transport;
  o Reports (encouraged by appropriate railway industry publicity) from on-duty and off-duty railway industry staff including those employed by train operating and maintenance companies; and
  o Rain gauge and other types of weather sensor capable of providing data in real time.

• Network Rail should complete initial development of its modified adverse weather earthwork management system. It should then alter its standards and, if necessary, other formal documentation to reflect the modified system. The updated documentation should include a process for the rapid updating of the ‘at risk’ register when significant risks become apparent.

• Network Rail should formalise the process for implementing additional mitigation if very extreme rainfall conditions mean that the mitigation normally provided in response to a red warning is inadequate for earthworks on the ‘at risk’ register and/or there is a significant likelihood of landslips at locations not included on this register.

Published 14 April

Canada: **Freight train derailment near Hardisty, Alberta, 28 April 2013**

For the full report, click [here](#).

At 03:55 (local time) on 28 April 2013, a Canadian Pacific freight train was proceeding westward when 17 of its 170 wagons (loaded with potash) derailed near Provost, Alberta. The train was travelling at 23 mph and was stopped by an automatic emergency brake application.

After making the necessary emergency broadcast and notifying the signaller, the driver performed an inspection and determined that the seventeenth wagon had been the first to come off.

Approximately 350 feet of track was destroyed. There were no reported injuries.

The Transportation Safety Board of Canada (TSBC) published the following causes and contributory factors:

• The derailment occurred when the train passed over a track irregularity due to a track subgrade failure.

• Due to the limited capacity of the drainage system, the water level was higher on the south side of the track relative to the north side, resulting in over-average water infiltration and saturation of the track subgrade.
The water flow through the track subgrade created a void below track level as ballast and subgrade material were lost from between and beneath the ties, reducing the capacity of the track to support the passing train.

The vertical force of the heavily loaded unit train on the poorly supported cribbed tie gap resulted in failure of the track structure.

It also noted that, if geotechnical hazards are not specifically identified and addressed, track structure degradation may occur, increasing the risk from derailments.

Published 15 April

Canada: Rear-end collision and derailment near Mai, Quebec, 11 January 2013

For the full report, click here.

At around 00:18 (local time) on 11 January 2013, a Quebec North Shore & Labrador (QNS&L) freight struck the rear end of iron ore train near Mai in Quebec, having passed a signal (1239) at danger. The leading locomotive on the freight was completely destroyed and the second locomotive derailed. Eight wagons on the iron ore train derailed. The freight crew sustained minor injuries. Approximately 40 feet of track was damaged.

The three-locomotive, 55-wagon, 3950-ton freight was being driven by a trainee, in the presence of a driver with over 20 years’ experience. Both were familiar with the territory and met fitness and rest standards. They had completed their previous turn more than 72 hours before their shift and had slept well the night before the accident. The trainee was undergoing practical training and had not yet received any formal training on the Canadian Railway Operating Rules (CROR).

Throughout the evening, the freight was following the iron ore train, which had departed about 30 minutes before the former. The latter had stopped at a signal while its crew cleared snow that prevented the remote operation of the points that provided access to a siding.

The Transportation Safety Board of Canada (TSBC) noted that more robust cab sheeting, along with the presence of collision posts, corner posts and anti-climbers, would have minimized damage to the cab and afforded more protection for the crew. It added that the absence of regulations requiring improvements in crashworthiness for locomotives built before 1997 increases the risk of injury for crew members and the risk of damage being sustained by such locomotives during an accident.

The TSBC confirmed that the freight, having passed the signal (1239) at 40 mph, was unable to stop before colliding with the stationary iron ore train, despite an emergency brake application.

It also listed the following causal and contributory factors:

- Given the conversation with the signaller a little less than one hour before the collision, and despite receiving an alarm, the crew continued to believe that the iron ore train would be in the siding at Mai and that signal 1239 would not be at danger.

- Because the driver did not expect 1239 to be at danger, and because he trusted the trainee, he did not intervene to control the speed on approaching the signal.

- The trainee had not yet received Canadian Railway Operating Rules (CROR) training; he therefore had limited signal experience and did not have a complete grasp of the measures required for the situation in which he found himself.
Given that the proximity detection device (PDD)\(^1\) screen in the signal box does not show the actual separation distance between two trains moving in the same direction, the signaller did not fully appreciate that a collision was imminent.

Since the trainee acknowledged the without reading the data concerning the iron ore train, he maintained a high speed and was therefore unable to stop the train in time.

The TSBC also added the following findings as to risk:

- In the absence of additional physical fail-safe train controls in signalled territory, the existing defences proved inadequate to prevent the collision.

- Considering the sightline distance to signal 1239, it would be impossible for a train, traveling at the permitted speed, to follow the signal indication once it became visible, thereby increasing the risk from collision.

- In the absence of adequate CROR training and overlearned procedures, engineer trainees lack sufficient means to operate trains safely, which increases the risk of accident.

- Without an instructor training program, it is difficult to ensure that knowledge and good practices are properly transferred to driver trainees so they can operate trains safely.

- The absence of any regular re-evaluation of drivers’ skills means that unsafe engineer practices that may increase the risk of accident cannot be identified.

- The absence of regulations requiring improvements in crashworthiness for locomotives built before 1997 increases the risk of injury for crew members and the risk of damage being sustained by such locomotives during an accident.

**Safety action**

On 16 January 2013, the TSBC issued a Rail Safety Advisory Letter to Transport Canada (TC) regarding the importance of comprehensive training for safe train operations. The TSBC suggested that TC review the training provided to driver trainees at QNS&L given the determination that the trainee who operated the incident train had not received formal CROR training and had not completed his practical training phase.

On 22 February 2013, TC issued a Notice of Danger to QNS&L, citing the risk from operating a locomotive without CROR qualification. On the same date, Transport Canada issued a Notice of Danger to QNS&L, citing the risk from having a driver trainee operate a locomotive alone.

In response to a TSBC Rail Safety Advisory Letter, TC indicated on 5 March 2013 that its Quebec Regional Office had begun an in-depth review of the training and supervision of QNS&L employees.

Within the scope of its risk-based business planning process for 2013-14, TC has increased supervision of QNS&L operations. Also, in the summer of 2013, TC audited QNS&L’s safety management system (SMS) with a focus on the training programmes for drivers and instructors, supervision of drivers, supervision of driver trainees, and the corrective actions implemented in the wake of this accident.

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\(^1\) The PDD warns the driver about the presence of any other rail vehicle within a specified distance. It is equipped with a GPS that can determine the position, direction and speed of any other tail vehicle fitted with the device.
Czech Republic: SASSPAD at Postřelmov station, 31 August 2013

At 14:18 (local time) on 31 August 2013, a long-distance passenger train passed a signal at danger at Postřelmov station and passed over a nearby level crossing that was still open to road traffic. There were no reported injuries.

The Rail Safety Inspection Office (RSIO) concluded that the SPAD was caused by the driver failing to check the signal before starting the train, but added that the absence of a train protection system was a contributory factor.

It said that the underlying cause was the removal of the train dispatcher from at Postřelmov station in March 2012, despite a number of previous incidents and RSIO warnings about the risks associated with this plan of action.

Recommendations

- The infrastructure manager should:
  - Expedite the fitment of ETCS on the route and plan for its fitment to other main and regional lines;
  - Install ‘train stop’ equipment at signals to reduce the risk from SPADs on lines where ETCS is not to be introduced;
  - Not allow the dispatch of passenger trains by signal alone at staffed stations;
  - Not increase the number of stations where passenger trains are dispatched by signal alone.

- The railway undertaking should:
  - Expedite the installation of the vehicle-mounted components of ETCS, in order to allow full ETCS functionality as soon as the infrastructure is ready;
  - Modify technological procedures in order to the train driver of the leading rolling stock of the train with passengers in a place for entry and exit of passengers at the station where the departure of the rolling stock is allowed only by using of signal always initiated before putting of the train in motion warning signal which will be given verbally, by signalling tool or technical equipment with incorporation to share obligation of verification of position of the main signal to signal allowing movement of the train by leader board staff.

- The Czech National Safety Authority should ensure the above recommendations are implemented.