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.

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Contents: (click to navigate)

Rail
Italy: Freight train derailment at Villa San Giovanni, 15 January 2011
Italy: Empty coaching stock derailment at Napoli Centrale, 31 July 2011
Slovak Republic: Passenger fall from moving train at Nové mesto nad váhom, 17 December 2011
Belgium: Fatal SPAD and collision near Buizingen, 15 February 2010
UK: Safety incident between Dock Junction and Kentish Town, 26 May 2011
UK: Train door incident at London King’s Cross, 10 October 2011

Tram
UK: Fatal accident at Piccadilly Gardens, Manchester Metrolink, 5 June 2011

Key issues in this edition:

- Inadequate point maintenance
- Passenger behaviour
- Adequacy of on-board safety notices
- Train dispatch
- Rail regulation and failure to consider safety holistically
- Rostering and fatigue
- Lack of driver reminder devices and train protection
- Poor decision making
- Passenger use of social networking sites
- Failure to follow rescue procedures
- Communication with passengers during degraded operations
- Door edge seal design
Declared to ERA 4 May

*Italy: Freight train derailment at Villa San Giovanni, 15 January 2011*

At 01:30 (local time) on 15 January 2011, a freight train derailed on a set of points at Villa San Giovanni. There were no reported injuries, although there was damage to track and rolling stock.

The investigation concluded that the derailment was caused by inadequate point maintenance and the inadequate application of procedures.

**Recommendations**

- The infrastructure manager should ensure that the procedures, implemented in the area where the accident occurred, will solve technical abnormalities when detected or reported.
- The National safety Authority should verify the correctness and effectiveness of the procedures included in the operator’s Safety Management System, with particular regard to the activities of those involved in maintenance checks.
- When accidents or incidents occur, the infrastructure manager should immediately identify and preserve the affected area to allow investigations to be carried out accurately and quickly, thus minimising delays to services.

Declared to ERA 4 May

*Italy: Empty coaching stock derailment at Napoli Centrale, 31 July 2011*

At 16:02 (local time) on 31 July 2011, two cars of an empty coaching stock formation derailed on pointwork at Napoli Centrale. There were no reported injuries.

The investigation concluded that the derailment was caused by poor point maintenance.

**Recommendations**

- The National Safety Authority should ensure the infrastructure manager corrects and improves its maintenance regime at Napoli Centrale, focusing on the state of the sleepers, the geometry of the rail, and the thermal expansion joints and battens.
- Given that similar events have occurred in other yards on the Italian network, and that the wheel-rail interaction at low-speed appears to play a substantial role, the National Safety Authority should strengthen its measures for checking the status of pointwork in yards across the Italian network, focusing on the elements noted in the previous recommendation.
- The National Safety Authority should start a study on the effects of different levels of lathe work on wheel treads in relation to the wheel-rail interface.
- When accidents or incidents occur, the infrastructure manager should immediately identify and preserve the affected area to allow investigations to be carried out accurately and quickly, thus minimising delays to services.

Declared to ERA 9 May

*Slovak Republic: Passenger fall from moving train at Nové mesto nad váhom, 17 December 2011*

At 19:11 (local time) on 17 December 2011, a passenger fell from a train whilst it was moving at Nové mesto nad váhom station. The passenger died from their injuries.
The investigation found that the victim had been a foreigner, who did not 'observe caution adequate to the character of the railroad operation' and who perhaps did not understand the safety notices on board the train.

**Recommendations**

- The vehicle owner should take measures for controlling the functionality of closing and locking the carriage doors on ‘B’ series stock.
- The vehicle owner should take measures to improve the standard of on-board safety notices.

**Declared to ERA 22 May**

**Belgium: Fatal SPAD and collision near Buizingen, 15 February 2010**

At 08:28 (local time) on 15 February 2010, two SNCB services collided between Hal and Buizingen, near Brussels. Nineteen people were killed and 79 were injured. The driver of passing train stopped to raise the alarm and summon the emergency services.

The accident caused severe damage to OHLE, leading to disruption on high-speed services between Paris and Brussels.

The investigation determined that the accident was caused when a northbound long-distance train (E3678) passed a signal at danger after leaving Hal station. Ahead, a late-running commuter service (E1707) was switching tracks. The two collided laterally.

At around 08:26, E3678 had completed its stop at Buizingen's unstaffed station. Having been informed that all boarding and alighting was complete via the 'lamp door' in the cab, the driver pulled away with full acceleration. It is almost certain that at this moment the main signal, 335 metres ahead of the platforms, was red. The driver had received and cleared the warning received when he passed the previous signal (double yellow), 590 metres before the station.

E3678 passed the red signal at approximately 60km/h and continued to accelerate. The driver then noticed that E1707 was crossing its path. He sounded the horn several times and applied the emergency brake, but to no avail.

The investigation concluded that the accident revealed ‘a failure of the fundamental safety principles of the railway system in which drivers must respect signals at danger’.

The team found signal sighting to be good concluded that there were no physical or physiological issues with the driver, who was not colour blind, not distracted, not suffering from stress and not abnormally tired at the time of the incident.

A study of the driver's timetable of service over the 45 days leading up to the accident ‘did not show an accumulated sleep deprivation’. The ‘only significant element likely to affect the driver's concentration level [was] the loss of sleep brought about by an early morning (03:30) to start his shift on the morning of the accident.’ However – regarding the psychological and, in particular, cognitive aspects of the driver’s activity, the operational context that he experienced provided some possible explanations for the SPAD:

- The booked stop at the unmanned Buizingen station may have caused the driver to forget that the previous signal had been a caution (double yellow) and that the next would therefore be red (‘even more so as no external memory aide was provided’).
- Driving routinely ‘on the yellow’ may have led the driver to lose the association between a cautionary aspect and a subsequent stop aspect.
The means of conveying to drivers that platform operations are complete differs and can create confusion. Furthermore, conveying this information before the line is clear encourages the ‘start against red’ situation.

In brief, 'these elements together suggest that the driver reacted to the lamp door with an automatic reflex and subsequently created an incorrect image of the situation in which the signal was symbolically clear and could only be seen as "green"'. Thus the investigation team suggested the following:

- Removing the interruption of the double yellow-red signal sequence by station stops;
- Standardising the way that drivers are informed that platform operations are complete;
- Sending this information after information about the state of the line ahead; and
- Taking into account the risk from fatigue caused by shift rostering patterns.

The report also notes that ‘the scenario of the SPAD’ is well known and acknowledges that much work has been done over many years to mitigate the risks. The accident therefore confirms the existence of ‘background noise’ related to passing signals at danger, ‘linked to the limits of human reliability’. Yet the report suggests that, as human performance has been found to be generally good in Belgium, the rise in SPADs year-on-year is in down to a rise in passenger traffic. This means that drivers ‘meet’ more signals during each shift than hitherto.

The best solution to the SPAD problem would be to install ATP. This is increasingly being used in Belgium, but is not yet fitted on the line in question.

‘An additional solution would be to equip the system, in addition to the automatic functions, with a real capacity to recover the overrunning of signals at danger. This is practically non-existent today: nothing indicates the overrunning of a signal at danger to the driver or signaller; the signaller has no means of action which is sufficiently fast, etc.’

The report hints that the Belgian infrastructure managers have not acted with sufficient speed in tackling SPADs with technology, making the following points:

- There is, traditionally, a ‘reactive’ culture in the Belgian rail industry, dealing with accidents case-by-case and based on the expectation that everyone follows the rules. Therefore logically, failures of front-line operators tend to be seen as the ‘explanation’ for accidents. The industry does not take a holistic view and assumes the main onus to be on the driver.
- This focus on the driver meant that the industry acted slowly in its fitment of ATP, as it under-appreciated the safety benefits of investment.
- The industry did not question itself enough and became complacent in the way it managed safety. It experienced difficulty in taking strategic, long-term decisions and in implementing new initiatives.

The investigators also noted a certain weakness of the Belgian NSA, although it is the only body which can impose an overall integrated vision external to the interest of the operational side of the industry. The NSA also delegates too much safety management responsibility to the infrastructure manager (Infrabel). This is the direct result of the fact that the NSA took a long time to be set up and ‘find its feet’. Red tape also played a part in delaying the establishment of the Authority.

‘The application of the EU directive has obliged the NSA to formalise a risk management process. Progress was made, but the knowledge and ownership of risk management methods and systematic analysis, and the response to accidents and incidents, could still be improved.’

As a result of the accident, Infrabel and SNCB have proposed a fast-track equipment plan for implementing TBL1+ (an ATP system) by the end of 2015. This is an ‘emergency recovery plan’, which will address the need to reduce SPAD risk. However, TBL1+ is not a ‘fully supervised’ system, therefore its set-up and implementation on the Belgian network can only be a short-term solution. A longer-term solution will be possible when ECTS is implemented, as planned.
Recommendations

- Infrabel and SNCB should provide a detailed action plan for responding to the various recommendations within a maximum of three months. The plan should include an estimation of the time it will take to close out said recommendations.
- The National Safety Authority has (SSICF) has verified the need to distribute the recommendations to other railway undertakings.
- SNCB and Infrabel should take concrete steps to prevent collisions resulting from SPADs and reduce the consequences of collisions between trains.
- SNCB and Infrabel should implement measures to reduce the number of SPADs, and their short- and long-term consequences, in a systematic way.
- SSICF, in coordination with the service or services concerned within FPS Mobility and Transport, should provide a follow-up to the deployment of ETCS with an overview of the development of safety, with the intention of checking that the rate of deployment is being respected, and at the same time check that the transition, and in particular the deactivation of existing systems, is not being done to the detriment of safety.
- Infrabel and SNCB submit to SSICF a review of their Safety Management Systems manuals to positively develop and take the appropriate measures to compensate for the insufficiencies identified in the investigation report.
- Infrabel and SNCB should remind staff to respect the instructions for access to an accident site, to remind personnel that taking measures, or carrying out repairs is forbidden without prior authorisation from the judicial authority and/or the investigation body, and that access should be strictly limited to the emergency services and to the investigators.
- Infrabel and SNCB should adjust their emergency plans for the evacuation trains in accordance with the lessons learned from this accident.
- Infrabel should review its priorities for informing parties to allow everyone to carry out their duties after an accident.
- Infrabel is recommended to propose an amendment to its safety management manual, in order to ensure respect of the periodic signal maintenance and of its clear-cut traceability.
- When designing new track layouts, or upgrading existing ones, Infrabel should limit the risk that an authorised and travelled route may be crossed or result in conflicting movements in cases of SPADs.

Thanks to Helen Bataille for the initial translation of this report.

Back to top

Published 23 May

*UK: Safety incident between Dock Junction and Kentish Town, 26 May 2011*

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

At around 18:26 on Thursday 26 May 2011, a First Capital Connect service from Brighton to Bedford lost power and became stranded between St. Pancras and Kentish Town. Almost three hours elapsed before the train, with its passengers still on board, was assisted into Kentish Town station.

During the period that the train was stranded, conditions for passengers became increasingly uncomfortable because the train was heavily loaded and the air-conditioning and toilets stopped working at an early stage. Some passengers opened doors to improve ventilation and passenger alarms were repeatedly activated.
The strategy for rescuing the stranded train was to bring another unit onto the front and haul it into Kentish Town. The arrival of the assisting train was delayed and it did not couple onto the front of the failed train until around 20:20. During the next 50 minutes, the driver of the combined train tried to complete the arrangements necessary for its movement into Kentish Town. He was hampered by further operation of alarms by passengers frustrated at the continuing delay, and his uncertainty over the status of the doors (open or closed) on part of the train. A small number of passengers started to alight from the train.

Eventually, the driver over-rode a safety system in order to move the train. At the time when the train moved a short distance for the driver to test that it was properly coupled, some passengers were still alighting from the train to the track. When the train subsequently moved into Kentish Town, it did so with at least two doors open.

RAIB’s investigation found that options for evacuating passengers, other than the use of an assisting train, had either been discounted or had not been briefed to those staff responsible for developing the rescue strategy on the day. There had been very little communication with passengers during the incident because the public address system on the train failed about 45 minutes after the train became stranded. Previous incidents of a similar nature had been investigated by First Capital Connect, but actions had not been taken on the findings.

Recommendations

- Train operating companies and Network Rail routes over which they operate, should review existing protocols, or jointly develop a new protocol, for stranded trains in accordance with the contents of the ATOC / Network Rail Good Practice Guide *Meeting the needs of passengers when trains are stranded*. The protocols should also consider:
  - The key findings from this investigation;
  - The different arrangements in place for the interface between Network Rail and train operators’ control functions;
  - The different approaches to managing incidents and good practice applied in different parts of the main-line and other railway networks;
  - The need to identify who will take the lead role in managing the incident and how key decisions will be recorded and shared between the affected organisations;
  - The need to provide on site support to the traincrew of such trains in managing passengers’ needs
  - The need to provide technical support to the train crew of stranded trains, with a particular focus on means of communicating and the need for coordinating the technical and operational response to such incidents;
  - The need to recognise when minor operational occurrences have the potential to develop into major incidents unless decisions are taken in a timely and decisive manner;
  - The views of passenger interest groups and emergency services: and
  - The positive and negative role that can be played by social networking sites in the management of such incidents

- First Capital Connect should carry out a review of its management processes referred to in this report to examine why it did not identify and address deficiencies in emergency preparedness prior to the incident. The lessons learnt from this review should lead to changes in management systems to provide confidence that all such deficiencies will be identified in the future.

- Network Rail and the train operators should amend their processes so that safety lessons identified during Significant Performance Incident Reviews and other incident review processes can be effectively monitored through to closure, and actions taken as appropriate. The process...
should also include a mechanism for advising other railway operators of safety lessons that may be relevant to them.

Published 30 May

**UK: Train door incident at London King’s Cross, 10 October 2011**

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

A passenger became trapped in a train door and was pulled along a platform for a distance of approximately 20 metres at King’s Cross on 10 October 2011. She suffered bruising to the fingers of her left hand.

The passenger’s hand became trapped when she attempted to board the train while the doors were closing. The train started to move before her fingers were released because a member of staff on the platform did not fully check the train doors before giving the ‘right away’. The requirement to check doors is given in the Rule Book.

It is possible that the passenger could have withdrawn her fingers from the doors before being pulled along the platform, if alternative door edge seals had been fitted on the Class 365 involved in the incident.

When the passenger alarm was operated, the train did not stop immediately because the driver decided to continue to the next station. This decision had no effect on the incident, but was contrary to the Rule Book and, in slightly different circumstances, could have increased the severity of the accident.

RAIB has identified two learning points re:

- The importance of fully checking train doors before trains depart; and
- The need for drivers to stop trains immediately if the passenger alarm is operated when any part of the train is within a station.

**Recommendations**

- Eversholt Rail UK (Ltd) should determine whether the next planned replacement of Class 365 door seals provides an opportunity to modify the seal arrangements to reduce the risk associated with trapping of objects and people to be as low as reasonably practicable. If such modification is found to be reasonably practicable, Eversholt Rail UK (Ltd) should:
  - Determine whether a similar modification is appropriate for other classes of train owned by the Eversholt Rail Group;
  - Determine whether such modifications should be applied if seals require replacement before the scheduled date; and
  - Make available to other train owners suitable and sufficient information for these owners to establish whether a similar approach should be considered for any of their train doors.

Published 20 May

**UK: Fatal accident at Piccadilly Gardens, Manchester Metrolink, 5 June 2011**

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

At 00:16 on 5 June 2011, a Manchester Metrolink tram struck and fatally injured a pedestrian.

The tram was approaching Piccadilly Gardens at around 9 mph when a pedestrian ran into its path. The pedestrian appeared to become aware of the tram and tried to stop before reaching the track, but fell...
directly in front of it. Although the tram had started to brake before reaching the pedestrian, it did not come to a complete stand before the pedestrian had come into contact with the under-run protector (a device that projects down from the underside of the tram and is designed to prevent pedestrians from being crushed under the wheels).

Recommendations

- UK tram operators should work together to improve the data collection on tram front end collisions with pedestrians. This is to include greater detail on the type and severity of any injury received as far as possible, and the likely points of contact with the tram.

- UK tram operators in conjunction with UKTram (as a representative body of UK light rail operators), and in consultation with tram owners, should undertake research into the potential for the reduction of injuries to pedestrians involved in front-end collisions with trams. Operators should understand the likely ways in which pedestrians can come into contact with the fronts of trams, and the severity of any consequential injuries. Should this research show that it is appropriate to implement design changes, either to existing trams or emerging new designs, these should be done.