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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Key issues in this edition:

- Location knowledge
- Competence
- Sighting (vegetation)
- Use of access points
- Use of train horn
- Lack of noise made by coasting electric traction
- Briefings
- Possible mobile telephone distraction
- Rostering
- Fatigue
- Over-reliance on mathematical models
- Detonator storage
- Change management
- Trackbed integrity
UK: Member of staff struck by train near Poole, 12 July 2013

For the full report, click here.

At around 10:40, a signalling technician, walking alongside the track near Poole High Street level crossing, was dealt a glancing blow from behind by a train travelling at about 15 mph. The technician sustained minor injuries and did not require hospital treatment.

RAIB found that the accident occurred because the technician did not remain alert to trains. He had been briefed that trains could run in both directions on the adjacent line, but had not registered this as a likely event because he had not seen it happen in that area before. (Although he had been working there for two weeks, he had only done about 30 minutes' work on the line east of Poole level crossing before the day of the accident.)

The train involved was an electric multiple unit (EMU), which was very quiet while coasting; it was also running slowly, so there was very little noise transmitted through the rails. There was some background noise from the surrounding area, but the level crossing alarms stop sounding once the barriers are fully down, so were silent as the train approached.

The train driver had sounded the horn when he first saw the group, but did not do so again. He was not required to do so when starting away from a signal, and the driver did not notice anyone walking alongside the track, although the technician was about 50 metres away from the rest of the group when he was struck. RAIB has been unable to establish why the driver did not notice him. There is no evidence of anything likely to have distracted the driver at the time of the incident.

The technician had to follow an erratic path to avoid obstacles close to the line, such as vegetation and lineside signs. If the vegetation had been cut back (as was done after the accident), he would have had to spend less time in a position where he was foul of an approaching train.

He legitimately chose to walk along the lineside, because he believed that this would save time and a considerable detour in his route back to the local depot. In fact, there is an alleyway between shops that would have allowed him to reach his destination almost as directly as the lineside route, but he was unfamiliar with the area and unaware of its existence.

RAIB has identified the following key learning points:

- **For staff working on or near the track**
  - The need to be vigilant at all times when walking or working close to the line.
  - The importance of using authorised access points to get on or off the railway, and thus minimising the distance people need to walk alongside the line (Rule Book, Handbook 1, section 3.1).

- **For train drivers**
  - The need to sound the train's horn as it approaches each group or individual, unless it is clear that all people on or near the line are aware of the train's approach (Rule Book, module TW1, section 10.2).

- **For infrastructure managers**
  - The importance of controlling vegetation close to the track which may obstruct the safe walking route along the cess.
UK: Track worker struck and seriously injured at West Drayton, 31 July 2012

For the full report, click here.

At around 10:37, an Oxford–Paddington service was travelling between West Drayton and Hayes & Harlington, when it struck and seriously injured a track worker acting as a lookout. The lookout had his back to the train which struck him and he was not standing clear of the line (his right foot was approximately 0.5 metres from the nearest rail).

RAIB identified inconsistencies between the paperwork filled in by the Controller of Site Safety (COSS) and site activities. However, these did not contribute to the accident.

The Safe System of Work (SSoW) briefing record acknowledgement was signed by the injured party, but there is conflicting witness evidence as to whether he was given a full site safety briefing before starting work. His previous experience in the role of COSS at this location meant that, even if no formal briefing took place, he should have been aware of the likely content of such a briefing. This may have given sufficient confidence for him to sign a briefing acknowledgement, and for the COSS to accept the signature without a specific briefing being given.

The COSS had identified a location along the track where the lookout could undertake his duty safely in accordance with Network Rail procedures. The COSS did not explicitly demonstrate to the intermediate lookout how far he should stand from the track. However, the rules governing the work of intermediate and distant lookouts clearly state that they should always stand in a position of safety.

The lookout had not anticipated being required to undertake safety critical duties that day and was transferred, with little warning, from an environment that he perceived to be less hazardous in the yard. The injured party has stated that while in the yard, he had been using his mobile phone to try and resolve some personal issues. He continued to think about these when deployed as a lookout.

Forward-facing CCTV images taken from the train moments before the accident shows the injured party looking towards London with his body at a near right-angle to the track while holding his flags rolled together in his left hand. In this position, he was facing directly away from trains approaching on the adjacent line. This difference from his normal working practice could indicate that he had not fully engaged with the duties of a lookout.

Witness evidence shows that the injured party’s mobile phone was found on the trackside immediately after the accident in a position indicating it was probably in his hand when he was struck by the train. The injured party cannot recall events immediately before the impact and could not positively account for the location of his mobile phone when he was struck.

Telephone records show that the mobile phone sent and received a small amount of data during the time the lookout was on the track. It has not been possible to identify whether this data was messaging, internet data or passive background updates of the device without the owner’s intervention. The same records do show the device was not used for voice calls during this period. Although it is possible that the lookout checked his mobile phone while on track, no other track workers recalled seeing him use his phone and the telephone records indicate little or no interaction with the device.

While mobile phone use is likely to act as a distraction to users, there is no definitive evidence that this was a significant factor in the lookout not realising he was standing in an unsafe position.

It has not been possible for RAIB to determine exactly when, or if, the horn of the train involved in the accident was sounded in a position where it could have warned the injured party about the approaching train. Post-accident testing of the train showed that the on-train data recorder (OTDR) did not reliably record all horn blasts, as it is possible to move the operating lever far enough to sound the train horn, but not far enough to operate the OTDR input switch. Witness evidence and earlier RAIB testing on a similar horn shows that this is a typical characteristic of the type of train involved in the accident.

The driver was aware that the lookout had not acknowledged the approaching train, but did not sound an urgent warning because the lookout appeared to be clear of the line.

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The train was on a curved section of track as it approached the injured party and in these circumstances it can be difficult for a driver to be certain whether somebody is clear of the track until the train is close to that person.

Neither the injured party nor the other trackworkers recall hearing a horn blast after the train had passed the survey team. The COSS was the nearest person to the injured party and did not recall hearing the horn while returning to the survey team, but he may have been unable to hear due to the noise of the train passing him. The CCTV showed no indication of the lookout responding to a horn blast.

RAIB does not consider the number of track workers in the vicinity of West Drayton to have been a factor in this accident. However, it has witnessed both members of work groups and lone track workers in the Reading to London Paddington area not acknowledging warnings from approaching trains. Other drivers state that this happens so often that they do not consider it appropriate to give an urgent warning every time.

RAIB did not conduct a full investigation as it does not believe that an investigation would identify new safety learning. However, the accident illustrates the importance of applying existing safety knowledge, particularly the following learning points:

- Network Rail and other organisations engaged in activities involving work on the railway are advised, as part of their routine briefings, to remind their staff that:
  - Staff working on or near the line must focus on the task in hand and not be distracted by other thoughts or use of a mobile phone. If any staff feel that they cannot concentrate on this task, they must move to a position of safety and tell the person in charge that they cannot do the job safely and ask to be relieved; and
  - When acting as a COSS, even when instructing an experienced co-worker, a full briefing must be given to everyone to give assurance that people are aware of the safe system of work and have fully engaged with implementing it; and
  - While on or near the line, track workers must acknowledge any warning given by an approaching train so that the driver is better able to judge whether there is a need to sound an additional urgent warning.

- Train operating companies are advised, as part of their routine briefings, to remind all drivers that:
  - When sounding warnings to people on or near the line, they should pay particular attention to lookouts and other staff who may be remote from a main group; warnings should start with a blast on the high and the low tone horn (in the loud setting where soft or loud settings are provided), followed by short sharp blasts where no acknowledgement is received or the track worker remains in a dangerous position; and
  - Train drivers approaching track workers in areas of curved track should appreciate that it can be difficult to see whether these people are in a position of safety until they are close to the individual concerned. If there is any doubt a warning should be sounded.
  - Train operators should endeavour to improve the availability and quality of forward and rear facing closed circuit television recordings because this assists in the evidence gathering needed for safety learning.

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Worldwide FI Summary

Published 15 November

Australia: Multiple SPAD by freight train at Hurlston Park, NSW, 30 January 2013

For the full report, click here.

On 30 January 2013, a Nowra–Orange freight passed two signals at danger on the Down Goods line between Dulwich Hill and Hurlstone Park in Sydney. Just prior to this incident, two persons from a litter pickup work crew were on the track just before the train passed through their worksite. Once alerted to the train’s approach they moved to a safe place behind the platform at Hurlstone Park. There were no reported injuries or damage.

The Australia Transportation Safety Bureau’s investigation found that the train crew did not take action in response to the indications of three consecutive signals, resulting in the SPADs. It was found that the more senior co-driver had inadvertently fallen asleep on the approach to these signals. The trainee driver, in a reduced state of alertness, missed the first signal at caution, and the next signal at stop. He applied the brakes once the train passed the final signal at stop after realising this signal applied to his train.

A number of Pacific National’s policies and procedures were examined to determine if any area of the management or training of the train crew contributed to the incident. Fatigue management, and in particular over-reliance on the use of bio-mathematical model scores used to roster train crew, was one area where improvement was needed.

The ATSB also found that there was an absence of adequate procedures and training for drivers who were performing co-driving duties while coaching trainee drivers.

What's been done

As a result of the incident, Pacific National has undertaken a range of actions to improve its approach to fatigue management and the implementation of fatigue training. They have also commenced a review of SPAD risk management processes and training requirements for coach/tutor drivers. A trial has commenced of improved data loggers.

Recommendations

- Pacific National's fatigue management system is over-reliant on the use of a bio-mathematical model to predict individual fatigue risk, being based principally on rostered work hours without due consideration to higher level fatigue risk management strategies.

  Pacific National is in the process of releasing an updated Fatigue Management Standard to meet the requirements of Regulation 29 of the National Law. Pacific National Bulk rail will consider the appropriate use of these bio-mathematical tools as part of the fatigue risk management review process. The ATSB notes the response provided and is satisfied that the action initiated by Pacific National will, when completed, address the safety issue.

- Pacific National division did not provide training on fatigue management to the driver.

  Pacific National has commenced a review of the delivery and implementation of fatigue training to safety critical personnel to ensure relevant personnel have received the appropriate training. The ATSB notes the response provided and is satisfied that the action initiated by Pacific National will, when completed, address the safety issue.

- Pacific National does not provide coach/tutor drivers with sufficient training and direction as to how to perform their role.
Pacific National will review training requirements for coach/tutor drivers and is currently considering development of a more comprehensive coach/mentor training package. In addition Pacific National Rail is currently reviewing an improved system called JobReady to assist in the management and monitoring of training via personalised training plans based on job roles. The ATSB notes the response provided and is satisfied that the action initiated by Pacific National will, when completed, address the safety issue.

- Pacific National’s SPAD strategy focuses on individual crew actions and the costs of SPADs, rather than developing integrated error tolerant systems of work with regard for the broader systemic issues known to contribute to SPAD events.

Noting previous comments in regard to the purpose of the SPAD Strategy document, Pacific National has commenced a review of its existing SPAD risk management processes and will consider the findings of this report. The ATSB notes the response provided and is satisfied that the action initiated by Pacific National will, when completed, address the safety issue.

Published 19 November

Ireland: Fog signal activation in DART driving cab at Bray, 6 March 2012

For the full report, click here.

At 08:00 on 6 March 2012, a DART service from Greystones to Malahide was stationary at Platform 2 at Bray, awaiting a driver change over. The relief driver entered the driving cab at 08:10, intending to take the train to destination.

As the driver put his leather bag on the floor of the cab, 11 of the 12 fog signals (‘detonators’) in the bag exploded. The driver sustained injuries to his hand and suffered some temporary loss of hearing. The cab interior was superficially damaged.

The emergency services were soon on the scene and initially the occurrence was declared a suspected scene of crime by An Garda Síochána (Garda); as a result, the Explosives Ordinance Department of the Defence Forces Ireland were tasked to undertake an examination.

The site was declared safe at 13:30. Subsequent enquiries by the Garda established that the explosion was not the result of a criminal act.

During the Rail Accident Investigation Unit’s investigation, it was found that the fog signal supplier had changed the signals supplied to Iarnród Éireann (IÉ) to a less robust type. IÉ had not been notified of this change and had not noticed the difference in fog signals until after the accident.

Although the immediate cause of the explosion could not be ascertained, the RAIU identified the following causal, contributory and underlying factors:

- The Alsetex fog signals supplied to IÉ by Lacroix were not as robust as the Lacroix fog signals requested by IÉ;
- IÉ did not notice that the Alsetex fog signals provided to them were not the Lacroix fog signals that were ordered.
- The fog signal storage tube, designed by IÉ, allowed the fog signals to impact on one another which may have caused them to degrade over time;
- IÉ did not risk assess the storage and transportation of fog signals outside of Central Stores;
IÉ had not introduced any training to staff in the handling of fog signals; and

IÉ did not have a process in place for the checking of parts when they arrive at Central Stores.

Recommendations

IÉ should ensure that their procurement and quality control processes verify that goods received are of the correct specification as those ordered.

IÉ should introduce appropriate procedures and standards for the safe issue, storage and transportation of fog signals.

IÉ drivers should receive adequate training in the safe handling of fog signals.

Declared to ERA 20 November

Czech Republic: Freight train derailment near Karlovy Vary, 26 February 2013

For the full report, click here (includes summary in English).

At 11:45 (local time) on 26 February 2013, six wagons of a freight train derailed between Karlovy Vary-Dvory and Karlovy Vary.

There were no reported injuries.

The NIB found that the incident had occurred due to track buckling, caused by the poor condition of the local subsoil.

Recommendations

None issued.