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:

- Driver behaviour
- Driver and trainee driver supervision
- Permissive working
- Management training
- Buffer stop collisions
- Non-standard working methods
- Poor knowledge sharing between infrastructure manager and operators
- Poor perception of risk
- Non-compliance
- Poor management check function
- Poor concentration
- Use of TMO level crossings
UK: Passenger train collision at Norwich station, 21 July 2013

At 00:11 on Sunday 21 July 2013, a passenger train carrying 35 passengers collided at 8 mph with a train stabled in Platform 6 at Norwich station. Eight passengers required hospital treatment.

RAIB concluded that the accident occurred because during the last 20 seconds of the driver’s approach to the station, he either had a lapse in concentration or a microsleep.

RAIB identified some factors which may explain the driver’s possible lapse in concentration (ie the noise made by the passengers immediately behind his cab and the various thoughts occupying his attention at the time of the approach). RAIB also found that the driver had a previous operational history indicating that he was prone to lapses in concentration, and that this had not been identified by Greater Anglia’s competence management system.

Greater Anglia’s investigations of the previous incidents in which the driver had been involved had not raised any concerns about the driver’s ability to maintain concentration. This was because the driver manager who carried out the investigation had not been trained to consider that incidents, seemingly different in nature, could be linked by underlying behavioural issues. Opportunities to formally review the driver’s operational history were missed and this was also not identified by the internal audits conducted by Greater Anglia.

Furthermore, the driver was tired through a short-term lack of sleep, and his performance might also have been affected by the prescribed medication that he was taking. These could have been other factors leading to a lapse in concentration, or they could have led to the driver having a microsleep.

RAIB also observed that:

- The risks associated with permissive moves at Norwich station had not been assessed in accordance with the requirement current at the time of the accident;
- The line remained open to train movements for 24 minutes after the accident because it had not been reported to the signallers in Colchester; and
- Greater Anglia’s fatigue management system predates the latest guidelines from the ORR on managing the fatigue of rail staff.

In addition, RAIB identified two learning points for the railway industry:

- In accordance with the Rule Book section relating to general safety responsibilities, it is important for railway employees to advise the signaller of all accidents and incidents even when there appears to be no immediate risk to the safety of the line; and
- It is important to provide a full and accurate account of medical conditions, medical history and prescribed medication during consultation with an occupational health professional.

Since the incident, the driver has been taken to a stage 2 Safety Performance Review, where a decision was made to permanently restrict him from train driving.

On 19 August 2013, Greater Anglia re-issued its briefing note to all station staff (supervisors and Duty Traincrew Managers (DTMs)) on the length of each platform at Norwich station and the maximum number of vehicles that can be accommodated. Station supervisors and DTMs were asked to sign a form to confirm that they had read and understood the briefing note. However, RAIB has been informed that, since then, there have been further reported instances when six vehicles have been accommodated in Platform 6.

In November 2013, Greater Anglia started a 12-week programme of training driver managers and driver instructors on non-technical skills. Greater Anglia stated that it plans to roll out this training to its drivers taking account of the experiences of other train operating companies in relation to the importance of using suitably qualified individuals to deliver the training.
Greater Anglia also stated that it has reviewed the ORR’s guidance on fatigue management, and is in the process of updating the fatigue management procedures within its safety management system.

Network Rail has added the following clarification to Colchester signal box’s special instructions:

“Before you allow a train carrying passengers to approach an occupied platform at Norwich station you must confirm with the Person in Charge of the platform that there is enough room for the complete train to be accommodated in the platform. If you are unable to get such confirmation, you may use the platform length table displayed on the panel. However when all platform track circuits are occupied and you are not sure if the train can be accommodated you must not signal the train towards that platform.”

This is in line with the requirements in with the Rule Book section relating to track circuit block regulations which state that (if in doubt), signallers must get confirmation that there is room on the platform before clearing the calling- on signal. It is unclear whether the revised instruction would lead to a different outcome if the same circumstances were to occur again.

Recommendations

- Greater Anglia should complete the update of its Competence Management System (CMS) to include consideration of non-technical skills. The updated CMS should include:
  - The development and delivery of training on non-technical skills to Greater Anglia’s drivers, driver managers and driver instructors by suitably qualified trainers;
  - The tools necessary to support its application, including those required to:
    - identify substandard non-technical skills;
    - alert a manager to a driver who is found not to be meeting the competence requirements on repeated occasions; and
    - guide managers on the actions to be taken;
  - A briefing of those who manage the implementation of the CMS so that procedures are complied with (eg managers know when to refer drivers to safety review panel); and
  - Monitoring of the implementation of the updated CMS to confirm that it delivers the expected improvement in the safety performance of its drivers.

- Greater Anglia should:
  - Update its accident and incident investigation procedures to include consideration of non-technical skills in the causation of accidents; and
  - Train all its investigators to assess the role of non-technical skills in the causation of accidents.

- Greater Anglia should review and make any necessary changes to the application of the audit procedure, including any locally pre-defined question sets, to ensure that it allows for consideration of compliance with all safety related elements of the operational procedures.

- Greater Anglia should complete the review of its fatigue risk management system to identify and implement improvements. Greater Anglia should continue to refer to the Office of Rail Regulation’s guidance, dated January 2012 on ‘Managing rail staff fatigue’ as part of the review.

- Network Rail should assess the risk associated with permissive working at Norwich station. Greater Anglia should support Network Rail by providing an understanding of the current constraints and processes for short-term alterations to platform allocations. Network Rail should take these into account when assessing the risk and determining any necessary risk control measures. Network Rail and Greater Anglia should implement any required risk control measures and brief their staff accordingly.
Sweden: Empty coaching stock runaway and subsequent buffer stop collision at Saltsjöbaden station, 14-15 January 2013

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

On the night of 14-15 January 2013, an empty coaching stock formation (two electric multiple units) ran away from Neglinge depot and proceeded towards the end of the line at Saltsjöbaden under full tractive power.

At Saltsjöbaden, the units travelled over Track 1 at some 80 km/h, crashed through the buffer stops and collided with an apartment building 30 metres beyond the end of the line. Rescue workers extracted one seriously injured woman (a cleaner) from the wreckage. There were no other casualties. The leading vehicle was damaged beyond repair and the building sustained severe damage.

Earlier in the day, the last scheduled train had arrived at Neglinge depot and its EMU was coupled to the one from the second-last train. At this point, the signaller at Saltsjöbanan went off duty and, according to plan, left the control centre unmanned, there being no services scheduled. All points were released for local operation and the entire system was given over to a track possession. This was normal procedure, introduced to allow maintenance to be done during the night.

Prior to the start of services the next day, cleaning and light maintenance were planned. To this end, a shunter and a cleaner were working on site.

It had been snowing, and the temperature was a few degrees below freezing. The shunter decided that the vehicles could not be left with the brakes on, as there was a chance the blocks might freeze to the wheels. In order to avoid this, a special piece of equipment is installed on all sidings at Neglinge: using a 24V AC feed through a cable from outside and a special procedure in the cab, the brakes can be released without having to activate the controls.

However, the equipment was not working on Track 3, and had actually been out of order for several weeks. This being the case, the shunter decided to use an unauthorized procedure to take the brakes off, activating the driver’s controls in the cab facing Saltsjöbaden, engaging the driver’s safety device using a loose brake block and then closing the doors, to enable brake release. The doors were then released for individual control, to prevent engagement of tractive power. At some point during the procedure, the train control lever was placed in the ‘full power’ position. The shunter then helped the cleaner with some of her tasks.

When the cleaner was almost finished, the shunter left the units and went to the workshop office to complete some maintenance forms. The cab was left as arranged, with the controller key in the lock. When he returned some 30 minutes later, the units had gone.

The cleaner – who spent several days unconscious in hospital – cannot remember any detail of that night, but has been able to give a statement as to how the normal cleaning procedure is conducted. The crucial part is that cleaning the carriage floors involves sweeping sand and grit out through the passenger doors. Since dirt in the door guides can prevent the doors functioning correctly, a final move is normally to close the doors using a central command from a cab where the door system is activated, to check the proper function of the doors.

It has been shown, through practical tests, that with the driver’s controls arranged as they were, engagement of tractive power depends only on a central impulse to close the passenger doors. The Swedish Accident Investigation Board is convinced that this is what happened. The driver’s controls were arranged to release the brakes.

Later, the cleaner closed the doors using a central command button. When the impulse was given, the tractive power was engaged. The control lever, being left in the ‘full power’ position, enabled the power control system gradually to apply full power to the traction motors. Since the cleaner had no knowledge
of the function or use of the driving controls and, indeed, probably had no idea at all of what was happening, she could not find a way to stop the train and eventually took cover in a passenger seat close to the cab. The duration of the movement from Neglinge to Saltsjöbaden was less than two minutes.

The points at Neglinge had been left in the position they had had after the route was set for the arrival of the last train to Track 3. The runaway vehicles were thus led back out onto the line towards Saltsjöbaden.

The Board concluded that the direct cause of accident was that the driver's controls had been arranged to release the brakes and keep them released without further human intervention. The manner in which the arrangement was carried out made the engagement of tractive power depend only on a central impulse to close the passenger doors.

The contributory factors were that the shunter was under the impression that his method of releasing the brakes was not insecure and that it was an efficient measure to take when the proper equipment was out of service. Supervising functions in the safety management system of the railway undertaking had not been able to identify neither where unauthorized procedures were employed in the practical work, nor the risks accompanying such procedures.

Furthermore, one switch on the route traversed by the runaway was intended to be used as trap points to protect the line towards Saltsjöbaden from irregular movements in the yard at Neglinge. This switch was not changed to the protective position, however, as the operator had concluded that there was no rule that clearly stated which position the switch should be in when not used. The switch was left in the position for the route of the last incoming train, to facilitate the departure of the first train the next morning (that is, minimize risk of snow/ice blocking the switch in the ‘wrong’ position). The investigation found that the railway undertaking and the infrastructure manager had different views on the handling of switches serving as trap points, but the infrastructure manager had not noted this discrepancy.

**Recommendations**

- In light of the actions taken in response to the accident, by the railway undertaking and the infrastructure manager, and the ongoing development work within the Swedish Transport Agency regarding licensing and auditing, it has been decided not to issue explicit recommendations. It is assumed, however, that findings recorded in this report will be taken into account.

**Published 12 May**

*UK: Near miss at Balnamore AHB crossing, 31 May 2013*

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

At approximately 03:10 on Friday 31 May 2013, a car driver was forced to take action in order to avoid colliding with an engineering train that was traversing Balnamore AHB crossing, which is located between Coleraine and Ballymoney on the Belfast to Londonderry/Derry line.

The car subsequently struck metal fencing forming part of the crossing, causing minor injuries to its two occupants and damage to the car. The crew of the train spoke with the car driver and then continued work without reporting the accident.

At the time of the accident, the engineering train was undertaking weed-spraying operations within a planned possession. Because of the possession, the crossing was being operated manually via its local controls. However, as the train passed over, its half barriers had not been lowered and its road traffic signals were not operating, even though this was required by the railway rules relating to this type of level crossing. This meant that the car driver did not have enough warning to stop his car before the train arrived.

RAIB found that the team responsible for undertaking weed-spraying was routinely not complying with the rules relating to the operation of AHBs within possessions. This was probably due to a combination
of factors, including the team possibly having a low perception of the risks presented by this non-compliance and a desire by them to complete the weed-spraying more quickly. In addition, the team may have been influenced by the status of rules relating to the local control of other types of crossing in possessions and the method of work adopted at level crossings during a recent project.

RAIB also found that this non-compliance was not detected or corrected by safety checks conducted by Northern Ireland Railways. In addition, the investigation identified that the appointment of additional competent staff to operate crossings within the possession may have prevented the accident from occurring.

RAIB identified three key learning points: that the person in charge of a possession should correctly complete the form intended to help them keep track of level crossings; that boarding moving trains, where it is prohibited, should be avoided; and that accidents should be reported.

Recommendations

- Northern Ireland Railways should review (in conjunction, as necessary, with Iarnród Éireann) the requirements of the NIR/IE Rule Book, NIR Rule Book Appendix and NIR Signalmen’s General Instructions which relate to activities at level crossings within pre-planned possessions. This review should consider whether:
  - All of the level crossing types present on the infrastructure managed by Northern Ireland Railways are covered by the existing rules and instructions;
  - The risks from such activities are being adequately mitigated; and
  - Existing risk controls are adequately resourced and comply with any relevant industry best practice, legislation, regulations, codes of practice and guidance.

Northern Ireland Railways (in conjunction with Iarnród Éireann as necessary) should implement any changes identified as a result of this review. Northern Ireland Railways should ensure that suitable briefing and training accompanies any changes which are implemented.

- Northern Ireland Railways should review any method statements currently being used by its track department in order to ensure that they are supported by risk assessments, in accordance with relevant requirements of the infrastructure division’s safety management system.

- Northern Ireland Railways should implement the planned restructuring of the infrastructure division safety, quality and environment team. The team should have the resources and tools necessary to facilitate the identification of non-compliances to the NIR/IE Rule Book, NIR Rule Book Appendix and NIR Signalmen’s General Instructions, similar to those identified by this investigation. This should be supported by ongoing monitoring arrangements by Northern Ireland Railways of the performance of its framework contractors.

Published 15 May

UK: Near miss at Llandovery level crossing, Carmarthenshire, 6 June 2013

For the full report, click here.

The incident occurred at around 05:56, when a Swansea–Shrewsbury service was driven over Llandovery level crossing while it was open to road traffic. As the train approached, a van drove over immediately in front of it. A witness working in a garage next to the level crossing saw what had happened and reported the incident to the police.

The crossing is operated by the train’s conductor using a control panel located on the station platform. The level crossing was still open to road traffic because the conductor of train 2M43 had not operated the level crossing controls. The conductor did not operate the level crossing because he may have had a lapse in concentration, and may have become distracted by other events at Llandovery station.
The train driver did not notice that the level crossing had not been operated because he may have been distracted by events before and during the train’s stop at Llandovery, and the positioning of equipment provided at Llandovery station relating to the operation of trains over the level crossing was sub-optimal. RAIB identified that an opportunity to integrate the operation of Llandovery level crossing into the signalling arrangements (which would have prevented this incident) was missed when signalling works were planned and commissioned at Llandovery between 2007 and 2010. RAIB also identified that there was no formalised method of work for train operations at Llandovery.

Recommendations

- **Arriva Trains Wales (ATW)** should identify all locations where traincrew carry out operational activities (eg token exchange and level crossing operation) in addition to train dispatch, and develop risk assessed methods of work for each location. These should be briefed to all traincrew, be incorporated in the performance monitoring systems and be subject to periodic review.

- ATW should lead a review of the positioning of platform equipment and signage used by traincrew at unmanned stations and, where practicable, arrange with Network Rail for improvements to be made. This should include:
  - Identification of the optimum stopping position for trains to enable the best achievable view of signals, stop boards and indicators; and
  - An assessment of the positioning of control equipment operated by traincrew (such as level crossing controls).

- Network Rail should make improvements to its processes for the design of new and altered signalling, to require the active consideration of reasonable opportunities to make improvements to the control of risk beyond the immediate scope of the proposed works, including identifying where operator errors, individual or collective, could lead to unsafe conditions.

- ATW should conduct a review of its operational risk management arrangements in the light of the findings from this investigation, and make improvements in accordance with the findings of the review. The scope of the review should include:
  - The process for assessing risk associated with station duties on all lines over which its traincrews operate (eg the application of route risk assessments);
  - A prioritised plan for the assessment of dispatch risk at unmanned platforms;
  - A prioritised plan to formulate, brief and train dispatch plans to traincrew;
  - The effectiveness of its methods for checking compliance with its policies and procedures (eg the application of remote booking-on spot checks, out-of-hours checks, and remote monitoring of the use of safety-critical equipment (including the use of OTDR data));
  - The guidance issued by ORR and RSSB about fatigue management, in particular sleep risk assessments when booking-on duty, and a culture of trust and openness in fatigue management; and
  - The need for a revision of its training practices and materials for drivers, conductors and controllers to explain the rationale that underpins the rules and to emphasise the benefits of compliance (as well as describing the rules and the consequences of non-compliance).

- Network Rail should review the current arrangements for providing an indication to the train driver of the status of the crossing at Llandovery. This should include consideration of the practicability of providing an active indication when the crossing is still open to road traffic (eg a flashing red light). This review should then be extended to other traincrew operated level crossings of a similar design.
ATW should review and improve the training and guidance given to its duty control managers on the steps to be taken when traincrew are involved in a serious operating incident where their actions directly contributed to it.

Published 28 May

**Australia: Proceed authority exceeded at Tarcoola, SA, 21 August 2013**

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

On 21 August 2012, a Genesee and Wyoming Australia (GWA) freight was en route from Adelaide, South Australia, to Katherine, Northern Territory, when the crew exceeded the limit of their train authority at Tarcoola.

The train authority permitted the crew to travel to Northgate, which is on a branch north of Tarcoola. However, they did not take the line to Northgate and the train continued through Tarcoola, travelling west for about 2.6 km towards Perth before it stopped.

The Australian Transport Safety Bureau (ATSB) found that the driver was a trainee who was unfamiliar with the route and had not completed the minimum competencies required by GWA to enable him to operate the train. The qualified supervising driver had allowed him to take control and had subsequently fallen asleep.

Anecdotal evidence indicates that some GWA crew members occasionally nap in the second person’s seat when not actively involved in the management of the train.

After the incident, the supervising driver returned a positive test for amphetamine and methamphetamine, which he had consumed while off-duty. These drugs probably contributed to him falling asleep during the shift.

The ATSB found that the supervising driver’s performance was being managed in accordance with GWA’s drug and alcohol management programme as a result of a previous positive drug test and that the company’s drug and alcohol policy/processes were effective in managing drugs and alcohol in the workplace.

The ATSB also found that the company’s safety management system did not provide supervising and trainee drivers with enough guidance and direction re their supervisory and permitted driving roles.

The report adds that the actions of a crew member travelling in the crew van in alerting the locomotive crew and operating the emergency brake handle significantly reduced the distance that the train travelled before it stopped.

**Action taken**

GWA has introduced a ‘Category Card’ to enhance the classification system for trainee locomotive drivers. The card specifies any operational restrictions placed on trainees and instructs the supervisor/mentor driver of the level of oversight that must be exercised for each classification level.

GWA has notified all drivers of changes to the classification system and has taken steps to clarify the responsibilities of drivers supervising a trainee.

While GWA had a robust alcohol and drug-testing programme in place, the organisation has taken further action by introducing screening en route and at off-train resting locations and increasing the frequency of random screening at existing locations.

**Safety message**

The ATSB notes that this incident emphasises the need for rail transport operators to implement robust procedures that systematically manage the supervision, training and assessment of trainee drivers. It also highlights the risks associated with the use of amphetamines or methamphetamines and the impact that recreational drug use can have on safe rail operations.