Rail Accident Investigation Branch

Contact between a moving train and an occupied pram at Banbury station, 8 June 2024

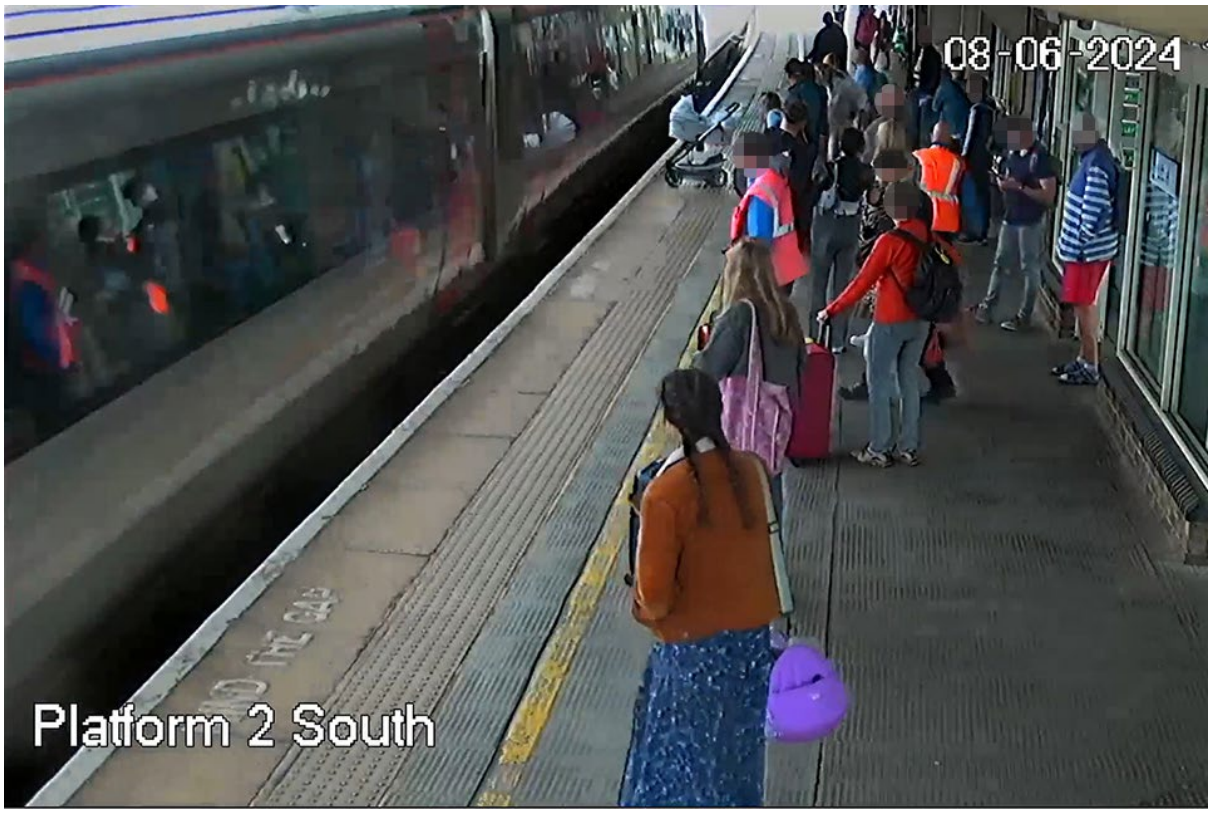
Important safety messages

This accident demonstrates the importance of:

- station operators taking appropriate steps to understand any hazards associated with the platforms they operate
- station operators applying appropriate standards and guidance when using platform markings, signage and announcements intended to warn passengers of hazards and influence behaviour
- station operators and infrastructure managers working collaboratively to understand and control the risks arising from platforms which slope towards the railway
- infrastructure managers considering the risks to safety in deciding when and how platforms should be brought into compliance with relevant standards.

Summary of the accident

At around 12:26, a passenger train travelling between Reading and York entered platform 2 of Banbury station, where it was due to stop. As the train arrived, a pram, carrying a 2-month-old infant, rolled towards the platform edge and came into contact with the train's bodyside. This contact occurred while the train was moving at an estimated 35 mph (56 km/h) and caused the pram to spin and tip over, resulting in the infant falling from the pram onto the platform surface. The infant sustained a minor head injury as a result.



CCTV footage from Banbury station showing the pram and train moments before the accident occurred (courtesy of Chiltern Railways).

Cause of the accident

The accident occurred because the pram, which had been momentarily released by the infant's parent, rolled along the platform slope, which sloped towards the platform edge at that location.

In the 10 minutes before the train arriving, CCTV footage from the station shows the infant's parent and another relative standing with the pram and their luggage around the midpoint of the platform's width. The footage shows that the pram remained parallel to the platform edge with the parent facing towards the pram and being either very close or in direct contact with it.

Around 15 seconds before the accident, the infant's parent started to move the pram closer to the platform edge, intending to board the train. The pram was moved perpendicular to the platform edge and, around 10 seconds before the accident, its front wheels were touching the yellow line with the parent holding the pram's handle with both hands. The infant's parent then leant away from the pram to place one hand on their wheeled luggage and turned to face their relative, momentarily letting go of the pram. Around 6 seconds before the accident, with the parent still facing away from the pram, it began to move towards the platform edge. Around 3 seconds before the accident, the front of the train passed the position where the pram was located, and the pram continued to roll towards the platform edge. Around 1 second before the accident, the relative tried to intervene but the pram contacted the train's bodyside.

At the time of Banbury station's construction, there was no requirement for platforms to slope away from the railway and many platforms constructed at this time were built with a degree of slope towards the track to assist in the drainage of water.

RAIB has been unable to determine why the infant's parent momentarily let go of the unbraked pram. The small degree of slope present is unlikely to have been apparent to the infant's parent, who possibly became momentarily distracted while unaware of the hazard created by the slope.

In 2018, the Rail Safety and Standards Board (RSSB) published research T1098, *'Identifying mitigations for the risk of unplanned movement of wheelchairs and pushchairs on station platforms'* which included a survey of pushchair users. The research identified that pushchair users had low awareness of the presence of, and risks associated with, crossfall gradients (the slope from the rear of the platform to the platform edge when looking along the length of the platform) on station platforms. The research noted that less severe crossfall gradients can pose a considerable risk, because the slopes involved are not immediately apparent and can be harder to perceive. The research recommended measures to aid communication in the form of platform marking, signage and station announcements to alert passengers to the hazard and to influence passenger behaviour.

CCTV footage showing the locations of the signs on platform 2 (yellow ellipses) near where the accident occurred. The red dashed ellipse shows the approximate position of the pram 15 seconds before the accident. Inset image shows an example of the signage present (courtesy of Chiltern Railways).

The location where the accident occurred had warning signage on the platform surface, in dark blue and white colour, stating ‘Sloping Platform Apply Brakes’. However, the design of the signage was less likely to alert pram users to the hazard, as it did not comply with the general design language (and associated regulations) that are used to convey safety related information. The Health and Safety Executive document ‘*The Health and Safety (Safety Signs and Signals) Regulations 1996: Guidance on Regulations’*, edition 3 dated 2015, outlines that red and yellow colours are used to convey a meaning of warning or danger. The colours that were used would have reduced the conspicuity of the signage against the dark grey colour of the platform surface. It is also possible that the pram or the presence of other passengers on the platform partially or wholly obscured this less conspicuous signage before the accident.

Examples of signage outlined in Rail Delivery Group published Guidance Note RDG-OPS-GN-022 ‘Safe Management of Pushchairs and Wheelchairs on Station Platforms’ (issue 2, dated October 2019).

The signage on the platform surface was not supplemented by signage in passengers’ normal line of sight (eye level) on the platform or elsewhere on the station. Such supplementary signage may also have alerted passengers to the hazard posed by the crossfall slope and may have made them more likely to notice the signage on the platform surface. Chiltern Railways was unable to state exactly when the signage on the surface of platform 2 at Banbury station was installed but believes that it was before 2014.

In addition to the platform signage, recorded station announcements were used on all stations managed by Chiltern Railways. A station announcement was made at 12:15 when the parent was standing on the platform, stating: *'Passengers are reminded to keep hold of all personal belongings at all times and ensure that prams, buggies and wheelchairs have their brakes applied while stationary on station platforms as fast trains could cause wind turbulence when passing through'.* Post-accident inspection of the platform by Chiltern Railways noted that this announcement was audible at the location where the accident occurred.

Rail Industry Standard RIS-3703-TOM, 'Passenger Train Dispatch and Platform Safety Measures', issue 5 dated September 2022, provides guidance to station operators on the design and delivery of station announcements. The guidance notes that the use of words such as 'caution', 'warning' or 'danger' at the beginning of an announcement may heighten the attention of passengers and communicate the importance of the risk within the announcement. While this announcement reminds pram users to apply brakes due to the risk from wind turbulence from passing trains, it does not inform them of the risk from crossfall slopes.

CCTV evidence shows that the pram began to roll around 3 seconds before the front of the train reached the location of the pram. RAIB does not believe that the turbulence created by the slow moving and smooth-sided train coming into the platform caused the pram to start to roll towards the edge of the platform. RSSB and RDG have stated that there are currently no standards or best-practice guidance that would require station operators to make station announcements warning passengers about the risk of platform crossfall slopes.

Like most stations on the British mainline network, Banbury station is owned by Network Rail. It has been managed by Chiltern Railways as the station operator since 1996. Both organisations have responsibilities for safety and maintenance of the station. Network Rail is responsible for structural safety and refurbishment/renewal of the station and Chiltern Railways is responsible for passenger safety, day-to-day management of the station and routine maintenance/repair.

As the station operator, Chiltern Railways was responsible for risk assessing platform 2, identifying hazards that could affect passenger safety and putting mitigation measures in place to reduce any identified risk. Any mitigation measures that required minor works and maintenance (for example, installing and maintaining signage throughout the station and the content and audibility of station announcements) were the responsibility of Chiltern Railways. Any mitigation measures that required major physical works (such as any changes to platform slope) would fall to Network Rail.

RSSB's Platform-Train Interface Risk Assessment Tool (PTI RAT) aims to support station operators when considering how effective their risk controls are and help them to identify areas where further safety mitigation is needed. To achieve this aim, assessors are asked to consider a set list of risk controls and score their effectiveness. The tool's guidance asked assessors to consider platform slope and to assign scoring as follows:

- 5 – if the platform is level or slopes away from the platform edge
- 3 – if part of the platform slopes slightly towards the platform edge

- 1 – if most of the platform slopes towards the platform edge or there is a large slope towards the platform edge in low-footfall areas
- 0 – if all of the platform slopes towards the platform edge or there is a large slope in high-footfall or critical areas.

In March 2022, Chiltern Railways completed a PTI RAT assessment for platform 2 of Banbury station. The assessor scored the platform as a 3 for platform slope and noted that *'there is a slight slope along part of the platform'.* The assessor did not propose any recommendations to mitigate the risk of platform slopes following the PTI RAT assessment and no further mitigation action was taken. Guidance associated with the PTI RAT prompted assessors to consider the speed of passing trains and to refer to RSSB's Platform Aerodynamic Risk Assessment Tool (PARAT), which Chiltern Railways also used to assess platform 2.

The PARAT assessment aims to help station operators manage the aerodynamic risk from passing trains to passengers on the platform (including pram and wheelchair users) and support decisions to mitigate the risk. The tool requires assessors to record the presence of crossfall slopes towards the platform edge under 'optional information' but this does not affect the overall risk score for the platform. The tool does not provide any guidance on measures to mitigate the risks associated with the slope of the platform but does include recommendations to help influence passenger behaviour and mitigate the aerodynamic risk from passing trains, such as announcements, which the assessor noted were already in place. As a result, Chiltern Railways took no further action to mitigate the risk of the slope at platform 2 following the PARAT assessment.

Rail Industry Standard RIS-3703-TOM, 'Passenger Train Dispatch and Platform Safety Measures', issue 5 dated September 2022, prompts station operators to consider whether their platforms have slopes that could pose a risk to users of wheeled vehicles. The RIS also references guidance from the Rail Delivery Group (RDG) document *'Safety management of pushchairs and wheelchairs on station platforms'* which was first published in December 2014 and updated in October 2019. This provides guidance to station operators on identifying and mitigating the risks of wheeled vehicles rolling away on platforms. The guidance includes a structured process for completing detailed on-site inspections and quantified risk assessment of platforms. Chiltern Railways management staff stated they were aware of the RDG guidance but had not followed it. This was because it was not referenced in RSSB's PTI RAT.

Managers at Chiltern Railways stated they held no information relating to the extent and degree of platform slopes at Banbury station and that this was typical of other stations they managed. They did not have the equipment or trained staff to measure platform crossfall slope themselves. They also stated that they did not undertake any survey/assessment of platform crossfall slopes because they did not believe any recommendations would have been taken forward by Network Rail. This was because they believed platform slopes would only be addressed by Network Rail when major works were undertaken on the platform.

Documentary evidence shows Network Rail had completed an assessment of the crossfall slopes at Banbury station in 2015. This assessment followed the process shown in Network Rail's Special Inspection Notice (SIN) 140 *'Platform Crossfalls: Method of Measurement and Action Plan'*, dated October 2014, which was published after similar 'roll off' accidents at Southend Central and Whyteleafe stations (RAIB Report 17/2014). The assessment of Banbury station platforms concluded that ticket/vending machines should be relocated and '*to consider resurface or rebuild platform, where possible*'.

The assessment does not state which organisation should carry out the recommendations. Network Rail managers have subsequently stated that they believed the recommendations were made to the station operator. Chiltern Railways was unable to provide any evidence that they had reviewed or considered taking action to address these recommendations and believed that this may have been due to the turnover of management staff.

Network Rail and Chiltern Railways were unable to provide any evidence of any additional assessments or collaboration to remedy the slopes at Banbury station since 2015. Network Rail reported that recommendations or proposed works to reduce the incline of the platform slope would only occur if there was a reasonable opportunity to do so within their business plan.

RIS-7016, 'Interface between Station Platforms, Track and Trains', issue 2 dated June 2022, specifies that the surface of the platform be constructed to provide a fall away from the rear edge of the platform coping stones (that is the slope should lead away from the track) at a gradient of between 1 in 40 (2.5%) and 1 in 80 (1.25%), with an optimum slope of 1 in 50 (2%). RIS-7016 (and previous applicable Railway Group Standards) does not apply retrospectively. However, RIS-7016 also states that when station alterations are made they should be assessed (on a case-by-case basis) to determine whether they provide a *'reasonable opportunity'* to bring the item into conformity to the requirements of the standard.

Network Rail standard NR/L3/CIV/162, 'Platform extensions', issue 2 dated September 2011, also provides guidance on the circumstances when the installation of tactile surfaces will be funded by Network Rail and states:

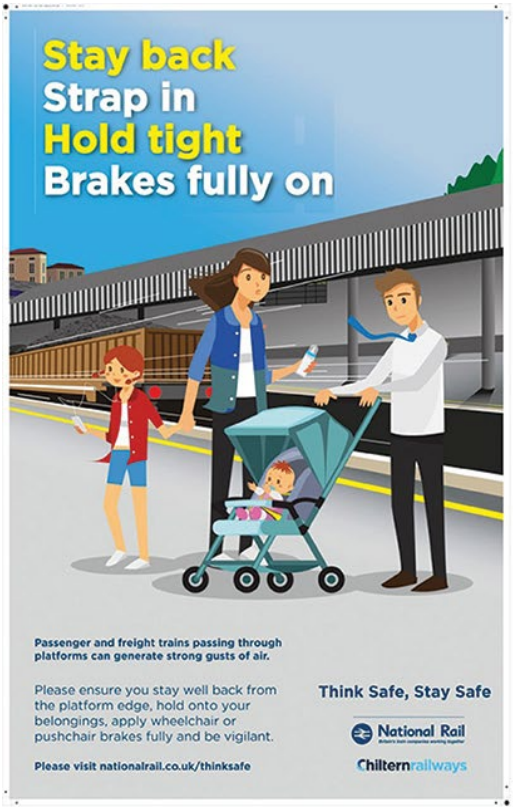
- '*The substantial lengthening of an existing platform shall therefore require the extension and the remainder of the platform to be equipped with tactile paving where it can be demonstrated that this is a "reasonable opportunity".*
- *When an existing platform is rebuilt or resurfaced, over more than 75% of the useable platform length, this shall be considered a "reasonable opportunity" to install tactile paving.*
- *When an existing platform is extended, without any work undertaken on the existing platform, this shall not be considered a "reasonable opportunity" to install tactile paving.'*

Although the criteria described in CIV/162 is strictly applicable to the provision of tactile surfaces, witness evidence indicates that Network Rail management staff were also using it to indicate whether work conducted on the platforms presented a *'reasonable opportunity'* to bring the whole platform into compliance with other aspects of RIS 7016, including remedying platform slope.

Network Rail reported that there was no '*reasonable opportunity*' to remedy the slopes at Banbury station between the 2015 assessment and the time of the accident. The normal practice for maintaining platforms involves preventative maintenance and repairing damaged areas as required. This would mean that resurfacing more than 75 percent of a platform would rarely take place, and therefore it would potentially be a very long time before maintenance requirements alone prompted the remediation of platform slopes.

While it is considered good practice to look for opportunities to make safety improvements when undertaking changes, the railway must also systematically assess measures to increase safety based on their own cost-effectiveness.

Following the accident, Chiltern Railways installed signage in the customer lifts at Banbury station in addition to reviewing the signage on the platform surface. The signage installed in the lifts draws the attention of passengers to aerodynamic risk from passing trains to passengers on the platform but does not highlight the risk from platform crossfall slopes. Despite this, the instructions provided to passengers in this signage include appropriate actions to help prevent similar accidents (to the one that occurred at Banbury station) from reoccurring.



Sign installed by Chiltern Railways in the customer lifts at Banbury station following the accident (courtesy of Chiltern Railways).

Previous similar occurrences

A number of similar incidents or accidents at the platform-train interface involving passengers exposed to higher risk have previously been identified by RAIB.

Accidents with similarities to the accident at Banbury station which were investigated by RAIB include:

- Accidents involving a wheelchair user falling from the platform onto the track at Southend Central station in August 2013 and an infant in a pushchair rolling onto the track at Whyteleafe station in September 2013 (RAIB Report 17/2014). At both locations, there was nothing to indicate to passengers that the platforms sloped towards the track and no action had been taken to eliminate the slope as part of the wider improvement works.
- An accident at Twyford station in April 2016 (RAIB report 01/2017) where a wheelchair user received a minor injury following their wheelchair coming into multiple glancing contacts with the wagons of a freight train. The aerodynamic forces generated by the passing freight train caused the occupied wheelchair to move towards the edge of the platform despite its brakes being applied. In this case, there was no requirement to carry out an aerodynamic risk assessment for station platforms and there was uncertainty about what actions should be taken to minimise the risk from passing trains. The recommendations from the investigation resulted in the PARAT assessment process.

RAIB's website also includes a summary of learning from incidents relating to managing the risk at the platform-train interface.