Rail Accident Investigation Branch

Passenger train collision with buffer stop at Preston station, 1 April 2017

1. Important safety messages

This accident illustrates the importance of:

- driving instructors/driver mentors closely supervising trainee drivers when they are driving on higher risk sections of the route, such as unfamiliar short bay platforms
- train operators reviewing whether the quality of training given to new drivers could be improved by better training for instructors on: methods of teaching; the supervision and mentoring of trainees; and development of non-technical skills
- train operators checking that the security of vehicle interior-mounted equipment, such as disabled access boarding ramps, is compliant with the relevant design standard in order to minimise the risk of detachment and injury in collisions (this was the subject of an Urgent Safety Advice issued on 25 April 2017).

2. Summary of the accident

A passenger train travelling at about 6 mph (10 km/h) collided with the buffer stop in platform 3C at Preston station. The train was a 3-car class 158 diesel multiple unit operating the 12.27 hrs Northern service from York to Blackpool North but which, due to engineering works, was terminating at Preston. The train had been signalled into platform 3C, which is a short bay platform with a rail-built buffer stop.

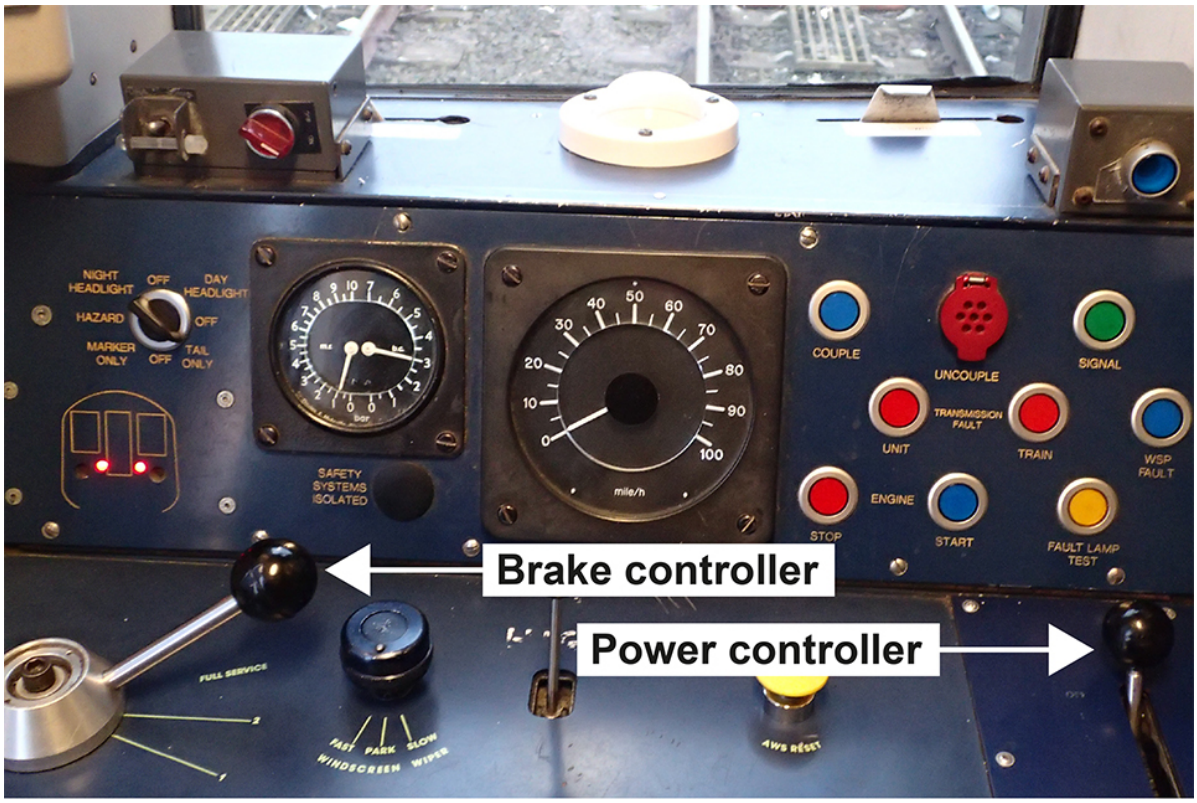
CCTV footage from the station showed that the train underwent a rapid deceleration and recoil in the collision with the buffer. Two members of train crew and thirteen passengers reported injury, one of whom was taken to hospital.

3. Cause of the accident

(Left) View of front of train with driving cab to the right of gangway; and (right) view of deformation in buffer stop beam after the collision

The train was being driven by a trainee driver under the supervision of a driver mentor. The on-train data recorder (OTDR) confirms that the trainee driver reduced the train speed on the approach to Preston station to comply with the 15 mph (24 km/h) speed limit. On entering the platform, the trainee driver continued braking, reducing the train speed to 8 mph (13 km/h) to pass over the train protection and warning system overspeed equipment on the track. The train's brakes automatically operate if the speed over this equipment exceeds 10 mph (16 km/h). He then released the brakes and coasted toward the buffer stop at a speed of around 6 mph (10 km/h).

When approximately 16 metres from the buffer stop, the OTDR shows that the trainee driver operated the power controller (which is to the right-hand side of the driver's desk), selecting power notch 2, instead of the brake controller (which is on the left-hand side). The driver mentor realised the trainee had applied power instead of braking and instructed him to brake. The trainee driver also became aware of his error when the train did not slow. He applied the emergency brake around four seconds after applying power. However, by then it was too late to stop the train before it collided with the buffer stop.



View of class 158 driver's desk showing power and brake controllers

The trainee driver had not driven a train into platform 3C at Preston before the accident. However, the driver mentor considered the trainee sufficiently competent to be able to carry out the movement without close supervision. During his training, the trainee driver had driven passenger trains in service for a reported 80 hours and had driven trains into bay platforms on around 66 previous occasions without incident.

Platform 3C at Preston station is 75 metres long and only 5 metres longer than the 3-car train. When approaching Preston station, the trainee driver had been instructed by the driver mentor to stop the train close to the buffer stop to ensure that all the train doors were in the platform. In his previous experience of driving into bay platforms, the trainee driver had a reported tendency to approach the buffer stop too slowly which resulted in the train coming to a halt some way short of the buffer stop. In these cases, because the platform was longer, the train had stopped with all doors in the platform.

On the approach to platform 3C, the trainee driver was aware that if he stopped the train before all doors were in the platform, the train guard may not realise this and could open them, exposing passengers to danger. With this in mind, the trainee driver was conscious that he should not apply the brake too early. In the event, he applied the power controller in error and there was not then enough time to avert a collision.

During the movement, the driver mentor was seated in the second person's seat, on the other side of the central gangway from the driving cab. He could maintain verbal contact with the trainee driver but was unable to see his actions because the partition between the cab and the gangway hid his view of the driver's desk. The driver mentor reported that he saw the trainee's right arm move and called to him to brake, but was unable to intervene to avert the accident.

The buffer stop in platform 3C was at least 40 years old. It was fabricated from bent rails to a design which predates the modern industry standard for buffer stops to be energy-absorbing. It had, however, a current risk assessment, as required by the industry standard, which was carried out in October 2014, confirming its adequacy for the location. This took account of the number of trains routinely using the platform each day and the need for trains to approach within 5 metres of the buffer stop.

4. Consequences

The impact bent the buffer stop beam and caused damage to the front of the train. Two locked internal doors came open in the collision: a passenger fell through the door between the front car saloon and the driving cab, and the door to a locker containing a disabled access boarding ramp opened and the ramp fell out. No-one was injured by the falling ramp but the RAIB understands that the ramp fell next to an occupied pushchair. The RAIB subsequently issued an Urgent Safety Advice (appendix A) regarding the security of the boarding ramp to operators of class 158 (and the similar class 159) trains and other relevant parties. On 15 June 2017, RSSB issued a National Incident Report (NIR 3348) related to this issue.

5. Previous similar occurrences

The RAIB investigated a collision between a passenger train travelling at around 7.5 mph (12 km/h) and a buffer stop at King's Cross station on 17 September 2015 (RAIB report 15/2016). The train was being driven by a trainee driver under supervision. On the approach to the buffer stop, the trainee driver selected the power instead of the brake controller and was then unable to stop the train before it collided with the buffer stop.

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Appendix A

URGENT SAFETY ADVICE

1. INCIDENT DESCRIPTION			
LEAD / INSPECTOR		CONTACT TEL. NO.	
INCIDENT REPORT NO	0910	DATE OF INCIDENT	1 April 2017
INCIDENT NAME	Passenger train collision with a buffer stop at Preston station		
TYPE OF INCIDENT	Buffer stop collision		
INCIDENT DESCRIPTION	At around 14:50 hrs on Saturday 1 April 2017, a passenger train travelling at approximately 6 mph (10 km/h) collided with the buffer stop in platform 3C at Preston station. The train was a 3-car class 158 diesel multiple unit operating the 12.27 hrs Northern service from Leeds to Blackpool North. However, due to engineering works the train was terminating at Preston. The train was signalled into platform 3C, which is a short bay platform with a rail-built buffer stop. The service was being driven by a trainee driver under the supervision of a driver mentor. As the train approached the buffer stop the trainee driver inadvertently selected power instead of the brake. He corrected the error and applied the emergency brake, but by then it was too late to stop before the train collided with buffer. Two members of train crew and thirteen passengers reported injury, one of whom was taken to hospital.		
SUPPORTING REFERENCES	Figure 1: Ramp cupboard door open and ramp on floor of vestibule. Figure 2: Hook and loop strapping used to secure ramp to back wall of cupboard. Figure 3: Lock keep on the door jamb of the cupboard door. Figure 4: Broken lower bracket mounted on the cupboard door jamb. Figure 5: Strip of self-adhesive hook and loop tape applied in place of the original door magnet. Figure 6 Strip of self-adhesive hook and loop tape applied in place of the original bracket.		

2. URGENT SAFETY ADVICE	
USA DATE:	25/04/2017
TITLE:	Securing of refreshment trolley/disabled access ramp
SYSTEM / EQUIPMENT:	Class 158/159 rolling stock
SAFETY ISSUE DESCRIPTION:	The refreshment trolley/disabled access ramp was not adequately secure.
CIRCUMSTANCES:	The refreshment trolley/disabled access ramp was stowed in a cupboard in the vestibule of the rear vehicle. The cupboard door has a budget lock which requires a 'T' key to open. It closes on to the keep shown in figure 3. On the inside of the door, there were originally two magnets at the top and bottom which closed on to mating brackets mounted on the door jamb. The ramp was held upright in the cupboard by two strips of hook and loop strapping fixed to the rear wall of the cupboard (figure 2). At some point in the past, the upper door magnet and bracket had been replaced with self-adhesive hook and loop tape (figures 5 and 6). The deceleration of the train during the impact with the buffer stop overcame the internal fixings and caused the locked door to spring open. The ramp pulled through the hook and loop strapping and fell out of the cupboard onto the floor of the vestibule (figure 1). The lower door bracket had also been pulled out of the door jamb.
CONSEQUENCES:	It is possible that a passenger could have been injured by the falling ramp. The vestibule area is open to passengers and likely to be occupied by them while waiting to alight at stations. An inadequately secured ramp is therefore a significant hazard in the event of even minor collisions.

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URGENT SAFETY ADVICE

SAFETY ADVICE:	Operators and maintainers of class 158 and class 159 rolling stock should check compliance of the fixtures and fittings used to stow the refreshment trolley/disabled access ramp against the design standard for body mounted equipment, and address any deficiencies found. The design standard deceleration in the longitudinal direction has remain unchanged at ± 3g. The RAIB estimates that the deceleration in the rear vehicle during the impact was significantly less than this. This advice may be applicable to other rolling stock with similar methods of securing trolley/disabled access ramps. The RAIB has observed that it is good practice for rolling stock operators and maintainers to carry out regular checks on the condition of fixtures and fittings used to secure heavy items of internal equipment, such as trolley/disabled access ramps, fire extinguishers etc.

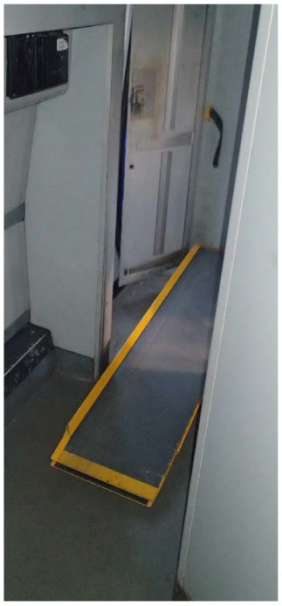

Fig 1

Fig 2

Fig 3

Fig 4

Fig 5

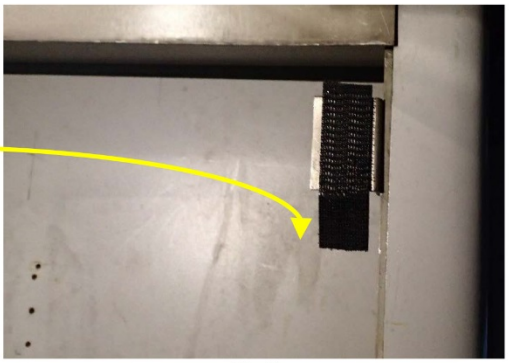

Fig 6

USA SIGN-OFF*			
INSPECTOR NAME:		**CI / DCI NAME:**	Simon French
INSPECTOR SIGNATURE:	ELECTRONIC COPY	**CI / DCI SIGNATURE:**	ELECTRONIC COPY
DATE:	25 April 2017	**DATE:**	25 April 2017