

Passenger trapped by tram doors and dragged at Shudehill tram stop, Manchester, 27 May 2022

Important safety messages

This accident demonstrates:

- the importance of tram and train drivers conducting an effective final visual safety check to provide confirmation that nothing is trapped in the doors and that it is safe for their tram or train to depart
- the need for tramway and railway operators to implement appropriate assurance processes to verify that safety briefings have been correctly understood and that they are being acted upon.

Summary of the accident

At around 11:17 hrs on 27 May 2022, a passenger became trapped in the doors of a tram which was departing from Shudehill tram stop on the Manchester Metrolink system. The tram was heading towards Manchester Victoria on its journey to Bury. The passenger was dragged by the tram and fell onto the platform, sustaining injuries to their face and hand.

The passenger involved in the accident was walking along the tram stop platform with a companion when the tram arrived at Shudehill. The passenger then used a contactless 'touch-in' device located on the platform, adjacent to a ticket vending machine. While the passenger was standing by the 'touch-in' device, the tram driver initiated the tram's door closure sequence.

The evidence available to RAIB suggests that, after using the 'touch-in' device, the passenger moved towards the tram and started boarding as the tram doors started to close. The passenger stepped back onto the platform to avoid the closing doors, but their bag became trapped as the doors reached the fully closed position. The passenger's hand was stuck in the strap of the bag, meaning that they were unable to free themselves from the doors.

The driver checked that the green 'doors closed' light in the cab had illuminated and started to drive the tram away from the tram stop. As the tram departed, the passenger was dragged for approximately 13 metres before extricating themselves from their bag and falling onto the platform. The driver was focused on a tram signal and on pedestrians and vehicles in the road area ahead. They were unaware of the accident until they were subsequently advised by their employer, Keolis Amey Metrolink (KAM), who operate trams on the Metrolink network.

Cause of the accident

This accident occurred because the driver did not complete the final safety checks of the platform before moving the tram away from the tram stop. This meant that they were unaware that the passenger was in an unsafe position when they made the decision that it was safe for the tram to depart.

The KAM Driver's Rule Book requires drivers to make three checks of a tram stop platform using the tram's closed-circuit television (CCTV) system before a tram departs. The first check is to be made before the doors are commanded to close, to make sure that the doors are clear. Once the doors are closed, the Driver's Rule Book then requires the driver to undertake a second check using the CCTV system. This is intended to look for trapped passengers or objects. Once satisfied the doors are clear, the driver is required to turn the selector switch to the drive position.

The selector switch configures the CCTV monitors presented in the cab and allows the driver to display the relevant live images for:

- a. preparing to depart from a tram stop (either on the left or right of the tram), which configures the monitors as a split screen, displaying images of the platform from the front and rear cameras on the tram
- b. drive, which configures the monitors to show the front external cameras, providing a view along the right- and left-hand sides of the tram similar to that provided by road vehicle wing mirrors.

The Driver's Rule Book then requires the driver to undertake a third (final) safety check using the CCTV system before the tram moves off from the platform. This is again intended to ensure that nothing is trapped in the doors and that it is safe to depart.

As well as the CCTV system, the tram is fitted with a door interlock system which confirms that the doors are closed and locked. This system is designed to automatically reopen the doors if objects which are at least 30 mm thick are detected. If the doors close and lock successfully, then the driver receives an illuminated green 'doors closed' light in the driving cab. The limitations of this system mean that the doors can still close and lock, and the 'doors closed' light may still illuminate when objects thinner than 30 mm, such as coats and bag straps, are trapped in the doors. KAM tested the tram's door systems after the accident and found they were functioning correctly.

In the case of this accident, the driver reported that they undertook the first CCTV check required by the Driver's Rule Book, before closing the doors. However, the driver would not have been able to see the passenger at this stage in the dispatch process because the passenger would have been masked from the view of the tram's CCTV system by the ticket machine. This masking effect of the ticket machine was confirmed during a reconstruction by RAIB.



Image A: View from cab CCTV monitor providing mirror image view looking along Shudehill tram stop platform (reconstruction). Image B: Location of contactless device where passenger was stood.

There is no evidence that the driver then went on to undertake the second and third safety checks as required by the Driver's Rule Book. The driver stated that they believed that receiving the illuminated 'doors closed' light in the driving cab meant that nothing was trapped in the closed doors, and that the tram could safely depart. In this case, however, the passenger's bag strap was thinner than 30 mm, so it would not have been detected as an obstruction by the interlock system. This meant that the passenger was in an unsafe position despite the driver having received the 'doors closed' indication.

If the driver had conducted the final two safety checks of the platform, then they would have had the opportunity to identify that a passenger was standing close to the tram and was potentially trapped in the closed doors.

In February 2018, RAIB issued [urgent safety advice](#) to all UK tramways following an incident in December 2017, when an empty pushchair was dragged after becoming trapped in the closed doors of a tram at Radford Road, Nottingham. This advised tram operators to take urgent steps to confirm or ensure that tram drivers:

- perform a thorough check after obtaining door interlock and before moving the tram to confirm that nothing outside the tram is trapped in the doors
- do not place sole reliance on the door interlock system when deciding whether anything outside the tram is trapped in the doors
- are provided with the means to achieve the above.

In February 2018, in response to this urgent safety advice, KAM issued a safety brief to its drivers. This included references to checking the CCTV monitor to make sure that it is safe before moving the tram. A briefing item about not relying on the door interlock system (the 'doors closed' indicator light) to indicate that it was safe to start the tram was included in the first version of the safety brief, which was briefed face-to-face with each driver. Drivers were also given a copy of the briefing note.

This safety brief was subsequently revised, briefed and issued to drivers later in February 2018. This revision was intended to clarify the requirements of KAM's rule book. KAM stated that the reference to not relying on the 'doors closed' indicator light was unintentionally omitted during this revision.

Following an accident at Bury in May 2018 ([RAIB safety digest 08/2018](#)), also on the Manchester Metrolink system, two further iterations of this brief were delivered in May and June 2018. These two briefs and a further update in December 2018 restored the reference to the 'doors closed' indicator light. The driver involved in the accident at Shudehill received a face-to-face briefing on the June 2018 iteration of the brief and signed to confirm that they had done so. In February 2022, the driver also successfully passed an assessment in safely approaching, stopping, and departing a platform, which Metrolink stated would have covered the necessary departure checks.

However, following this accident, the driver stated that they were unaware that thin objects could be trapped in the closed doors and not detected by the door interlock system. This suggests that the driver did not fully understand the need to not rely on the 'doors closed' indicator light or the importance of the final safety checks before departure despite having received the safety briefing and successfully passed a relevant assessment.

This illustrates that safety briefings will only be effective if there is the supporting assurance process which ensures that they are both understood and acted on.

Previous similar occurrences

A number of 'trap and drag' incidents have previously been investigated by RAIB on both tramways and mainline railways. Some of these incidents have resulted in serious injuries, and many had the potential to result in fatalities.

Incidents with similarities to the accident at Shudehill tram stop which were investigated by RAIB include:

- At Wellesley Road, Croydon, in June 2007 ([RAIB report 40/2007](#)), a passenger was dragged after their hand or clothing became trapped in the closed and locked doors of a departing tram. The investigation found that the door system did not detect the passenger's trapped hand or clothing in the closed and locked doors, and that neither a trainee driver nor an instructor driver had completed a final safety check.
- At Radford Road, Nottingham, on 15 December 2017 ([RAIB report 15/2018](#)), an empty pushchair was dragged between tram stops after its plastic rain cover became trapped in the closed and locked doors of a tram on the Nottingham tramway. The tram driver, and other tramway staff, were not aware that small objects could be trapped but not detected by the door system.
- At Bury, Greater Manchester, on 30 May 2018 ([RAIB safety digest 08/2018](#)), a passenger was dragged along the platform when their hand was trapped in the closed doors of a departing tram. The tram driver was not aware that thin objects could be trapped in the closed doors and not detected by the door system.
- At Wood Street station, north-east London, on 14 January 2022 ([RAIB safety digest 01/2022](#)), a passenger was dragged along the platform when their hand was trapped in the closed and locked doors of a departing train. The train driver observed that the passenger was close to the train, but did not believe that they were trapped in the doors, because the door interlock had been obtained.

A wider summary of previous RAIB learning, including further similar incidents relating to the risk at the platform-train interface, can be found on [RAIB's website](#).