RAIU

Safety Advice Notice (SAN)
Investigation Report
SAN 003

PART 1 – Occurrence Description

Organisations	Transport Infrastructure Ireland (TII) – Owner of the Luas infrastructure, trams and depots; procures new trams and extensions; manages the operating contract; oversees safety, asset management and long-term investment. Tram operator and maintainer: • Transdev Dublin Light Rail (TDLR) – Contract ends 31st August 2026; • Keolis Amey Light Rail Dublin Limited – Contract commences on the 1st September 2026.
Synopsis of incidents	The incidents involved in this SAN are related to trap-and-drag incidents where persons or their belongings, were trapped in the tram doors which resulted in them being dragged along the platform, with the trams, when the trams departed.
Scope of SAN	The scope of the SAN is in relation to the door closing sequence, the obstacle detection system on trams, the information available to tram drivers and the public's awareness of how tram doors operate.
Definitions	Chimes – Audible warning tones emitted by a tram to provide information or warning to passengers, pedestrians, road users or operational staff. Chimes are typically associated with door operation (e.g. doors opening or closing) or other operational events requiring an audible alert.
	Obstacle detection – A safety function of a tram door system that detects an obstruction during door closure and causes the doors to stop and reopen.
	Mental model – A person's internal understanding of how a system is expected to function, which influences how they perceive information, anticipate system behaviour, and make decisions when interacting with it.
	Trap-and-drag incident – A trap-and-drag incident happens on passenger services when someone gets part of their body or their belongings trapped in closing tram doors and is dragged along the platform when the tram departs.

PART 2 – Evidence

2.1 – Obstacle detection system

The obstacle detection on the Luas Citadis fleets allows 10 millimetres (mm) to facilitate door closing i.e. the doors would not be able to close if set at 0 mm. There is no other advanced technology fitted on the Luas trams to prevent trap-and-drag incidents.

It should be noted that the Citadis fleets on both the Red Line (i.e. the Citadis 401s) and the Green Line (i.e. the Citadis 402/502 fleets) were both commissioned using the latest industry normative standards — the former using a French national standard (Railway rolling stock. Carriage access doors. Characteristics. Operating. Checks and tests, NF-F 31054) and the latter an EN standard (Railway applications. Bodyside entrance systems for rolling stock, EN 14752). Both of these standards specifically reference door obstacles and their maximum dimensions of which objects trapped within the door leaves must be detected. In each case, a 10 mm object is noted as being this reference dimension.

2.2 – Information for passengers on door closure

Information stickers are located on the doors of trams to inform passengers to stand clear of closing doors, see Figure 1.

In a study by Bayliss et al. (2025)[1] it was shown that there is a widespread misunderstanding of how train doors function and that passengers' mental models are incomplete. Passengers' perceptions of the doors lead them to act in risky ways without knowing the full extent of the risk. Having this overall belief that the doors will behave like lift or shop doors despite previous experience can lead to passengers boarding/ alighting when it is not safe to do so.

Figure 1 – Information sticker

[1] Bayliss, J., Waterson, P. & Young, M. S. (2025). How passenger perceptions of London underground & mainline train doors can lead to trap & drag incidents.

2.3 – Tramway Safety Instruction (TSI) Manual

The TSI Manual, Section 4.5.3, Door Closure Sequence, outlines the door closure sequence when trams dispatch from stops; it states:

- Allow ample time for passengers to board and disembark before commencing door closure;
- Be aware of mobility impaired passengers awaiting to board or who may be disembarking your tram as they will be slow to do so, allow ample time for them to clear the doors before commencing door de-selection;
- Use the chimes beforehand to indicate to the passengers that you are preparing to depart;
- Before commencing the doors closure sequence, use cameras[2] (and mirrors if available) to confirm the doors are clear of passengers/obstruction;
- If you cannot see the length of the tram, make a PA announcement ("Stand clear of the doors, doors are about to close") particularly in the case of overcrowding;
- Deselect authorisation button and doors will commence closure;
- If doors are not closing due to obstruction reselect the authorisation button and make announcements again;
- When you confirm that doors are clear, deselect authorisation button[3];
- Wait until all doors are fully closed and the three beeps sound;
- Only then deselect side selection;
- Do not deselect the side selection button until all doors are closed otherwise the obstacle detection is not operative (passengers may be trapped and dragged or injured);
- Check your platform cameras/mirror again before departing;
- Ensure all door selection buttons are de-selected before departing;
- Note: Objects less than 10 mm can become trapped in a closed door and may not be identified by the obstacle detection system. Always check your camera before moving.

[2] It is noted that the picture quality of the camera display (CCTV) is not consistent throughout the fleet; as determined by RAIU observations of footage.

[3] A button pressed by the driver to select what side the doors open i.e. doors on both sides will not open.

2.4 – Sequence of events on the 21st April 2026 at Heuston Stop

Tram 3026 was at Heuston Stop, awaiting departure. As the driver (Driver 3026) initiated the door closing sequence, the doors began to close, and a passenger put his finger between the doors, with the tram doors closing on his fingertip, trapping it, see Figure 2. The fingertip would have been less than the 10 mm and therefore not detected.

Figure 2 – Passenger placing finger in between doors

Figure 3 – Passenger running with the tram

Tram 3026 departed, with Driver 3026 unaware of the passenger being trapped. The person ran alongside the tram before Driver 3026 became aware of the commotion on the tram and stopped the tram. A passenger onboard pushed the trapped passenger's finger out from inside the tram.

The passenger was uninjured.

TDLR fleet maintenance inspected the tram door following the incident and confirmed the door failed the obstacle detection test; this has now been corrected with a full door setup.

Driver 3026 received post-incident assessment which included trap-and-drag protocols.

Evidence 2.5 – Sequence of events on the 15th May 2026 at Stillorgan Stop

Tram 5011 was at Stillorgan Stop, awaiting departure. As the driver (Driver 5011) initiated the door closing sequence, the doors began to close, and a passenger ran towards the doors, see Figure 4.

Figure 4 – Teenager approaching tram doors

The passenger put their coat in between the doors. The tram doors closed as normal trapping the coat, see Figure 5, the coat would have been less than the 10 mm and therefore not detected.

Figure 5 – Coat trapped in doors

Driver 5011 departed, unaware of the coat being trapped. The passenger attempted to dislodge their coat from the door and ran parallel to the departing tram, see Figure 6, before releasing the coat at the end of the platform and falling (out of view of the CCTV). Driver 5011 remained unaware of the incident.

Figure 6 – Teenager running along the platform

Customers on the platform assisted the teenager and contacted the emergency services and the teenager was removed to hospital by ambulance. The teenager's parents reported the incident to TDLR, stating that she sustained deep lacerations to her face as well as grazing to her knee and hands.

TDLR carried out a check on the doors and the obstacle detection operated as expected.

Driver 5011 received post-incident assessment which included trap-and-drag protocols.

2.6 – Sequence of events on the 29th May 2026 at Bus Áras Stop

Tram 3014 was at Bus Áras Stop, awaiting departure. As the driver (Driver 3014) initiated the door closing sequence, the doors began to close, and two passengers ran to the doors and put a bag between the doors, with the tram doors closing on the bag, trapping it, see Figure 7. The bag would have been less than the 10 mm and therefore not detected.

Figure 7 – Bag put in between closing doors

Figure 8 – Females running with the bag

Driver 3014 departed, unaware of the bag being trapped.

The passengers held onto the bag and ran alongside the tram, see Figure 8.

The passengers on board began making noise, alerting Driver 3014, who brought the tram to a stop.

The passengers were uninjured.

TDLR carried out a check on the doors and the obstacle detection operated as expected.

Driver 3014 received post-incident assessment which included trap-and-drag protocols.

Evidence 2.7 – Sequence of events on the 17th June 2026 at Hospital Stop

Tram 4011 was at Hospital Stop, awaiting departure. As the driver (Driver 4011) initiated the door closing sequence, the doors began to close, and a dog on a lead boarded the tram without the owner. The tram doors closed as normal trapping the lead, see Figure 9, the lead would have been less than the 10 mm and therefore not detected.

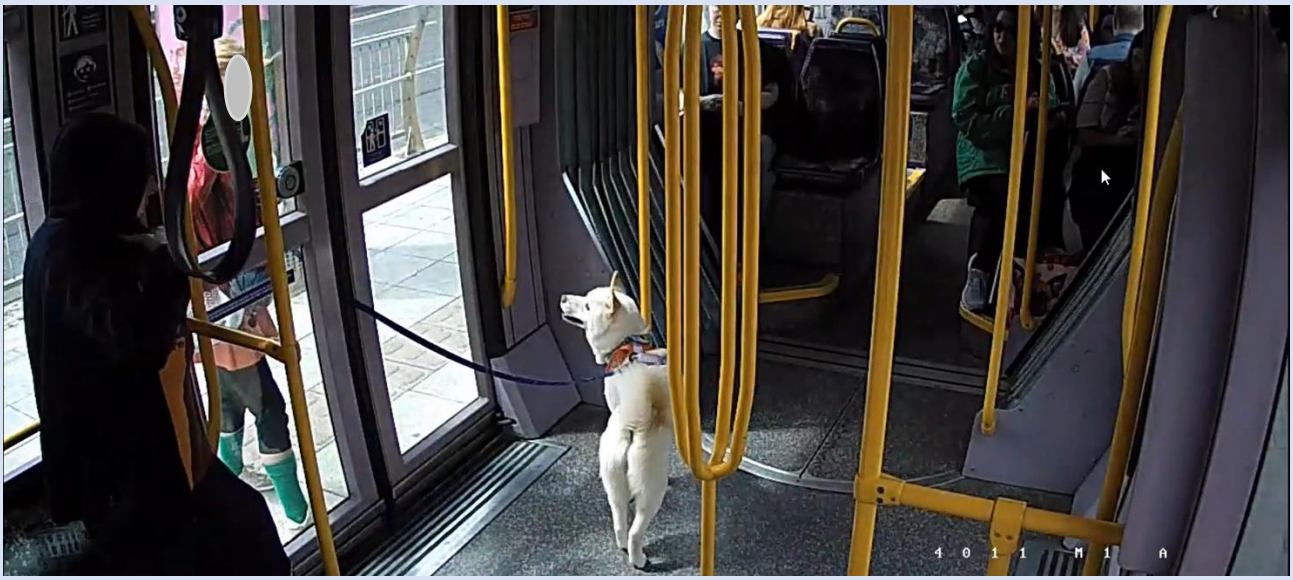

Figure 9 – Dog onboard tram with lead trapped in the door

Driver 4011 departed, unaware of the lead being trapped. The dog owner had the lead around her wrist and was dragged alongside the tram, eventually freeing herself from the lead and falling onto the platform.

A passenger onboard assisted the dog that was being pulled towards the doors.

Driver 4011 heard the passengers onboard shouting and brought the tram to a stop.

The dog owner sustained minor cuts but declined medical attention. The dog was uninjured.

TDLR carried out a check on the doors and the obstacle detection operated as expected.

Driver 4011 received post-incident assessment which included trap-and-drag protocols.

PART 3 – Analysis & Conclusions

3.1 – Obstacle detection system

All the obstructions in the four occurrences were less than 10 mm and therefore allowed the doors to close and lock, trapping the obstacles. Enhanced obstacle detection and dedicated drag detection technologies, if installed, would likely have prevented the incidents.

3.2 – Information stickers

A study indicated that there is a widespread misunderstanding of how train doors function and that passengers' mental models are incomplete. The information stickers (Figure 1) on trams are not sufficiently effective in clarifying the operation of the doors and informing passengers of the risk associated with the closing doors.

3.3 – TSI Manual

The TSI Manual is clear on how the drivers operate the doors, making it consistent through the network. An additional observation is that the picture quality on the camera displays differs throughout the Luas fleets, with some of the older fleets having poor quality views, a more refined high definition CCTV may have assisted the drivers in seeing the persons/ belongings trapped.

PART 4 – Measures taken by TDLR and TII since the incident

4.1 – Safety Alert

TDLR issued a Safety Alert, SA01-26 on the 19th May 2026, after the incident at Stillorgan, reminding drivers to:

- Allow ample time for passengers to board and disembark before commencing door closure;
- Once the doors are closed after the three-beeping auditable tone, all drivers must check internal and external monitors and mirrors, to make sure there is no object trapped at the doors;
- Use cameras and mirrors to perform a thorough check after obtaining door interlock;
- Always be aware of mobility impaired passengers awaiting to board or who may be disembarking your tram as they will be slow to do so, allow ample time for them to clear the doors before commencing door deselection;
- Prior to closing doors, make a passenger announcement ("Stand clear of the doors, doors are about to close") particularly in the case of overcrowding;
- Use the chimes beforehand to indicate to the passengers that you are preparing to depart;
- Always follow the correct door operation as per the TSI Manual.

PART 5 – SAN Safety Recommendations	
SAN Publication Date	14/08/2026
SAN Title	Prevention of trap-and-drag incidents on the Luas network.
SAN Number	SAN 003
Addressee	The safety recommendations are addressed to the "Tram Operator" (as a result of the contract changing) & Commission for Railway Regulation
Implementer	The Tram Operator
Synopsis of incidents	The incidents involved in the SAN are related to trap-and-drag incidents where persons or objects attached to persons were trapped in the tram doors and resulted in the persons being dragged along with the tram.
Possible consequences	There was a risk of injuries or fatalities to the passengers involved from being dragged along with the tram.
SAN Safety Recommendation 1	The intent of this safety recommendation is for TII and the Tram Operator to review obstacle detection and anti-drag technology, to see if it can be applied to new and existing tram fleets; consideration should be given to determining if the risk is as low as is reasonably practicable (ALARP). As a result, the RAIU make the following safety recommendation: **The Tram Operator, in conjunction with TII, should install advanced technology to reduce the risk of trap-and-drags, this could include but is not limited to:** • **Enhancing the ability of door control systems to detect the presence of trapped objects (e.g. sensitive edges and/or anti-drag systems);** • **Adding sensors to the doors to alert the driver of an obstruction;** • **Better CCTV[4] along the tram to help support the driver in spotting if someone is trapped in the doors; and/ or,** • **The introduction of smart CCTV which can automatically detect if someone is trapped in the doors and alert the driver.**

[4] It is noted that that the picture quality of the camera display (CCTV) is not consistent throughout the fleet, evidenced through footage reviews by the RAIU.

SAN Safety Recommendation 2	The intent of this safety recommendation is to change passenger behaviours in terms of late boarding of trams. As a result, the RAIU make the following safety recommendation: **The Tram Operator, in conjunction with TII, should add warning stickers (such as "shark's teeth" decalcomania) to the tram doors, to make the risks associated with closing train doors more visible to passengers.**
SAN Safety Recommendation 3	The intent of this safety recommendation is to change passenger behaviours in relation to late boarding of trams and improve passengers' understanding of how the doors operate. As a result, the RAIU make the following safety recommendation: **The Tram Operator, in conjunction with TII, should develop a safety education campaign, to educate passengers on the operation of the doors and illustrate the risks associated with closing doors.**
SAN Safety Recommendation 4	The intent of this safety recommendation is to emphasise to tram drivers, the importance of checking platform cameras/ mirrors before departing. **The Tram Operator should review the operating procedures for the door closing sequence, outlined in Section 4.5.3 of the TSI Manual, to ensure that the step "Check your platform cameras/mirror again before departing" is given greater emphasis.**