



HM Senior Coroner Sarah Ormond-Walshe
South London Coroner's Office
Floor 2, Davis House
Robert Street
Croydon
CR0 1QQ

Transport for London
London Trams

Floor II
17 Addiscombe Road
Croydon
Surrey
CR0 6SR

15 November 2021

Dear Madam

Sandilands Inquests

I write on behalf of Transport for London (TfL) with regard to the Senior Coroner's Regulation 28 Report to Prevent Future Deaths (PFD) dated 21 September 2021 following the inquests arising from the deaths of Dane Chinnery, Donald Collett, Robert Huxley, Philip Logan, Dorota Rynkiewicz, Philip Seary and Mark Smith.

I would like to take this opportunity to again personally offer my sincere condolences, and those of everyone at TfL, to the family and friends of each of the seven victims of this tragic accident.

Since November 2016, TfL has been focused on making sure a tragedy like this can never happen again and has worked closely with the Rail Accident Investigation Branch (RAIB), the Office and Rail and Road (ORR) and other industry partners to introduce a number of additional safety measures on the Croydon tram network. The primary objective of the work undertaken is to prevent an overturning event happening in the first place.

Safety will always be TfL's number one priority. TfL continues to review its operations and to work with the wider tram industry to introduce any further measures that may benefit the people who rely on those services.

The PFD report

The Senior Coroner's PFD report addressed to TfL, all UK tram operators, Bombardier Transportation UK Ltd (Bombardier) and others raises the following matter of concern:

'At least one of the seven died as a result of being ejected through the bottom of the door leaf. A recommendation was made by the RAIB that consideration should be given to the feasibility of strengthening doors, whether in current tram stock or in future tram building. Little seems to have been done since.'

Consideration should be given to current and future trams as to whether tram doors can be adapted now or in the future’.

Bombardier is now known as Alstom following a recent takeover of the company.

TfL has carefully considered this matter of concern and I provide details below of the work undertaken in respect of strengthening tram doors.

RAIB recommendation

As noted in the PFD report, one of the RAIB’s recommendations was to consider the feasibility of strengthening doors. The recommendation stated:

‘UK tram operators and owners should, in consultation with appropriate tram manufacturers and other European tramways, review existing research and, if necessary, undertake further research to identify means of improving the passenger containment provided by tram windows and doors. The findings should then be used to:

- i. Provide a time-bound plan to modify doors and windows on existing trams when practical to do so (e.g. during planned refurbishment);*
- ii. Promote changes to the specifications and standards governing the doors and windows of new trams; and*
- iii. Inform the Department for Transport of the findings to allow implementation of the safety advice at paragraph 492’.*

The intent of this recommendation, as stated in the RAIB report, was to reduce the likelihood of people being seriously injured or killed by being ejected through tram doors and windows (i.e. to provide better containment).

I provided evidence to the Senior Coroner during the Inquests on actions taken to strengthen the glazing on the existing fleet of trams. Given the Senior Coroner’s area of concern in the PFD report, my response below is focused on proposals to strengthen doors.

Proposals to strengthen doors

In respect of doors, the SNC Lavalin study commissioned by TfL stated that *“increasing stiffness of doors may help in situations where doors are containing passengers in an overturn situation”*. However, the study also stated that *“implications on weight and cost are likely to be prohibitive to retrofit. Compliance with standards relating to closing energy may be affected”*.

Changes to the design of the existing fleet cannot be considered in isolation. There is a tension between a requirement for containment and a requirement to enable evacuation. For example, as the SNC Lavalin reported noted, any redesign must also meet ORR’s guidance which stipulates *“the door arrangement*

should enable passengers and tram crew to evacuate safely. It should be possible for passengers to open designated external doors once the tram is stationary ...". More generally, adding additional weight may have significant knock-on implications for other systems on the tram and its safety. For instance, the braking and acceleration systems of the tram would be significantly affected by the additional mass added to the tram, as well as having a detrimental effect on the overturning speed of the tram.

However, we remain committed to investigating whether anything can be done to strengthen the door mechanisms on our existing fleets as well as making sure this is addressed in the specification of any new fleet we procure.

To this end, we have been working with Alstom to commission a fresh engineering study to look at whether it is possible to strengthen the existing door mechanisms on the CR4000 fleet. Using a tram TfL has given to Alstom for this purpose, this work is already underway using technical experts from Alstom's light rail team based in mainland Europe. It will assess all aspects of the door mechanism currently on the fleet, then determine whether it is technically possible to strengthen the existing design in any way and, if a solution is identified, how that can be rolled out across the fleet. Alstom have confirmed to TfL that this detailed assessment of the existing door mechanism design is anticipated to be complete by the end of December 2021.

Following the completion of this work, Alstom have committed to providing TfL with a full technical report confirming any improvement actions and final recommendations by the end of January 2022. Once this report is received, TfL will determine the appropriate way forward based on the report, including any funding requirements and timelines. TfL proposes to share this report with the Light Rail Safety Standards Board (LRSSB) as well as any other Tram systems that use the same type of vehicles as TfL's CR4000 fleet. I will also provide an update to you which can be shared with all the Interested Persons involved in the Inquests.

With respect to any new fleet that enters service on the London Tram network, we will ensure that during the specification phase for any procurement the manufacturers will comply with all appropriate LRSSB guidance in force at that time, but also ensure that any design of the door mechanism takes into account the learnings from the work we are undertaking with Alstom.

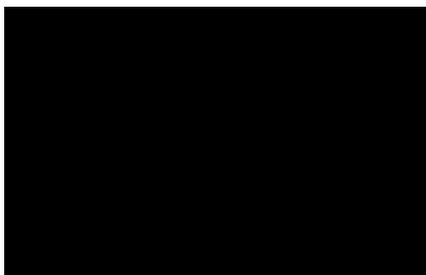
Other matters

As you know, TfL has worked hard to consider and respond to all of the RAIB's recommendations. A bespoke Physical Prevention of Overspeed System (PPOS) has been procured, developed and installed on the London Tram network. This system, the first of its kind in the United Kingdom, provides a high level of safety assurance by automatically braking the tram to a stand in a controlled manner, when an over-speed event is detected at 13 pre-identified locations, where the risk of overturning has been assessed as high.

We now use the London Trams Safety Risk Model which is an estimation of risk pre and post fitment of the above systems and safety measures and was introduced in response to the RAIB recommendations. This safety model has shown that the risk of a tram overturning has been reduced by 76% and therefore, by extension, also reduced the risk of someone being ejected through a door in the event of an accident of this type. TfL remains committed to reducing the risk of a tram overturning to as low as reasonably practicable and will review the recently issued LRSSB guidance notes and determine whether there is any more work we can do on the existing fleet to comply with this advice.

I trust this response is helpful. Please contact us if we can be of any further assistance.

Yours faithfully



General Manager, London Trams