



Dear Madam, BOMBARDIER
TRANSPORTATION
UK LTD
LEGAL
COMPANY SECRETARIAT

HM Senior Coroner
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Inquests regarding the Sandilands tram crash 9 November 2016 (the “Inquests”)
Regulation 28 report to prevent future deaths dated 21 September 2021 in relation to the risk of passenger ejection through tram doors (the “PFD Report”)
Response of Bombardier Transportation UK Limited (“BTUK” - Since 29 January 2021 part of the Alstom group “ALSTOM”)

We refer to the PFD Report which was sent to Transport for London (“TfL”), ALSTOM, UK Tram, Rail Safety and Standards Board and the Department for Transport (“DfT”).

From the outset, we would like to take this opportunity once again of expressing our sincere condolences to those who lost loved ones as a result of this tragic accident. We would also like to put on record our sincere appreciation to you and your team for your efforts to ensure that the Inquests were concluded notwithstanding the challenges posed by the COVID-19 pandemic.

Please find below ALSTOM’s response to the PFD Report.

Introduction

The PFD Report provided that: *“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 RAIB that consideration should be given to the feasibility of strengthening doors, whether in current tram stocks or future tram building...Consideration should be given to current and future trams as to whether tram doors can be adapted now or in the future.”*

I set out below details of actions which ALSTOM has taken, or proposes to take, in response to the PFD Report, together with a timetable for such action.

Steps taken so far

An international team including experts from ALSTOM and IFE has been assembled to investigate any changes to current and future tram door design which might be feasible. This is a considerable exercise given the complexity of the tram system.

The team, led by [REDACTED], ALSTOM’s Quality, Performance & Integration Director (UK & Ireland), includes experts from a variety of relevant disciplines in the UK, Austria and France. Where appropriate, ALSTOM has sought to draw on the expertise of external consultants, namely SNC Lavalin. The objective of



the team is to seek to reduce the risk of passenger ejection in particular through the bottom of the door leaf.

To meet the objective, ALSTOM has engaged with TfL to agree a collaborative approach to reviewing the feasibility of strengthening the in-service tram doors in particular the lower part. This has involved information sharing and, importantly, TfL has provided ALSTOM with access to a CR4000 tram. This will enable detailed mechanical assessment of the tram doors and the evaluation of different options for strengthening the doors to lower the risk of passenger ejection.

In addition to the above, ALSTOM is engaged in a comprehensive engineering review of the existing CR4000 door design. This ongoing review involves internal and external experts and covers the existing CR4000 door design, service and maintenance activities, with a view to identifying any design improvements which can be made. It is envisaged that this exercise will be completed in December 2021.

As well as a desktop review of the door design, the ALSTOM team will also conduct (1) a detailed assessment of the CR4000 tram and (2) a general and door specific failure analysis. This exercise will also help identify any further information gathering work or other in-service door designs that may require further analysis.

Future steps

Once the studies described above are complete it is envisaged that by February 2022, ALSTOM should be in a position to make more detailed recommendations to TfL and other vehicle owners and operators as appropriate as to whether there are any improvements which can be made to the existing CR4000 fleet that would reduce the risk of passenger ejection through the lower part of the tram door leaf.

Using the output from their investigations, ALSTOM will then be able to develop detailed recommendations regarding any changes which are appropriate to future door designs and share those recommendations with other relevant stakeholders and regulators including RSSB (Light Rail) the DfT, Office of Road and Rail, TfL and other local transport authorities who are responsible for establishing or specifying relevant safety standards. In accordance with normal industry practices, those recommendations may then be adopted as industry standards and mandated for future trams designed by both ALSTOM and others. It is envisaged that the recommendations will be available by April 2022.

In tandem with ALSTOM's review of the door design, ALSTOM is continuing discussions regarding changes to the design of in-service doors and future door design standards with IFE, the manufacturer of the doors in the CR4000 trams. Such discussions will continue notwithstanding previous assurances given to BTUK by IFE that the IFE door leaves comply with EN14752 (issued after the design and supply of the CR4000 trams) and that door designs have evolved with a tendency to higher strength. It is anticipated that these initial discussions will be completed by the end of 2021 .

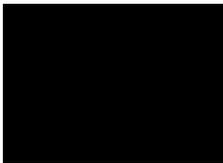
Once the evaluation of the current door design has been completed, ALSTOM will also engage other door manufacturers on its panel of specialist door manufacturers namely, Wabtec, Bode and Kangni, to obtain their views on the proposed changes to door standards. It is planned that this dialogue will begin in March 2022, after the initial investigation has been completed.

Conclusion

We trust that the above provides a clear explanation to HM Senior Coroner of the details of the actions taken and proposed to be taken by ALSTOM, together with the timetable for action. ALSTOM is grateful for the recommendations and would like to reassure HM Senior Coroner, the families of the deceased and the public at large, that it has and will continue to do all that it can to reduce the risk of passenger ejection through the bottom area of tram doors.

If it would be of assistance to HM Senior Coroner, ALSTOM would be happy to provide further progress reports to HM Senior Coroner and/or a fuller report setting out the steps taken to review the strengthening of current and future door design and its conclusions regarding the feasibility of door strengthening. It is anticipated that the entire process, as outlined above, will be completed by June 2022. For HM Senior Coroner's ease of reference and to provide further details of ALSTOM's timetable for investigating the feasibility of changes to current and future door design, I attach a copy of the timetable prepared by ALSTOM.

Yours sincerely



Company Secretary For and on behalf of Bombardier Transportation UK Limited

APPENDIX- Alstom Timetable

Step				
1	Engage with TfL on collaborative working in response to the PFD report	<p>██████████ (GM, London Trams - Transport for London)</p> <p>██████████ (Alstom Sales)</p> <p>██████████ (Alstom Quality)</p> <p>██████████ (Alstom, LR Platform)</p> <p>██████████ (Alstom Engineering)</p>	<p>Outcome: TfL confirmed the availability of CR4000 Tram (#2547) for a collaborative assessment of Doors.</p>	28/10/2021
2	Alstom Engineering,	██████████ (Alstom , Light Rail		

	Light Rail Platform - Review of existing CR4000 Door design	Platform) ██████████ (Alstom Engineering) ██████████ (Alstom, Engineering Door Specialist) – ██████████ (Alstom, Service) ██████████ (Alstom, Manchester Tram, PI) - ██████████ (Alstom Engineering Quality Manager, Services) ██████████ (Alstom Project Manager, Ilford) ██████████ (Alstom, Light Rail Modernisation) SNC-Lavalin Representatives	Intent: to utilise the expertise in the new Alstom organisation (legacy Bombardier and legacy Alstom) in a collaborative approach to reviewing existing CR4000 Door design, Service maintenance and overhaul activities.	November 2021
3	Detailed assessment of CR4000 Tram (#2547) at Ilford Depot	██████████ (Alstom Engineering) ██████████ (Alstom, Service) Specialist) ██████████ (Alstom, Manchester Tram, PI) ██████████ (Alstom Engineering Quality Manager, Services) ██████████ (Alstom Project Manager, Ilford) ██████████ (Alstom, Light Rail Modernisation) SNC-Lavalin Representatives	Intent: to conduct a detailed assessment of a CR4000 tram (#2547) available at Ilford Depot. This will be a collaborative assessment bringing together expertise from SNC-Lavalin, Alstom Light Rail Engineering, Alstom Light Rail Modernisation and TfL. The evaluation will consist of: - Physical expertise - Failure Mode Analysis - Door Specific FTA - Other surveys as required	December 2021
4	Review of CR4000 Door design with IFE (supplier)	██████████ (Alstom, LR Platform) ██████████ (Alstom	Intent: to review the CR4000 Door design and the potential to	December 2021
		Engineering) ██████████ (Alstom, Engineering Door Specialist) IFE Representative	strengthen the doors for both current and future Light Rail designs.	
5		██████████ (Alstom		

	<p>Establish recommendations / improvement actions for existing CR4000 fleets</p>	<p>Engineering, LR Platform) ██████████ (Alstom Engineering) ██████████ (Alstom, Engineering Door Specialist) ██████████ (Alstom, Manchester Tram, PI) ██████████ (Alstom Engineering Quality Manager, Services) ██████████ (Alstom, Light Rail Modernisation)</p>	<p>Intent: following the detailed assessment and design reviews, Alstom will confirm any applicable improvement actions / make final recommendations for existing CR4000 fleets.</p>	<p>February 2022</p>
6	<p>Alstom Engineering, Light Rail Platform - Review of Door design for future tram design</p>	<p>██████████ (Alstom, LR Platform) ██████████ (Alstom Engineering) ██████████ (Alstom, Engineering Door Specialist) ██████████ (Alstom, Light Rail Technical Director) ██████████ (Alstom Engineering Quality Manager, Services) ██████████ (Alstom, Light Rail Modernisation)</p>	<p>Intent: to utilise the expertise in the new Alstom organisation (legacy Bombardier and legacy Alstom) in a collaborative approach to reviewing future Door design, Service maintenance and overhaul activities.</p>	<p>March 2022</p>
7	<p>Establish recommendations / improvement actions for future fleets</p>	<p>██████████ (Alstom LR Platform) ██████████ (Alstom Engineering) ██████████ (Alstom, Engineering Door Specialist) ██████████ (Alstom, Light Rail Technical Director) ██████████ (Alstom Engineering Quality Manager, Services) ██████████ (Alstom, Light Rail Modernisation)</p>	<p>Intent: following the detailed assessment and design reviews, Alstom will confirm any applicable improvement actions / make final recommendations for new build CR4000 and future tram fleets.</p>	<p>March 2022</p>
8		<p>██████████ (Alstom LR</p>		

	Consultation with approved Alstom Door suppliers and relevant stakeholders	Platform) ██████████ (Alstom Engineering) ██████████ (Alstom, Engineering Door	Intent: to engage with other Alstom approved Door suppliers to review the feasibility of improved Door designs for future product development.	March 2022
		Specialist) ██████████ (Alstom, Light Rail Technical Director) ██████████ (Alstom Engineering Quality Manager, Services) ██████████ (Alstom, Light Rail Modernisation)	Share recommendations for current, in-service CR4000 doors with vehicle owners	
9	Review UK regulation (BS EN 14752) for Light Rail Doors	Alstom Relevant authorities (Central Government and devolved authorities) Light Rail Safety and Standards Board (LRSSB) Rail Safety and Standards Board (RSSB)	Intent: to engage with Central Government/devolved authorities, Light Rail Safety and Standards Board (LRSSB) and the Rail Safety and Standards Board (RSSB) to review the UK regulation for Light Rail Doors and, if necessary, make recommendations for a revised regulation.	April 2022
10	Presentation of Door Assessment findings back to HM Senior Coroner	Alstom HM Senior Coroner (London Jurisdiction) Rail Accident Investigation Branch (RAIB)	Intent: to present the findings following all studies relating to Door strengthening and feasibility. This will also include an industry perspective having taken our regulatory recommendations to both central and local governments.	June 2022