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Mr Andrew Hall  
Deputy Chief Inspector of Rail Accidents  
Cullen House  
Berkshire Copse Rd  
Aldershot  
Hampshire GU11 2HP

Dear Andrew,

**RAIB Report: Tram running with doors open on London Tramlink, Croydon**

I write to provide an update<sup>1</sup> on the action taken in respect of recommendations 2, 3, 4, 6, 7 and 8 addressed to ORR in the above report, published on 6 March 2014.

The annex to this letter provides details of the action taken. The status of recommendations 2 and 4 is '**Implemented**'. We do not propose to take any further action in respect of these recommendations unless we become aware that any of the information provided becomes inaccurate, in which case I will write to you again.

The status of recommendations 3, 6, 7 and 8 is '**Implementation ongoing**'. ORR will advise RAIB when further information is available regarding actions being taken to address these recommendations.

We will publish this response on the ORR website on 9 October 2015.

Yours sincerely,

**Oliver Stewart**

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<sup>1</sup> In accordance with Regulation 12(2)(b) of the Railways (Accident Investigation and Reporting) Regulations 2005

1. All 8 recommendations were addressed to ORR when the report was published on 6 March 2014.
2. We wrote to you on 15 May 2015 to report that recommendation 5 had been implemented. We had previously written to you on 3 March 2015 to report that recommendations 1 and 4 had been implemented, recommendations 2, 3, 6 and 7 were 'Implementation ongoing' and recommendation 8 was 'In progress'.

## **Recommendation 2**

*The intention of this recommendation is to improve the fault handling responses of drivers and controllers by providing them with a better understanding of fault modes, overrides, and resolution options.*

Tram Operations Ltd should revise its training modules and procedures on fault handling to achieve:

- improved awareness amongst drivers and controllers of critical fault modes, the effects of operating override switches (including the fault override and the driver's emergency door release) and how to respond to faults, including guidance on co-operation between drivers and controllers; and
- clarification of the procedure for handling critical faults such as Alpha faults, including explicit guidance for defined circumstances (such as how many attempts should be made to rectify a fault and when the tram should be taken out of service).

## **Brief Summary on what was previously reported to RAIB**

3. On 3 March 2015 ORR formally responded to the RAIB report that First Tram Operations Ltd was redrafting its manual of fault modes, overrides and resolution options relating to fault codes on the Bombardier CR4000 tram. Once validated by London Tramlink, the two versions of the manual (for the driver and the controller) they were to be issued and briefed out, with a similar exercise taking place for the Stadler SVT tram.

## **Steps taken or being taken to address the recommendation**

4. In a joint response on 10 July 2015, London Trams and First Tram Operations Ltd provided the following information:

*Drafting of manuals of fault modes, overrides and resolution options relating to fault codes on the Bombardier CR4000 and Stadler SVT trams was completed by March 2015. The manuals have been approved by London Tramlink (the maintainer & owner of the fleet). A programme of briefings for Controllers is underway.*

*The versions of the manuals for drivers are designed to assist drivers when asked to act following instructions from the Controller. The material currently relating to fault handling in drivers' refresher courses will now refer to these manuals.*

### **ORR decision**

5. ORR considers that First Tram Operations Ltd has revised its training modules in accordance with the requirements of this recommendation. It also notes that briefing out of the updated modules is underway but has yet to be completed.

6. ORR in reviewing the responses and provided by First Tram Operations Ltd has concluded that in accordance with the Railway (Accident Investigation and Reporting) Regulations 2005, it has:

- taken the recommendation into consideration; and
- has taken action to implement it.

**Status: Implemented.**

### **Recommendation 3**

*The intention of this recommendation is for improvements to be made to the driver's cab displays and labelling to minimise the chance of the driver not noticing that the doors are open and of misunderstanding the operation of override switches.*

London Tramlink, in conjunction with Tram Operations Ltd, should improve cab displays and labelling in all of its trams. This should include, but not be limited to:

- a prominent indication of the status of the doors (for example, by changes to the cab panel indicator light, or by introducing an audible warning); and
- information provided to the driver about the fault override function and other safety-critical overrides (such as the emergency door release), including the switch label and the associated alert on the message display, to clarify its purpose and effects of its operation.

### **Brief Summary on what was previously reported to RAIB**

7. On 3 March 2015 ORR formally responded to the RAIB report that proposals for a joint human factors review, to understand what improvements could be made to improve cab displays and labelling were expected in September 2014. Some opportunities had already been identified to improve labelling for some controls within the CR4000 and Stadler SVT cabs.

### **Steps taken or being taken to address the recommendation**

8. In their joint response on 10 July 2015, London Trams and First Tram Operations Ltd provided the following information:

*As a result of a human factors review we agreed to introduce an additional audible warning to alert the driver if an inadvertent attempt is made to move a tram when the passenger's doors are open after the fault override switch has been operated (on the CR4000 tram). The alarm has now been tested and installation on the remaining units has begun. We estimate that this modification will be complete on all CR4000 units by the 31st August 2015.*

*Other improvements to the labelling of some switches and buttons in the driver's cab are interdependent with changing the messages on the BISS display on the CR4000 tram. We are working with the OEM to deliver these improvements but do not have any timescales for completing these changes at the moment.*

#### **ORR decision**

9. ORR in reviewing the responses and provided by First Tram Operations Ltd has concluded that in accordance with the Railway (Accident Investigation and Reporting) Regulations 2005, it has:

- taken the recommendation into consideration; and
- is taking action to implement it.

**Status: Implementation on-going. ORR will advise RAIB when further information is available regarding actions being taken to address this recommendation**

#### **Recommendation 4**

*The intention of this recommendation is to minimise the risk of incidents involving accidental operation of safety override devices occurring elsewhere on UK tram networks.*

UK tram operators should conduct an assessment of controls in driving cabs in their current and future fleets to identify those which override safety systems, the risk of drivers inadvertently operating those controls and, where reasonably practicable, design and implement solutions to minimise such risk based on the lessons from this investigation.

#### **Steps taken or being taken to address the recommendation**

10. We wrote to you on 3 March 2015 to say this recommendation had been implemented.

11. In their joint response of 10 July 2015, London Trams and First Tram Operations Ltd provided the following additional information:

*We feel that the modified fault override switch and the resealing of all vulnerable switches has answered this recommendation. However, we did identify that one of the functions of one of these switches could be moved to another switch and that this should also be capped and sealed. The design and assurance work has been completed and the installation of the audible alarm should be complete by 31st August 2015.*

## **Recommendation 6**

*The intention of this recommendation is to improve the design of passenger controls and displays (emergency alarms, intercoms etc.), through shape, colour, symbols and/or signage, so as to make their operation more obvious and intuitive to the user in the event of an emergency.*

Tram Operations Ltd should take steps to improve the clarity and consistency of passenger controls and displays on its trams, taking into account the findings of RSSB project T052c as appropriate.

### **Brief Summary on what was previously reported to RAIB**

12. On 3 March 2015 ORR formally responded to the RAIB report that London Tramlink had confirmed that new passenger control signage was planned to be fitted by the end of March 2015 and the repainting of the Emergency Door release on both the CR4000 and Stadler SVT trams completed by the end July 2015. It was also planned to fit a new flap over the Emergency Door release on the CR4000 tram by the end March 2015.

### **Steps taken or being taken to address the recommendation**

13. In their joint response on 10 July 2015, London Trams and First Tram Operations Ltd provided the following information:

*A flap has been fitted to cover the Emergency Door Release (EDR) handles on the CR4000 trams; this has now been painted green. On the Stadler trams we are in the process of painting the EDR handles green – this should be complete by 21st August 2015. The associated symbols and signage (instructions on use) have been redesigned and are on a green background and have now been installed on both trams.*

*The intercom units on the CR4000 trams are to be painted red – this will be done during the refresh of the fleet in 2016. As an interim measure red vinyl is being applied to the facia of the intercom units – this will be completed by the end of July.*

### **ORR decision**

14. ORR in reviewing the responses and provided by First Tram Operations Ltd has concluded that in accordance with the Railway (Accident Investigation and Reporting) Regulations 2005, it has:

- taken the recommendation into consideration; and
- is taking action to implement it.

**Status: Implementation on-going. ORR will advise RAIB when further information is available regarding actions being taken to address this recommendation**

### **Recommendation 7**

*The intention of this recommendation is to minimise the potential for miscommunications on London Tramlink by enhancing the quality of the radio system.*

London Tramlink should develop and implement a programme to prioritise and expedite the planned upgrade of the radio system, to achieve an improvement in signal coverage and strength across the whole network (including tunnels) and reliable operation in adverse weather conditions (paragraph 102b).

### **Brief Summary on what was previously reported to RAIB**

15. On 3 March 2015 ORR formally responded to the RAIB report that London Tramlink had confirmed that it had placed an order for the provision of a new radio system with Simoco at the beginning of September 2014. This system was expected to be ready for use by August 2015.

### **Steps taken or being taken to address the recommendation**

16. In their joint response on 10 July 2015, London Trams and First Tram Operations Ltd provided the following information:

*This recommendation related to the introduction of the new radio system. We are still on target for completion by the end of August 2015 although there is a small risk to one element of the project. Laying the new fibre throughout the network is on schedule and the fitment of the new radios within the cabs is on schedule. By the end of August the fleet will be fitted with new cab radios however there is a small risk that the supplier may be late in delivering the remaining cab radios (expected mid August). To mitigate this risk LT has prioritised the fitment of cab radios to trams with known radio problems. Any risk of poor performance of cab radios will be mitigated further by the complete replacement of all radio aerials by the end of August.*

### **ORR decision**

17. ORR in reviewing the responses and provided by First Tram Operations Ltd has concluded that in accordance with the Railway (Accident Investigation and Reporting) Regulations 2005, it has:

- taken the recommendation into consideration; and
- is taking action to implement it.

**Status: Implementation on-going. ORR will advise RAIB when further information is available regarding actions being taken to address this recommendation**

### **Recommendation 8**

*The intention of this recommendation is to enhance fault reporting between the operator, the infrastructure manager and the maintainer so that reported faults that could impact on safe running of the network are recorded properly and followed up within appropriate timescales.*

Tram Operations Ltd should improve its fault reporting processes to ensure that faults are properly logged and tracked to resolution.

### **Brief Summary on what was previously reported to RAIB**

18. On 3 March 2015 ORR formally responded to the RAIB report that enhancements to the process by which First Tram Operations report infrastructure faults to London Tramlink, to enable First Tram Operations to received feedback relating to such faults which would then be reviewed, were in place. It noted, however, that a more specific report needed to the generated on the asset management system. This new report was not yet live.

### **Steps taken or being taken to address the recommendation**

19. In their joint response on 10 July 2015, London Trams and First Tram Operations Ltd provided the following information:

*This recommendation related to enhancing the fault reporting between the operator, the infrastructure manager and the maintainer. In our last update we said that we were developing a SAP report but it was locked into a (TfL) centrally controlled 12 week development and issue cycle. The report has now been developed. It has gone through user acceptance testing and two updates have been requested. TfL Information Management is currently updating the report with an aim to deliver by the end of July.*

### **ORR decision**

20. ORR in reviewing the responses and provided by First Tram Operations Ltd has concluded that in accordance with the Railway (Accident Investigation and Reporting) Regulations 2005, it has:

- taken the recommendation into consideration; and
- is taking action to implement it.

***Status: Implementation on-going.*** ORR will advise RAIB when further information is available regarding actions being taken to address this recommendation