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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: Pushchair trapped in tram doors and dragged, Nottingham on 15 December 2017

I write to report¹ on the consideration given and action taken in respect of the recommendations addressed to ORR in the above report, published on 10 September 2018.

The annex to this letter provides details in respect of the recommendations. The status of recommendations 1 & 2 is '**Progressing**'.

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 15 August 2019.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Oliver Stewart', is written over a horizontal line.

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

Oliver Stewart

Initial consideration by ORR

1. Both recommendations were addressed to ORR when the report was published on 10 September 2018.
2. After considering the recommendations ORR passed both recommendations to Nottingham Trams Limited asking them to consider and where appropriate act upon them and advise ORR of its conclusions. The consideration given to each recommendation is included below.
3. ORR also brought the report and recommendations to the attention of other tram operators as it was concluded that that there are equally important lessons for them. ORR did not ask these organisations to provide a reply.
4. This annex identifies the correspondence with end implementers on which ORR's decision has been based.

Recommendation 1

This recommendation is intended to reduce trap and drag risk.

Nottingham Trams Limited should review and improve arrangements intended to manage the risk of trap and drag during tram dispatch on its network. The review should consider equipment, operating practices and the interaction between these. Areas in which improvements should be considered include:

- ensuring that tram drivers have the equipment needed for an effective final visual door check of all doors after interlock is achieved;
- CCTV modifications to ensure a good view during the final visual door check of all areas where items could be trapped in closed and locked doors;
- investigating possible door seal modifications to reduce the risk of trapping items and, if appropriate, developing a programme for installation of improved door seals (eg during planned major overhauls);
- the initial training, refresher training and monitoring needed to ensure that drivers comply with tram stop procedures and understand the importance of undertaking an effective visual check of all doors after interlock is achieved; and
- the initial training, refresher training and monitoring needed to ensure that travel officers:
 - apply appropriate procedures when removing passengers from trams;
 - understand trap and drag risk and how this affects their work; and
 - appreciate what should be considered as emergency situations and how they should respond to these.

This recommendation may apply to other tramways (paragraphs 98, 99 and 101).

ORR decision

5. Following their initial response, we met with NTL on 10 June 2019 to discuss the actions they were taking in response to the recommendation.

6. NTL explained that they had been carrying out a technical appraisal with Alstom regarding an engineering change to the trams which requires the installation of a button which will hold the platform view on the cab monitors to facilitate a further drivers check. The change will be reasonably straight forward on the newer Citadis fleet however a solution is still being designed for the older Incentro trams. NTL are as yet undecided whether to roll out the change on the Citadis and risk introducing an inconsistency between fleets which will have potential safety implications. NTL consider that the "blind spot" issue identified in the RAIB report will also be addressed with by the cameras remaining in platform view for longer. NTL will confirm how and when the CCTV modification will take place.

7. In addition, NTL are participating with the other operators in UK Tram to evaluate a potential new door seal for trams with pressure sensitive switches. It is unlikely however that the current tram doors could accommodate such a seal. It may be that any further trams be specified as having to incorporate door seals with pressure sensitive edges. NTL will confirm why they will/will not be replacing door seals on current fleets at midlife refurb and what specification will apply to any new trams in the future.

8. NTL carried out an urgent driver briefing in February 2018 highlighting the need to ensure drivers understand they must carry out a final check on both monitors and internal mirrors to ensure, so far as is reasonably practicable, that no one or anything is trapped in the doors. The briefing specifically states that the door interlock should not be relied on. Door trap scenarios incorporated into driving simulator training and driver standards monitoring includes tram departure and observation by the driver.

9. NTL have briefed all Travel officers on the process for removing passengers from the tram which includes the need to inform the driver via the passenger help point if more time is needed to avoid a separation. NTL have not yet provided information on what has been done to train travel officers on what constitutes an emergency and how they should respond.

10. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, Nottingham Trams has:

- taken the recommendation into consideration;
- but ORR has not yet been provided with a fully developed plan

Status: Progressing. ORR will advise RAIB when further information is available regarding actions being taken to address this recommendation.

Information in support of ORR decision

11. On 20 December 2018 Nottingham Trams provided the following initial response:

Rec 1 (a) - Initial review completed Feb 2018 – Closed

Further review to take place following other recent Light Rail and Metro door trap & drag Incidents. - Closed

Further review of tram equipment to optimise final visual check. - Closed

Rec 1 (b) - Initial checks carried out. Schedule routine CCTV checks to ensure optimal camera angles are maintained. – Closed

Rec 1 (c) - Review with tram and door manufacturers' opportunities for door seal modifications. – Ongoing

Rec 1 (d) - Driver training and standards monitoring includes additional elements on door trap risks. – Closed

Door trap scenarios have been added to the driving simulator to reinforce driver training. – Closed

Rec 1 (e) - Methodology for removing passengers has been reviewed and has been included in Travel Officer training. It is part of ongoing TO standards monitoring. – Closed

12. On 27 March 2019, Nottingham Trams provided the following update:

Internal meetings and reviews were held during the RAIB investigation through to the formal issuing of the RAIB investigation report. The actions from these are recorded and tracked on an actioning planner. A synopsis of the plan was included in our letter 20 December 2018, a full copy is attached to the covering email of this letter. We will also need to see the training information and material produced in response to this recommendation and an explanation of how it has been incorporated into your competence management system.

The extract of driver training procedure covering the additional aspects of tramstop departure, the driver briefing note and the Travel Officer briefing notes are appended to the covering email.

Recommendation 2

This recommendation is intended to increase Nottingham Trams' understanding of tram risk and the effectiveness of the mitigation measures on which it relies. It is possible that increased understanding of risk from low frequency, high consequence events could be assisted by Nottingham Trams working with the light rail industry body being set up in response to the RAIB's recommendation arising from the Sandilands accident (paragraph 107).

Nottingham Trams Limited should review its risk assessment process with a view to:

- improving the means by which it considers learning from other parts of the tramway and railway industries;
- giving explicit and detailed consideration of the ways in which identified mitigation measures can fail, and the consequences when this happens; and
- effectively evaluating the safety impact of changes to design and/or operational procedures.

Nottingham Trams should then implement the identified changes and update its existing tram operation risk assessments in accordance with the enhanced procedures (paragraphs 98, 99 and 101)

ORR decision

13. NTL have to change Safety Procedure: Risk Assessments SP/HSE/0009 issue 002 to detail the method by which risk assessments are reviewed and if necessary modified by taking into account industry learning.

14. Successful adoption of the LRSSB Tram Safety Risk Model should provide explicit and detailed consideration of the ways in which identified mitigation measures can fail, and the consequences when this happens. We have asked NTL to confirm when this is in place.

15. NTL will evaluate the safety impact of changes to design and/or operational procedures through introduction of Quality Procedure: Request for Change QP/ENG/GEN/0013 issue 4.

16. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, Nottingham Trams has:

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

Status: Progressing. ORR will advise RAIB when further information is available regarding actions being taken to address this recommendation.

Information in support of ORR decision

17. 20 December 2018 Nottingham Trams provided the following initial response:

Rec 2 (a) - NTL currently monitors all RAIB Investigations and the recommendations from comparable operations are assessed and actioned where appropriate. The scope of the assessment will be broadened and mainline recommendations will be considered in more detail. - Closed

Rec 2 (b) - Include in risk assessment reviews. - Closed

The Light Rail SRM precursor model and bow-tie accident modelling, when completed, will complement this. - Open

Rec 2 (c) - Design changes are currently evaluated for impact on operational procedures via the engineering change process. – N/A

Review NTL risk assessment Sep '18 process. – Closed

18. On 27 March 2019, Nottingham Trams provided the following update:

We access a wide range of sources to ensure we capture relevant safety and operational best practice whether this is from accident investigations UK, Europe and worldwide or by sharing operational best practice.

Examples are:

- *NTL are very active within UK Tram having representatives on the Operational, Engineering and Heads of Safety working groups. These are continually reviewing current performance and incidents, sharing and developing best practice, and supporting industry investigations and development programmes (e.g. developing NMU crossing guidance and assessment processes).*
- *NTL are part of the Keolis group having operations worldwide. Keolis promote best practice sharing and utilize knowledge management and sharing platforms that provide the ability to publish best practice, access technical experts elsewhere in group and raise topics for discussion. Keolis hold national and international conferences for safety, engineering and operations to provide opportunities for face-to-face discussions and work on common issues.*