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8 March 2017



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

Dear Andrew,

RAIB Report: Passenger trapped in train doors and dragged at Clapham South station

I write to report¹ on the consideration given and action taken in respect of the recommendation addressed to ORR in the above report, published on 9 March 2016.

The annex to this letter provides detailed information regarding the action taken in respect of the recommendation. The status of the recommendation is **'implemented'**.

We will publish this response on the ORR website on 9 March 2017.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Oliver Stewart', written in a cursive style.

Oliver Stewart

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

Initial consideration by ORR

1. The recommendation from the report was addressed to ORR when the report was published on 9 March 2016.
2. After considering the report and recommendation ORR passed recommendation 1 to London Underground Ltd asking it to consider and where appropriate act upon them and advise ORR of its conclusions. The consideration given to each recommendation is included below.

Recommendation 1

The intent of this recommendation is to ensure that London Underground continues to improve management of PTI risks by building on work already started by a group established after the Clapham South accident. The time-bound, funded programme provides a means for London Underground to demonstrate its long-term commitment to reducing these risks where reasonably practical.

London Underground should review the feasibility and effectiveness of measures to reduce risks associated with passengers being trapped in train doors and then dragged at the platform-train interface (PTI). The review should include measures already considered for all or part of the London Underground network, techniques already used by other railway operators, measures already considered by RSSB and measures made possible by the latest technology available when the review is undertaken. The review should include, but not be restricted to, consideration of:

- improving detection of objects trapped in train doors;
- improving the ability of passengers to pull out objects trapped in doors (including by improving door seal arrangements);
- improving train operator views of the PTI at despatch (eg increasing the number of CCTV cameras, repositioning cameras and providing larger monitors);
- enhancing the methods available to staff performing SATS duties when they need to alert train operators, or stop trains, in an emergency;
- using gap fillers or alternative means to reduce the gap between platforms and both moving and stationary trains;
- adapting platform markings to reduce passenger crowding close to trains/doors; and
- raising passenger awareness of the safety risks associated with objects, fingers and hands becoming trapped in doors.

The review should conclude with a time-bound, funded plan for progressing development of potentially viable measures. This should, if appropriate, include solutions which are only applicable to some parts of the London Underground network.

ORR Decision

3. London Underground have produced a three-year PTI strategy detailing how they will address each of the measures identified by RAIB in the recommendation. LU subsequently provided an update covering the work they were doing in a number of those areas:

- Improving train operator view of the PTI at despatch
- Enhancing the methods available to staff performing SATS duties to alert train operators/stop trains in an emergency
- Adapting platform markings to reduce passenger crowding close to train doors

LU have also identified a number of those measures in the recommendation where they consider further improvements not to be reasonably practicable, given the current economic environment in which LU operates. .

This conclusion must be seen in the context of RAIB's own report (para 85):

“The RSSB data shows that, for the period from 2009/10 to 2013/14, the FWMI for PTI accidents was 2.8 per billion journeys on London Underground and 5.7 per billion journeys on the mainline network. Although the total annual number of passenger journeys is similar on both networks (1.3 billion and 1.65 billion respectively in 2014/15), the risks experienced by passengers sometimes differ because the nature of journeys differ. The PTI statistics include many accidents that do not involve people or objects being trapped in doors and so do not allow a direct comparison of the differing despatch arrangements on London Underground and the mainline (paragraph 79). However, the statistics do show that the overall accident rate at the PTI is lower on London Underground than on the mainline.”

In short, LU has led safety and innovation in PTI management over the last 25 years and LUL's current management of PTI constitutes what is 'reasonably practicable' to achieve the safest level of PTI in the UK railway industry and therefore compliance with the law.

The Health & Safety at Work Act has no provision for ORR inspectors to require duty holders to take measures beyond that which is 'reasonably practicable'. ORR is therefore satisfied that the recommendation has been implemented, as LU are addressing PTI risk on their network as far as is reasonably practicable.

4. After reviewing all the information received from London Underground, ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, London Underground has:

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

Status: implemented

Steps taken or being taken to address the recommendation

5. London Underground wrote to ORR on 29 April 2016 outlining the steps they were taking in relation to each area RAIB identified that should be covered by

the review. London Underground provided a further update on 27 November 2016 (text shown in red):

1. Improving detection of objects trapped in doors

LU commissioned a report which looked at the alternatives to the current single door push back system which exists on the 95 Tube Stock trains. It concluded that the best option would be to fit sensitive edge technology on any new train fleets. It also explored the retrofitting of sensitive edge technology on the Northern line fleet. While we have the cost benefit details of this proposal, we have yet to bring these into the context of reasonable practicability to then determine our desired way forward.

Due to cost, there are no proposals to retrofit the Northern Line fleet with sensitive edge doors.

2. Improving the ability of passengers to pull out objects trapped in doors (including by improving door seal arrangements)

The aforementioned report looked at the introduction of double push back doors. The report concluded that a double push back system was not safer, or practical. While double pushback can provide improved safety benefit it will also cause the door detection to detect fewer items and therefore a higher reliance on reactive dragging protection. A double pushback system would double the trapped object detection limit therefore increasing the trapped object detection risk which may lead to more dragging incidents. To fit the double pushback system to single doors will require significant structural work and is therefore not practical.

As per previous update this option was considered as not practical.

3. Improving train operator views of the PTI at despatch (e.g. increasing the number of CCTV cameras, repositioning cameras and providing larger monitors)

Following extensive work LU has budgeted £10 million to improve train operator views of the PTI at the top risk platforms which currently experience obscured oblique views. This money is not yet allocated as the exact cost is unknown until we move to design phase. The next stage of this project is to analyse the level of risk at each of our top risk platforms and prepare individual business cases that will secure the release of the budgeted funds to design the addition and/or movement of cameras. The timeline for this project is also unknown until the design phase begins this summer.

Background and current project work

An initial assessment of all OPO PTI images (Track to Train CCTV (TTTCCTV) & Platform Based OPO CCTV Systems) across JNP and BCV was conducted to identify all platforms with oblique camera views. This information was then cross referenced with the number of PTI incidents per platform using PTI data from the previous five years. This provided a hierarchical priority list of platforms for each line. The Line PTI groups conducted desktop exercises and site surveys of the platforms on this list and prioritised the platforms based on PTI incidents and local knowledge. From this 90 priority platforms across JNP and BCV were identified as requiring more detailed analysis and potential mitigation for the obscured oblique camera views.

TTTCCTV and platform based OPO CCTV footage was obtained for one traffic day for each of the 90 priority platforms for the purpose of conducting obscured oblique CCTV review assessments. The CCTV reviews are part of the risk assessment process to determine if there is a possible increased PTI risk associated with the oblique camera views. This information supports and justifies the business case for any mitigation work and enables the project team to draw down funding from the £10 million that has been allocated to this project.

CCTV reviews commenced in May 2016 and are on programme to be completed in April 2017. Currently 60% of the platforms have been reviewed. The CCTV review team consists of representatives from Operations, Engineering and the local PTI H&S TU Reps.

From the CCTV reviews and the risk assessment, the project team has put together a first package of works for 29 of the 90 priority platforms. A quick wins programme of works for these 29 platforms, which includes some relocating of OPO cameras, installation and relocation of VEIDs and signage, painting platform end barrier (PEB) gates yellow, removal/relocation of platform seating and under platform lighting design surveys etc, will commence in December 2016.

Costs for carrying out a conceptual design survey (CDS) on the 29 platforms is due in at the end of November. The project team will seek to award this contract in February 2017. The CDS once completed will enable the project team to put any proposed mitigation work out to tender.

It is envisaged that in early in 2017 a second package of works, possibly consisting of between 20 and 30 platforms, will be put together with a view to conducting a similar process as the first package above.

4. Enhancing the methods available to staff performing SATS duties when they need to alert train operators, or stop trains, in an emergency

Station staff working on the platforms only constitutes approximately 16% of the traffic day, albeit this is when the crowding is at its greatest. LU commissioned a report to look into a range of options which would give

platform staff the ability to alert a train operator to an emergency or stop the train by other means. We have the cost benefits details for the various options but have yet to bring these into the context of reasonable practicability to determine our desired way forward. Some of the methods were discounted on the basis of lack of existing reliable technology. LU has however been progressing the discovery phase for two options – the use of an illuminated baton used by platform staff and the use of radio (challenging established thought on this). Funding for a trial of these methods will not be sought until the discovery phase is completed; this is likely to be by July 2016.

Connect Radio Stop Ability (Currently on hold)

There is a function on the Connect Radio handsets which enables the radios to be programmed to allow station staff to communicate directly with trains in the radio cell radius. The function means that platform staff (SATS) could alert a train operator to stop their train in an emergency. The downside of the function is that the message would be broadcast to all trains on that line within the cell radius – eg both N/B and S/B trains would stop. Whilst there is no bleed-over between lines at interchange stations like Kings Cross, each line would have to have dedicated radios programmed for their platforms.

Successful demonstrations have been conducted on the Northern Line by the Connect Team and the cost of programming the radios is minimal. The system is ready to go pending consultation. However a decision was made by senior managers to put this project on hold.

Illuminated SATS Baton

We have received the prototype LED SATS Baton from MC Electronics. The Baton has two modes of operation, a constant white LED light to enable drivers to see the baton on busy platforms and a function which will cause the LED lights to flash. The flashing lights function is being considered as a method for stopping trains in an emergency as they depart the station (this function will may only be suitable for trains fitted with TTTCCTV)

Next step is to take the prototype to PM's forum for discussion and approval. Then commence a trial of the baton on an open section station and a subsurface station. Early discussions suggest that the trial will be on the Jubilee Line but extensive trials will need to be completed for each line it is to be deployed on. Trial methodology has still to be developed.

5. Using gap fillers or alternative means to reduce the gap between platforms and both moving and stationary trains

LU has developed a new way of analysing the risk on each platform. This new approach will be first used on the highest risk platforms. These profiles will recommend physical controls such as nosing stone realignment (our preferred option to gap fillers) to reduce the gap between platform and train. We are

building a case to secure funding for this possibly in 2016/17, although more likely in 2017/18.

The GAPS Project will consider the option for nosing stone realignment as part of the mitigation for the 90 priority platforms as per bullet point 3. A number of platforms on SSL Infrastructure have been identified where nosing stones can be realigned to reduce PTI risk and a programme of works is currently underway. Currently there are no plans to install gap fillers.

6. Adapting platform markings to reduce passenger crowding close to train/doors

A 12 week trial to move the yellow line further back from the platform edge at four locations has been completed. The two key headlines are that the level of compliance by customer to stand behind the yellow line dropped but the distance they stood back from the platform edge (during arrival and departure) increased. We are doing some analysis requested by the standard holder (to prove that customers using this wider area as a corridor is not prevalent) before including it with the standard by June 2016. Additional platforms with the yellow line further back from the edge will be added as part of the risk profile work to introduce physical controls mentioned in item 5 above. The locations will be identified by the line PTI Group. Funding has not yet been secured for this work and it is not yet possible to give timescales.

Following consultation with the standard holder, the standard for yellow lines will not be amended, however a concession may be applied to the standard holder to move the yellow line from its current position of 300mm from the platform edge back to a maximum of 700mm if required. This will be considered as part of the mitigation proposed for the 90 priority platform and will be subject to a platform by platform review and agreement with all the key stakeholders.

In their Yellow Line Trial report, London Underground reported mixed results from moving part or all of the yellow line back from the platform edge 300-700mm at four locations on the network.

The report concluded:

The yellow line trial took place in November and December 2015, with mixed results. Dwell times were not affected and there was no increase in the number of incidents, however passenger compliance levels were varied at the trial locations.

Although operational staff were initially unsure as to the benefit of the adjusted lines, the majority felt they were a good idea after installation. Customers that were aware of the reasons behind the yellow line, generally thought it was a good idea, however raised concerns regarding overcrowding.

Observations were carried out at all four trial locations and found that although there was not 100% compliance, customers were generally standing further back than prior to the new lines.

7. Raising passenger awareness of the safety risks associated with objects, fingers and hands becoming trapped in doors

LU is planning on running a customer awareness campaign in the autumn regarding the risks associated with being caught in the doors. I sit on the RSSB PTI Steering group and this aligns with one of their many workstreams – customers believe that if they or their belongings are caught in the doors then the doors will reopen – we must clearly find an effective way of educating them.

The new GAPs manager has continued to represent LU on the RSSB PTI Steering Group. Launching an effective customer campaign continues to be a challenge for LU with more scrutiny, from TfL, regarding the type and tone of communications to our customers. (I'm awaiting an update from comm's with more information)

6. The London Underground PTI strategy was published on 17 June 2016 and identified six overall objectives:

A. ensure existing PTI mitigations are robust and adequate.

B. establish a governance structure for PTI risk for London Underground that will ensure the risk is managed and a clear vision and strategy is in place for managing PTI risk.

C. set out a costed timetable plan for making improvements to PTI management to allow LU to achieve the targeted level of risk of zero fatalities and life changing injuries and 10% fewer customer injuries at the PTI in 3 years.

D. raise the profile of the hazards at the PTI by engaging employees and customers with the overall aim to reduce the risks.

E. ensure new projects and strategies consider PTI risk at each stage of project or asset development.

F. ensure knowledge is shared across TFL and the industry to develop best practice.

7. London Underground have indicated that the strategy will be reviewed and tracked regularly, with a formal review will take place to take stock and identify new actions by November 2017.