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OFFICE OF RAIL AND ROAD

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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: Passenger trapped and dragged by a train at Hayes & Harlington station, 25 July 2015

I write to report[1] on the consideration given and action taken in respect of the five recommendations addressed to ORR in the above report, published on 30 June 2016.

The annex to this letter provides details in respect of each recommendation.

The status of both recommendations 1 and 2 is '**progressing**'.

ORR will advise RAIB when further information is available regarding actions being taken to address these recommendations.

Yours sincerely,

Oliver Stewart

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

Initial consideration by ORR

1. Both recommendations were addressed to ORR when the report was published on 30 June 2016.

2. After considering the recommendations ORR passed recommendation 1 to RSSB and recommendation 2 to Angel Trains and Eversholt Rail, asking them to consider and where appropriate act upon them and advise ORR of their conclusions.

3. Following discussion at the CP-3 meeting, it was decided to also address recommendation 2 to Porterbrook as although they don't own any rolling stock in the 'networker' family, the provision of sensitive edge door technology may be applicable to other fleets, as we had asked Angel Trains and Eversholt Rail to consider in their responses. The consideration given to each recommendation is included below.

4. This annex identifies the correspondence with end implementers on which ORR's decision has been based.

Recommendation 1

The intent of this recommendation is to improve the rail industry's understanding of passenger behaviour when boarding and alighting from trains and to identify the best methods and technology to promote safe behaviour.

RSSB, in consultation with the industry, and involving due industry process, should consider consolidating the findings from existing research and good industry practice, and undertaking new research as necessary to identify the optimum means for promoting safe behaviour by passengers when boarding and alighting from trains

ORR decision

5. RSSB is carrying out three coordinated pieces of work in relation to this recommendation, with the aim of improving passenger understanding of trap and drag incidents (Lend a Helping Hand); changes to industry guidance to improve the identification and mitigation of undesirable passenger behaviour at the PTI (RIS-3703-TOM); and improvements to the sharing of good practice across the industry (Opsweb).

6. We consider that RSSB have not yet satisfactorily addressed the recommendation, as they have not referred to existing research and good industry practice to identify the optimum means for promoting safe behaviour by passengers when boarding and alighting from trains and is focussing on passenger behaviour at the PTI, rather than industry understanding referred to in the recommendation.

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

- taken the recommendation into consideration; and

- is taking action to implement it, but ORR has yet to be provided with a timebound 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

8. On 29 September 2017 RSSB provided the following initial response:

On 19 July 2016, RSSB presented a paper to the Platform Train Interface Strategy Working Group (PTISWG), which suggested that the recommendation be accepted and addressed in the following ways:

- *The Lend a Helping Hand campaign could be used to help passengers understand how trap and drag events occur, the consequences of such events and the behaviour they should exhibit to safely board and alight. In addition, it was suggested that consideration be given to moving beyond posters to additional ways of influencing passenger behaviour.*
- *The Rail Industry Standard for Passenger Train Dispatch and Platform Safety Measures (RIS-3703-TOM) could be amended to include guidance on spotting undesirable passenger behaviours at the PTI and methods operators can employ to influence passenger behaviour and promote safe boarding and alighting.*
- *The PTI Opsweb site could be used to aid the collation of rail industry good practice, along with relevant information from other sectors (eg water, fire and driving safety etc.). This will further aid the promotion of this important area.*

The paper was approved by PTISWG. An update on progress for each workstream is provided below:

Activity	***Update***	***Status***
Trap and Drag Lend a Helping Campaign	*A new trap and drag poster and animation has been made available via OpsWeb and will be used by Network Rail to support their public education campaign.* *Further activities are planned. Including collaborating with a campaign ambassador who has been a victim of trap and drag.*	*Underway*
Project 16-019: RIS-3703-	*This considers train dispatch and will likely involve a*	*Underway*

TOM	*change to Rulebook module GERT8000-SS1 and an update to RIS-3703-TOM for 'Passenger Train dispatch and Platform Safety Measures'. Publication is expected in 2017.* *The scope has now expanded to now include platform staff as well as train staff and will consider related RAIB recommendations.*	
PTI Opsweb site - Collation of good practice to promote safe behaviour by passengers when boarding and alighting	*Updated and dedicated pages on the new OpsWeb portal is available. PTI Strategy outputs (tools, guides, good practice etc.) are located here to support industry in managing the PTI risk.*	*Complete*

9. ORR wrote back to RSSB on 27 October 2016 with questions about each of the three workstreams, to which they responded on 24 November. ORR's questions and the RSSB responses are set out below:

Lend a helping hand

What are the aims and objectives of the Lend a Helping Hand campaign? How do RSSB think it will address the risk of passengers becoming trapped in train doors?

The aim of the Lend a helping hand Trap and Drag campaign is to support the competence development and management of staff responsible for dispatch by raising awareness of trap and drag. By facilitating the PTI strategy in this area, RSSB is focusing on PTI strategy communications and engagement activities to raise awareness of this risk to system users. The new Trap and Drag poster and animation have been launched and promoted. Network Rail is using the poster to support a public education campaign, as well as using the outputs at managed stations and has been used by the wider industry in training and on stations. A Trap and Drag survivor is being sought to be an ambassador for the risk area in planned related Lend a helping hand campaign in the first quarter of 2017.

RIS-3703-TOM

Can you provide some more detail about the specific module of rule book GERT8000-SS1 under review, the changes being considered and the timescales for doing this work.

The RIS is to be revised to incorporate the learning from RAIB's investigation into the West Wickham and the Hayes and Harlington accidents, as well as other similar accidents. The scope of the review will include all staff involved in train dispatch, as it is perceived that the document is targeted at infrastructure managers and station staff involved in train dispatch. The requirements in the RIS will be written in a way which prevents doubt or misunderstanding for those who wish to apply the requirements for their train dispatch procedures.

RSSB is finalising the draft RIS-3703-TOM and supporting documents, for the 9 May TOM SC pre-consultation meeting. Publication is scheduled now for December 2017.

Opsweb

What do RSSB do to promote the availability of Opsweb and the information it contains to industry? What promotional activity do you undertake when new information is available on OpsWeb?

Opsweb is a known portal to RSSB members and is actively used to disseminate output and good practice from cross-industry system safety risk groups. It is governed by the Train Operations Risk Group (TORG) and administered by RSSB. TORG has dedicated Opsweb communications activities planned for 2017 after the portal's refresh in July. Additionally, the PTI strategy communicates the availability and benefit of Opsweb as part of its communications and engagement workstream.

Recommendation 2

The intent of this recommendation is for train owners to continue to review whether sensitive door technology can be applied to all fleets in the Networker family.

Angel Trains and Eversholt Rail should extend current research on fitting sensitive edge door technology on class 365 trains to include other units in the Networker family (classes 165, 166, 465 and 466), and develop a plan for the fitting of modified doors to those units if the case can be made to do so

ORR decision

10. As noted in para 3, ORR concluded that this recommendation may be applicable to other units, so asked Angel Trains and Eversholt Rail to consider this, while also asking Porterbrook for a response based on the applicability of the recommendation to other fleets.

11. We are reviewing the cost benefit analysis provided by the ROSCOs in order to satisfy ourselves that they are suitably robust and have considered appropriate

factors to support the conclusions they have reached with regard to modifying the door systems on Networker fleets. Further analysis by ORR will be carried out in the second half of 2017and is expected to conclude by 31 December 2017. We will notify RAIB when this work has concluded.

12. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, Porterbrook, Eversholt Rail and Angel Trains have taken the recommendation into consideration but ORR has not yet decided if the conclusions drawn and actions being taken have implemented the recommendation.

Status: Progressing. **ORR will advise RAIB when further information is available regarding this recommendation.**

Information in support of ORR decision

Angel Trains

13. On 30 September 2016, Angel Trains provided an initial response with further updates on 30 November 2016, 3 February 2017 and 27 April 2017. The consolidated response states:

> *16X Fleets*
>
> *For the Class 165 & 166 fleets the two options continue to be considered; -*
>
> *i) A solution similar to that proposed by Eversholt Rail Group for the Class 365 but which integrates sensitive edge nose rubbers with the modern Pneumatic Solution International Ltd (PSI) door system controllers, which are in progress of being fitted during the current C6 & PRM modification works. As reported previously costs have been obtained for the design, material supply, installation and approvals for a trial on a three-car Class 166 unit. The Cost-Benefit Analysis (CBA) for the fitment of sensitive edge nose rubbers to the Class 165/1 & 166 fleets has calculated that the cost of implementation of the modification would be disproportionate to the safety benefit that would be gained. Please note that the Class 165/0 fleet is not currently being fitted with PSI door system controllers and the cost/benefit will therefore be more disproportionate.*
>
> *The Cost-Benefit Analysis (CBA) for the design, material supply, installation and approvals for sensitive edge nose rubbers has now been shared with GWR & Chiltern who are currently in the process of reviewing the calculations to help them decide if there is a business case for modification.*
>
> *[Update - The CBA's have now been shared with Chiltern and GWR and both verbally confirmed their agreement with the outcome that the cost of fitment is disproportionate to the safety benefit that will be gained.]*
>
> *ii) A solution based upon the use of Light Curtain technology aimed at replicating the functionality of a sensitive edge which will again integrate with new door system controllers. We are still working with PSI and GWR to gain*

access to a specific unit at Reading depot to enable the trial fitment (not in-service) to one doorway to establish the optimal position for the curtain. PSI have visited a unit to establish where the equipment will be fitted to support a static trial. We are working with GWR to set up the trial without an impact on service delivery. This will then enable the technology to be proven and costs to be finalised to enable a CBA to be generated and shared with the operators to help them decide the business case for modification.

[Update - Angel Trains contracted ESG to review the feasibility of fitting Light Curtain technology to the Class 16X fleets. This work has now been completed and concluded that the current technology on the market is not suitable for providing full entrapment protection as exemplified by Deutsch Bahn's decision to additionally fit a sensitive edge solution to provide additional protection required when the doors have closed and locked. The conclusion that the system would need to be an addition to sensitive edge protection does not support a better CBA case than sensitive edge system alone and therefore this option will not be being pursued further.]

46X Fleets

We have revisited the sensitive edge system CBA that was originally carried out following the Class 365 Kings Cross incident to additionally account for more recent similar incidents including West Wickham and Hayes & Harlington. The CBA outcome has not changed since the original calculation was completed in 2014, i.e. the cost of the modification is disproportionate to the safety benefit that would be gained. We have now shared the CBA with Southeastern, who have initially reviewed the calculations and are broadly in agreement with the values used. Further questions have been raised which we will be working through with the Southeastern.

[Update – Southeastern have verbally confirmed their agreement with the outcome that the cost of fitment is disproportionate to the safety benefit that will be gained.]

Other Fleets

As previously reported and included here for completeness from a ROSCO perspective evaluation of door system modification options for other affected fleets was run as a joint-ROSCO project. A task was let with CH2M to identify and evaluate options. RDG in conjunction with RSSB invited in a number of TOCs to review the potential modifications identified by CH2M and produce a fault tree and quantify safety benefits, this review also highlighted a further 2 options in addition to those in the CH2M report. Seven different options were identified for evaluation as below; -

- *Option 1: removal of passenger door open controls availability*
- *Option 2: alteration of existing door closure sequence functionality – door fully open switch*

- *Option 3: Alteration of existing door closure sequence functionality – door close delay*
- *Option 4a: Change tolerance of obstacle detection (10mm)*
- *Option 4b: Fitment of sensitive edge (10mm)*
- *Option 5: Addition of sensitive edge obstacle detection – anti-drag detection*
- *Option 6: Push-back doors*

ATL Fleets considered were; -

- *Class 142, 150, 156, 158, 317, 465.*

RSSB have produced a further draft report based on the above entitled 'Passenger Door Operation - Safety Risk Review' which evaluates the CBA for each option including consideration of the potential for cost-effective joint party funding and concludes that 'all [options] are not considered to be reasonably practicable' for retro-fitment.

[Update – Final report awaited.]

Apologies for this update being slightly later than planned. We will continue to have dialogue with the 16X & 46X TOCs with the aim of formalising a decision on sensitive edge fitment and will advise you when this has concluded.

Eversholt Rail

14. On 31 October 2016, Eversholt Rail provided the following initial response:

Following the publication of the RAIB investigation into West Wickham, the three ROSCOs jointly commissioned CH2M Hill to investigate the passenger door systems on all BR legacy fleets to understand if modifications could be introduced to improve safety and reduce the risk of entrapment. This included the fitting of sensitive edge door seals.

The draft report is currently with RDG who are reviewing the implications of the suggested modifications on behalf of the TOC community. The report was limited to BR legacy fleets as the view was taken that modern trains tend to have more sophisticated obstacle detection systems and pose less of a risk. We are awaiting the results of the RDG review before approaching individual TOCs. We have of course talked to LSER about fitting a drag detection system to our Class 465 fleet as an outcome of West Wickham, as I mentioned in my previous email.

It is worth noting that the risk of trapping an object in the doors of Networker trains is thought to be higher than other legacy fleets as the plug door systems contain a positive lock mechanism which does not allow the door leaves to be pushed back.

To the extent that all other legacy stock does allow this, the recommendation in the Hayes and Harlington report is less relevant to those trains.

Porterbrook

15. On 15 December 2016, Porterbrook provided the following initial response:

Thank you for your correspondence in regard to your request that Porterbrook leasing consider recommendation 2 of the Hayes and Harlington investigation report and your advice that although the recommendation is focussed on the Networker fleets belonging to Angel Trains and Eversholt Rail, you consider the findings of the report are relevant to other fleets.

Porterbrook has reviewed the report and actions such that, as requested in your letter, we can provide you with:

a. *full details of any measures taken to implement the recommendation; or*
b. *full details of any measures that we propose to take to implement the recommendation and the proposed timetable for securing that implementation; or*
c. *a full explanation as to why we do not think that any measures to implement the recommendation is necessary.*

Before answering a, b or c we believe that it is pertinent to refer to the latest report produced by RSSB Titled "Passenger Door Operation- Safety Risk Review". Please be aware that this report is in draft status and is unlikely to be final before our deadline submission to you on the 15th of December.

This report contains a number of options, one of which, Option 5, is the addition of sensitive edge obstacle detection- anti-drag detection. The report generates a whole industry cost for implementing this option of between £36.9M and £69.8M. The Cost Benefit Analysis (CBA) results (based over a 20-year appraisal period) has been calculated at between 0.01 and 0.02.

The above values indicate that, through the use of accepted industry practice, modification of rolling stock to fit sensitive edge technology lies within the grossly disproportionate category and hence the existing arrangement is safe so far as is reasonably practical.

Our comments regarding a, band care as follows:

a. *Porterbrook are aware of current technology and the design being applied to Class 365 vehicles, however, based on the report referred to above, the company at this time are not actively developing applications for fleets not fitted with sensitive edge technology.*
b. *Should an operator wish to fit sensitive edge technology on rolling stock leased from Porterbrook we would work with the operator regarding methods of funding, development of the application and installation of the technology on that rolling stock including*

implementation timescales.

c. *Porterbrook, under its duties under the H&SAW Act, supported by the independent report produced by RSSB, using current guidance, believe that the retro-fitment of sensitive edge technology to rolling stock it is required as such an investment would be grossly disproportionate in safety terms. Notwithstanding this Porterbrook will work with our lessees on delivering any requirements they may have.*