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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: Person trapped in a train door and dragged at Jarrow Station,
Tyne and Wear Metro on 12 April 2012**

I write to provide an update¹ on the action taken in respect of recommendations 2 & 4 addressed to ORR in the above report, published on 3 December 2012.

The annex to this letter provides details of the action taken regarding the recommendations. The status of recommendations 2 & 4 is '**implemented**'.

We do not propose to take any further action in respect of the recommendations, unless we become aware that any of the information provided has become inaccurate, in which case I will write to you again.

We will publish this response on the ORR website on 14 February 2020.

Yours sincerely,

Oliver Stewart

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

Recommendation 2

The intent of this recommendation is that the reliability of the door control circuits on the TWM trains is increased in order to minimise the risk of a similar malfunction to that which occurred in this incident.

DB Regio Tyne and Wear should identify ways to improve the reliability of the door obstruction detection and traction interlock systems, including consideration of improvements in:

- design of the control circuitry;
- ingress protection of the micro switches;
- switch cleaning method;
- replacement procedures; and
- implement identified improvements.

ORR decision

1. At the time of the incident the Tyne & Wear Metro was operated by DB Regio Tyne & Wear. This arrangement ended on 1 April 2017 and operation of the system is now done in-house by Nexus.
2. The reliability of the door obstruction detection and traction interlock has been improved across the Tyne & Wear Metro fleet by the upgrading of the microswitches in the door control circuitry. Since that programme of work has been completed, no further trap and drag incidents have been reported on the Tyne & Wear Metro.
3. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, Nexus has:
 - taken the recommendation into consideration; and
 - has taken action to implement it

Status: Implemented.

Previously reported to RAIB

4. On 3 December 2013 ORR reported the following:

Having considered the engineering plan provided by DB Regio Tyne and Wear, ORR has concluded it has identified and implemented ways of improving the reliability of the door obstruction detection and traction interlock systems. The outstanding action is the replacement of Schaltbau switch on phased maintenance and heavy door refurbishment as required, now due for completion in December 2015.

Update

5. On 26 November 2019 Nexus provided the following update:

Replacement microswitches have been installed across the entire Metrocar fleet with the exception of Metrocars 4001 and 4002. These two vehicles have entirely different doorgear, and are not equipped with this type of microswitch.

Recommendation 4

The intent of this recommendation is that the test method used for checking the door obstacle extraction forces is aligned with those specified in the relevant industry standards.

DB Regio Tyne and Wear should change the test method it uses for checking compliance of its train doors against the obstacle extraction forces specified in Railway Group Standard GM/RT2473, so that it is also aligned with the requirements specified in BS EN 14752:2005.

ORR decision

6. Having initially sought a derogation from the Railway Group Standard, Nexus subsequently took action to comply with it by changing door seal maintenance arrangements and the method used for measuring extraction forces from Metrocar doors.

7. Following a review of GMRT2473 Iss 2, it was identified that none of the requirements were in scope of National Technical Rules (NTRs) and therefore both GMRT2473 Iss 2 and the accompanying guidance (GEGN8577) were withdrawn in March 2017 and superseded by RIS-2747-RST Iss 1.

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

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

Status: Implemented.

Previously reported to RAIB

9. On 3 December 2013 ORR reported the following:

We continue to have concerns about DB Regio's reasons for not modifying the doors and its intention to apply for derogation if that is necessary. We continue to engage and will update RAIB by 31 May 2014.

Update

10. On 26 November 2019 Nexus provided the following update:

After extensive dialogue with ORR, DBTW did not seek a derogation from GM/RT2473. This was because door seal maintenance arrangements, and the test method used for measuring extraction forces from Metrocar doors, were changed to comply with the (now withdrawn) standard.

Previously reported to RAIB

Recommendation 2

The intent of this recommendation is that the reliability of the door control circuits on the TWM trains is increased in order to minimise the risk of a similar malfunction to that which occurred in this incident.

DB Regio Tyne and Wear should identify ways to improve the reliability of the door obstruction detection and traction interlock systems, including consideration of improvements in:

- design of the control circuitry;
- ingress protection of the micro switches;
- switch cleaning method;
- replacement procedures; and
- implement identified improvements.

Actions taken or being taken to address the recommendation

1. In its response of 22 February 2013, DB Regio Tyne and Wear explained: *Technical risk assessments have been carried out and the programme for improvements is on-going, as outlined in the engineering action plan (below), and in accordance with our saloon door refurbishment and door switch modification instructions.*

Area	Action	Target date
Maintenance checks	<ul style="list-style-type: none"> • Immediate changes to the way doors are checked re: integrity circuitry. Email to Fleet duty managers to instruct staff. 	Complete
	<ul style="list-style-type: none"> • Notice to staff regarding maintenance requirements of Schaltbau S804B switches as recommended by Schaltbau Investigation Report S804 20120702. 	Complete
	<ul style="list-style-type: none"> • Changes to Work Instructions for A and B examinations to reflect both above points. 	Complete
Risk Assessment	Risk Assessment reviewing Jarrow Schaltbau switch failure, South Gosforth failure, door integrity and door nosing hardness.	Complete
Schaltbau Switch	<ul style="list-style-type: none"> • Identify possible replacements in relation to stronger rated spring for general replacements (S804b40 plunger type snap action switch /S800e40 roller type snap action switch sourced). 	Complete
	<ul style="list-style-type: none"> • Engineering change for stronger rated spring switch use on the fleet as a replacement component. 	Complete

Area	Action	Target date
	<ul style="list-style-type: none"> Alteration of technical procurement description for current Schaltbau switch for future deliveries. Replacement of Schaltbau switch, on phased maintenance /and also heavy door refurbishment as required. Sample checks on the fleet of Schaltbau switches for possible contamination. 	Complete 31 December 2015 Complete
Grease shield	<ul style="list-style-type: none"> A grease shield to be developed for the right hand fully closed switch. A grease shield to prototype, review and then engineering change with sign off prior to commencement. Manufacture (procurement) and installation to right hand fully closed switch on the fleet as undertaken on Metro car B examinations. 	Complete Complete 31 March 2013
Door nosing rubber	<ul style="list-style-type: none"> Determine solution for hardening current door nosing rubbers using the current nosing design Trials tests with firmer door nosing rubber installations and tests in accordance with GM/RT2473. Undertake comparisons and formulate assessment based upon results found. 	Complete Complete
Door header	<ul style="list-style-type: none"> Door header exhaust manifold engineering change directing actuator exhaust down to door side pillars. Cleaning of door header fabrication cover as per B examination. Continuation of Traincare regime Cleaning of microswitches by technicians with soft cloths on B examinations. 	Complete Complete 15 February 2013
Door refurbishment	<ul style="list-style-type: none"> Overhaul of passenger doors in accordance with ¾ Life Refurbishment specification 	31 December 2015

As of February 2013, 20 metro cars out of 90 have still to have all remedial actions identified in the above action plan. 70 cars have had all the micro switches cleaned and the door exhaust modification where applicable. We are monitoring a single vehicle currently fitted out with the grease shields on the fully closed switch to ensure it is not going to cause problems through obstructing/snagging the micro switch it is meant to be protecting.

All micro switches were regularly being changed out per month up until late December 2012 to inspect for contamination. All these switches have been retained for inspection and none have experienced decontamination within the internal mechanism.

We can confirm the previous practice of lubricating the switches has ceased. The switches have all been cleaned and those units requiring the exhaust modification have been dealt with. We estimate the work required on the remaining 20 cars will be completed by April 2013. Within this time, the performance of the grease shield will be further determined and then rolled out to the fleet or reviewed in its entirety if fitting the shield will actually be counterproductive.

Overhaul of the saloon doors will resume in December 2013 in accordance with the above requirements. Door header rewiring is taking place as part of a separate renewal programme.

Area	Action	Target date
<i>Door switches cleaning</i>	<i>Complete</i>	
<i>Failure mode analysis to determine improvements</i>	<i>Complete</i>	

2. An update was provided by DB Regio Tyne and Wear on 29 August 2013:

In our initial response, we indicated that the grease shields had initially been scheduled for fitting by December 2012 and had been rescheduled for replacement by the end of March 2013. As previously advised, some design and manufacturing problems were encountered, as a result of which further additional testing of a modified design was required. Unfortunately, the new design was unsuccessful, causing potentially serious door irregularities and we suspended fitment in May 2013. However we are replacing the micro switches with switches of a more robust design, completion is now scheduled for December 2015.

ORR decision

3. Having considered the engineering plan provided by DB Regio Tyne and Wear, ORR has concluded it has identified and implemented ways of improving the reliability of the door obstruction detection and traction interlock systems. Therefore, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, it has

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

The outstanding action is the replacement of Schaltbau switch on phased maintenance and heavy door refurbishment as required, now due for completion in December 2015.

Status: Implementation on-going. Completion date December 2015

Recommendation 4

The intent of this recommendation is that the test method used for checking the door obstacle extraction forces is aligned with those specified in the relevant industry standards.

DB Regio Tyne and Wear should change the test method it uses for checking compliance of its train doors against the obstacle extraction forces specified in Railway Group Standard GM/RT2473, so that it is also aligned with the requirements specified in BS EN 14752:2005.

Steps taken or being taken to address the recommendation

5. In its response of 22 February 2013 DB Regio Tyne and Wear explained:

New door gauges have been provided and the work instruction for their use has been written. However, problems have been experienced with ensuring full compliance with Railway Group Standard GM/RT2473; the standard requires 150N for pull tests and tests are consistently achieving around 180N. This work will be concluded by June 2013.

6. ORR and DB Regio Tyne and Wear have discussed the issues associated with adjusting the doors to conform to the Railway Group Standard 150N requirement for 'pull out' tests. Further information was provided by DB Regio Tyne and Wear on 29 August:

Testing to the Group Standard we achieve no more than 180N on a consistent basis and, on some occasions, achieve the required 150N. While we can consistently achieve the 150N if we adjust the doors, subject to assessment of engineering risks, we have concerns that this will reduce the sensitivity of the doors in detecting small hands; a hard edge provides greater sensitivity than a soft one. While we intend to use the Group Standard we do not intend to modify the doors at this stage. We will apply to RSSB for a derogation should this be necessary.

ORR decision

7. We continue to have concerns about DB Regio's reasons for not modifying the doors and its intention to apply for derogation if that is necessary. We continue to engage and will update RAIB by 31 May 2014.

Status: In progress – We will update RAIB by 31 May 2014