Andrew Eyles
RAIB Relationship and Recommendation Handling Manager
Telephone 020 7282 2026
E-mail andrew.eyles@orr.gsi.gov.uk

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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: Train fire at South Gosforth

I write to provide an update[1] on the action taken in respect of recommendations 1, 2 and 3 addressed to ORR in the above report, published on 25 September 2013.

Annex A to this letter provides details of the action taken. The status of these recommendations 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 11 December 2015.

Yours sincerely,

Andrew Eyles

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

Recommendation 1

The objective of this recommendation is that Nexus, with support from DBTW, should identify and mitigate the risk associated with electrical breakdown in the train line breaker assemblies.

Nexus, supported by DBTW, should carry out a detailed assessment of the risk associated with faults in the line breaker unit, which should include:

- identification of actual and potential failure mechanisms and an estimate of their likely frequency;
- consideration of the possible effects of line breaker faults, taking account of the configuration and reliability of the electrical protection systems currently provided on the Metro system; and
- consideration of possible consequences, taking account of the potential for fire in high risk environments, such as tunnels. Appropriate actions to reduce the risk and potential consequences of failures should be defined and implemented following the review.

ORR Decision

1. ORR is content that the implementation of this recommendation will be driven by the Nexus response to the Walkergate RAIB report, which also related to the reassessment of similar risks. Implementation of the Walkergate recommendations will satisfy South Gosforth recommendation 1 in a more robust manner than originally proposed. ORR considers that interim mitigation measures introduced by Nexus must be suitably robust to effectively control the risk and ORR is working with Nexus and DBTW to ensure this is achieved.

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

- taken the recommendation into consideration; and
- are taking action to implement it by 30 June 2016.

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

Brief summary of progress previously reported to RAIB

3. On 9 June 2014 ORR reported to RAIB that Nexus and DBTW had produced a joint action plan to reduce the risks associated with line circuit breaker fires and enhance D.C. protection systems, and a joint assessment of risks had taken place.

Update

4. On 28 May 2015 Nexus provided updated versions of the risk assessment and risk assessment summary sheet:

> *It is worth noting that this risk assessment was considered complete until we suffered a further event involving a line breaker in August 2014. As a result of that the Risk Assessment (RA) has been comprehensively reviewed. This is now being further reviewed following the release of an independent forensic examination of a line breaker by HSL laboratories which was requested by the ORR. Once that final review is completed the RA will be formally acknowledged by both Nexus & DBTW and the final version will be sent to you.*


Rec 1 RA Summary sheet Metro car fire Ja


RA Rec 1 Metro car fire Jan 13.pdf


Action Plan for ORR 06-09-13 Update V1 5

5. On 19 August 2015 Nexus provided a further updated version of the risk assessment and the following supplementary information:

> *The RA has been updated following the Tyne & Wear accident at Walkergate station in August 2014 which resulted in the overhead line parting. The ORR investigation into that event included a scientific examination of the Line breaker (a part of the train equipment) which 'failed' as part of the event. The updated RA has also considered the findings of this report.*
>
> *Following the event at Walkergate station in August 2014, the RAIB investigation report has included a recommendation to:*
>
> *"identify (or review) and assess jointly created risks that occur at all interfaces between the infrastructure, power operations and trains. This should include the use of suitable risk assessment methodologies appropriate for identifying potential failure modes and their consequences, and a recognised technique for assessing the extent to which additional mitigations are required to reduce the risk as low as reasonably practicable. To this end, Nexus and DBTW should ensure that they have access to, and utilise, competent advice on conducting assessments of system-wide risks".*
>
> *The stated approach to this is to combine the current RAs that we have to help satisfy the requirements of this recommendation.*


LB Failure modes Master index sheet V2


LB failure mode Risk Assessment V 2.6 SIG

Recommendation 2

The objective of this recommendation is to facilitate passenger evacuation from trains using the emergency handles to release doors by identifying a maximum level

of force required to operate them and then periodically checking that handles comply with the identified maximum.

DBTW, supported by Nexus, should establish the maximum level of force required to enable a diverse range (such as 5th percentile female to 95th percentile male) of passengers to easily operate the emergency door release handles on the Metro car fleet, and implement the necessary inspection and maintenance processes to achieve it in practice, taking account of the need to balance the ease of operation in emergency with the risk of undesired door releases.

ORR Decision

6. ORR notes that 37 of the 86 Metro car fleet have had their emergency door release mechanisms overhauled and that the full programme is due to be completed by July 2016.

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

- taken the recommendation into consideration; and
- are taking action to implement it by July 2016.

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

Brief summary of progress previously reported to RAIB

8. On 9 June 2014 ORR reported to RAIB that an initial investigation had taken place which has established the forces required to operate the levers, and forces which might be realistically applied by 5th percentile females. The report outlined the further work necessary to scope the problem and make reasonable adjustments.

Update

9. On 5 June 2015 DBTW provided the following update:

DBTW confirmed that a detailed study was conducted as part of her dissertation / thesis for a Batchelor's qualification in Engineering on the subject.

The report highlights that the current emergency door release mechanism requires forces of around 300N to operate, which is double the specified Railway Group Standard. With regards to 'establishing the maximum level of force required to enable a diverse range (such as 5th percentile female to 95th percentile male) of passengers to easily operate the emergency door release handles' the report specifically estimates that the force / mean grip strength of 5th percentile females ranges between 250-290N. There was no mention of the grip strength of 95th percentile males (i.e. the far right end of the scale). However, DBTW can only assume that if 5th percentile females are estimated

to have a grip strength of 250-290N then the vast majority of people above this percentile will be capable of far exceeding the 300N required to operate the current emergency release handle, especially 95th percentile males.

With regards to the second element of the RAIB's recommendation, 'implement the necessary inspection and maintenance processes to achieve it in practice', my understanding from speaking with Fleet is that there is an ongoing door modification programme which introduces a low friction cable into the mechanism and removes the emergency release mechanism protection plate. Both of these minor modifications culminate in a slight reduction of the force required to operate the mechanism (brings it down to approximately 231-250N) and therefore within the capabilities of a 5th percentile female. The obvious point is that this still does not meet the Railway Group Standard of 150N; however, any such modification will require a greater level of re-design and modification most likely suited to an upgrade programme / new fleet.

On a related note, we have also recently re-designed the emergency door release sign so that it is easier and more practical to follow. Once our Media and Marketing people have given it the 'green light' from a standards perspective it will be coming through the Concession Offices for Nexus consideration and, hopefully, approval prior to embodiment. In short, it includes direction that anyone wishing to operate the handle should pull it down slightly until they hear and feel all of the air and pressure has been released. The importance of this step cannot be underestimated as once the air has exhausted from the system the handle can be pulled down and locked in placed with relative ease. Without waiting for the air to release, the person is in effect pulling against the air pressure and therefore making the task a lot more difficult.

10. In response to a request from ORR for further information DBTW providing the following update on 12 November 2015:

As of 6 November 2015, 37 of 86 Metro cars have had their emergency door release mechanism overhauled. The current programme for door overhaul is projected to complete on the 19th July 2016. Additionally, DBTW can confirm that a newly designed Emergency Door Release Sign was created within DBTW, and submitted through the Key Metro Document procedure for approval by Nexus, in an attempt to make the instructions for operating the door release mechanism more easy to follow for members of the public. However, it has been decided that, prior to embodying this sign, further work is required within DBTW in order to determine whether a set of 'pictograms' or a mix of pictures and wording would be more appropriate as a replacement for the existing signs. This work is still ongoing.

Recommendation 3

The objective of this recommendation is to improve the reliability of the radio communication system used on the Metro network.

Nexus should review the communication systems used on the Metro network, establish an appropriate level of reliability/availability for them, and implement, in a defined timescale, the introduction of suitable improvements.

ORR Decision

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

- taken the recommendation into consideration; and
- are taking action to implement it by October 2016.

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

Brief summary of progress previously reported to RAIB

12. On 9 June 2014 ORR reported to RAIB that, at the time of the incident, Nexus was already in the process of procuring a new radio system which was scheduled for introduction in mid-2015. In the interim, work was on-going to ensure that the current radio system continues to operate within acceptable parameters. Interim measures include a survey of radio black spots and an additional radio mast at Tyne Dock.

Update

13. On 28 May 2015 Nexus provided the following update:

As you are hopefully aware, Nexus had begun to plan for a renewal of the radio communication system prior to the SGF train fire in January 2013. The update below goes some way to evidencing the progress of the 'radio project'.

- *Design – Has been completed, form A's, B's and AB's are continuing to be submitted for each part of the system*
- *Field Strength testing has been carried out for planning purposes*
- *Leaky Feeder – Installation of all main tunnel sections has been completed*
- *Core sites – Installation of the core sites has been completed – testing is on going*
- *Core sites – Have been connected to the Nexus IP Network*
- *BTS Sites – Main BTS site at Regent Centre has been completed – antenna are to be connected*
- *First test call over the new system has been completed*
- *BTS – Sites will commence installation in June – this will allow the installation of repeater sites*

- *Voice/Data logging solution – installation to be confirmed after CMT sign off*
- *Training – expected to start in June*
- *LDSR – installation within the control rooms is expected to commence in June*
- *Cab Radio's – FAT tests are scheduled to start in June*
- *Reliability Testing - due at the end of October*
- *Rolling stock install – Due to start at the end of November*
- *Health and Safety File – Completion due at the end of January*
- *Equipment Recovery – Due to be completed at the end of February*
- *Project Completed – April 2016*

14. Nexus provided following further information on 5 November 2015:

This is being addressed through the Nexus Radio replacement project.

The latest dates from the project team are as follows:

- *Radio Network Accepted into Service date (Linked to End of Radio Reliability Period) – 24 March 2016*
- *New Radio System Available for Use (All Metro Trains and Support Vehicles Converted & Tested) – 4 August 2016*
- *Project Complete (Incl Recoveries, H&S File etc) – 5 October 2016*

This project is discussed at length at the regular Control, Command & Signalling Engineering technical liaison meetings.