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Mr Andrew Hall
Deputy Chief Inspector of Rail Accidents
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Dear Andrew,

RAIB Report: Buffer stop collision at Chester Station

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 24 November 2014.

Annex A to this letter provides details of the consideration given/action taken in respect of these recommendations. The status of recommendation 1 is '**Part Implemented**', and recommendations 2 and 3 are '**In Progress**'. ORR will advise RAIB when further information is available regarding actions being taken to fully address these recommendations.

We will publish this response on the ORR website on 28 October 2015.

Yours sincerely,

Andrew Eyles

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

Initial consideration by ORR

1. The 3 recommendations were addressed to ORR when the report was published on 24 November 2014.
2. After considering the recommendations ORR passed:
 - Recommendation 1 to Arriva Cross Country Trains and Virgin Trains;
 - Recommendation 2 to Virgin Trains; and
 - Recommendation 3 to RSSB,asking them to consider and where appropriate act upon them and advise ORR of their conclusions.
3. The consideration given to each recommendation is included below.

Recommendation 1

The intent of this recommendation is to reduce the risk associated with low adhesion by extending the fitment of automatic sanders.

Operators of class 220 and 221 units should fit sanders to their trains which comply with Group Standard GM/RT2461 and automatically deposit sand on the rail when wheelslide is detected during heavy braking (equivalent to brake step 2 on step braked trains). The mode of operation of this new equipment should take account of recommendation 1 of RAIB report 25 (Part 3)/2006.

Steps taken or being taken to address the recommendation

Virgin Trains

4. On 11 December 2014, Virgin Trains provided the following information:

Virgin Trains confirms the contents of RAIB report paragraph 160 - which reads:

'Virgin Trains has stated that its fleet of class 221 trains is to be fitted with auto sanders. An order has been issued to Bombardier Transportation for this work and fleet installation is planned for completion by autumn 2015.'

5. ORR was subsequently advised by Virgin Trains on 29 June 2015 that the first auto sander had been fitted to the Class 221 fleet and that a rolling programme was in place to complete fitment of the whole fleet by early September 2015 (see Annex B).



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6. On 13 October 2015 Virgin Trains confirmed to ORR that the fitment programme had been completed.

ORR decision

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

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

Status: Implemented.

Cross Country Trains

8. On 12 March 2015, **Cross Country Trains** provided the following information:

Cross-Country is taking the following actions in respect of the recommendation:

- *With Bombardier our Voyager train service provider Cross-Country is exploring options for both the Class 220 and Class 221 fleets in relation to the design and fitment of an automatic sanding system that complies with Group Standard GM/RT2461 and automatically deposits sand on the rail when wheelslide is detected during heavy braking.*
- *Cross-Country believe the total budgetary price is in excess of £3 million for the fleet of Class 220 and 221 units. Cross-Country understand that Virgin Trains is planning to fit an automatic sanding system to its Class 221 units between April and September 2015. It is the Cross-Country expectation that there will be some synergies in the design work and installation process carried out by Bombardier for Virgin Trains and Cross-Country is working to provide some benefit to the process for Cross-Country's Voyagers.*
- *Cross-Country is currently approaching a period of Direct Award with the DfT, however Cross-country has engaged with Voyager Leasing, the owner of the trains to explore an approach for funding the works.*

9. Cross-Country trains provided a further update on 1 June 2015.

Cross-Country has discussed this project with the Department for Transport (DfT) and stated its intention to include it within the forthcoming Direct Award discussions. DfT is also keen to learn if there are any periods of currently planned modification downtime which might be used to facilitate the modification at an early date. Cross-Country is progressing obtaining a design and a price for the modification of Class 220 sets from Bombardier. We are seeking confirmation that the design already provided to Virgin Trains for Class 221 sets can be used for our modification noting any differences which now exist (e.g. tilt capability).

ORR decision

10. After reviewing information received ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, Cross-Country has:

- taken the recommendation into consideration; and
- is taking action to implement it, however is unable to determine at this stage, due to discussions with DfT, when this recommendation will be implemented.

Status: In progress. ORR will advise RAIB when the actions to address this recommendation have been completed.

Recommendation 2

The intent of this recommendation is to reduce the risk associated with trains approaching buffer stops in low adhesion conditions by an extension of existing defensive driving policy.

Virgin Trains should amend its defensive driving policy so that the requirement to reduce speed to 10 mph or less at a distance of 200 metres from the signal when approaching a danger signal in low adhesion conditions is also applied when approaching a buffer stop with a train that is not fitted with automatic sanders.

Steps taken or being taken to address the recommendation

11. On 11 December 2014, Virgin Trains provided the following information:

Virgin Trains confirm that it has briefed all of its Drivers prior to the Autumn 2014 season using both a poster campaign and the 'Autumn Safety Brief' which both advised that the approach to buffer stops during poor adhesion should be the same stopping technique as that adopted during poor adhesion when approaching a red signal.

The Professional Driving Policy is being reviewed and will be re-issued in early 2015 to make this a mandatory requirement.

12. On 20 August 2015 Virgin Trains provided the following update:

The Professional Driving Policy is still undergoing its review at this moment in time. The reason behind the extended timescale is due to the introduction of NTS within the policy which has required negotiations with our Aslef Company Council representatives. It is still our intention to release this year as soon as possible.

ORR decision

13. After reviewing information received ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, Virgin Trains has:

- taken the recommendation into consideration; and

- is taking action to implement it, however a timebound plan has not yet been provided.

Status: In progress. ORR will advise RAIB when the actions to address this recommendation have been completed.

Recommendation 3

The intent of this recommendation is that manufacturers of new trains for the UK railway system are made aware of the need for sanders to operate during braking in step 2 (or the equivalent brake handle position for units not fitted with stepped brakes) and above.

RSSB should propose and promote an amendment to Railway Group Standard GM/RT2461 to extend the requirement that sanders operate automatically when wheel slip is detected in full service and emergency braking, to braking at lower settings (e.g. step 2 on units with stepped brake controllers).

Steps taken or being taken to address the recommendation

14. On 28 January 2014, RSSB provided the following information:

RSSB notes the following:

- *The Class 221 unit involved in the incident was not fitted with automatic sanders, being instead fitted with driver-activated one-shot sanders (plus a reserve). None of the RAIB findings into the actual incident are directly applicable to the recommendation.*
- *On those disc-braked multiple units fitted with automatic sanders, the industry has already implemented automatic sanding in brake step 2 (triggered by wheel slide protection (Wheel Slip Protection WSP) activity, which indicates the presence of low adhesion). This work was initiated as a result of RAIB's January 2007 report following the low adhesion incidents at Esher and Lewes during autumn 2005.*
- *GM/RT2461 clause 6.1 already permits automatic sanding in brake step 2. The industry, through the Rolling Stock Standards Committee, accepted that deviations against GM/RT2461 have not been required when train operators re-configured their automatic sanders to operate in brake step 2.*

*Extract from applicable clause: **6.1 Conditions for sanding equipment activation in braking mode:** When operating in braking mode, as a minimum the sanding equipment shall discharge sand during full service and emergency brake applications when the presence of low adhesion is automatically detected.*

In parallel with the modifications to the automatic sanders on the disc-braked multiple units, all tread-braked multiple units have now been fitted with sanders. On tread-braked units, the sanders are manually triggered by the driver as these units are not fitted with WSP equipment, so cannot automatically detect low adhesion. Incidentally, evidence was collected over a series of autumn trials to show that permitting a greater use of sanders has not contributed to an increase in wrong side track circuit failures (WSTCFs);

consequently, a deviation to GM/RT2461 was granted during 2014 to permit driver-activated sanders in all brake positions.

Note too that GM/RT2461 is on the Rolling Stock Standards Committee's list of Railway Group Standards planned for revision but this work has still to be scheduled. In the meantime, an industry consultation on the existing document has been initiated – to determine feedback from users of the standard. Additionally there is ongoing RSSB-funded research work into sanders (T797 – Performance and installation criteria for sanding systems).

The Rolling Stock Standards Committee discussed the recommendation as written at its 16 January 2015 meeting. The Committee was minded to agree with it, but deferred implementation until the results from T797 are available. These are due by the end of 2015.

RSSB will enter this response into SMIS for tracking purposes.

15. On 23 March 2015 ORR wrote to RSSB expressing the view that:
- a. railway group standard (RGS) GM/RT2461 issue 1 did not meet the intent of the recommendation because it does not mandate the operation of sanders at lower speeds; and
 - b. seeking an update on progress with research programme T797 and the likely impact that delays in completing this work might have on updating the RGS.

16. RSSB provided the following update on 8 July 2015:

It was noted at the Rolling Stock Standards Committee [17 April 2015] that the results from T797 are still awaited. Once received, the decision can be taken re whether and how to revise the RGS. It was felt by the committee that the change proposed by the RAIB recommendation was not sufficient justification within itself to commence a project to amend the standard because changing the RGS will not (of itself) prevent a repeat of the Chester buffer stop collision (the deficiencies in sanding on the Voyager are not addressed by the recommendation).

However, despite the delay in awaiting results from T797, there are several changes that could reasonably be made to RGS GM/RT2461 and therefore the committee asked RSSB to promote the priority of the project. Technical resource has now become available and so the project to amend GM/RT2461 (including consideration of the RAIB recommendation) will commence July/August 2015.

ORR decision

17. After reviewing information received 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, however RSSB has not indicated when action to implement this recommendation will be completed.

Status: In progress. ORR will advise RAIB when the actions to address this recommendation have been completed.



Class 221 Operations Notice

Introduction of Automatic Sanders

Effective from 26th June 2015

Groups	Drivers, Driver Team Managers	Train Managers, On Board Managers	Station Team, Group Station Managers	On Board Catering Team	Ops Control	Fleet Team	Other Managers	Relevance ratings 3 = Critical/must be acted upon 2 = Need to know 1 = Information only 0 = Not relevant
Relevance ratings	3	0	0	0	1	2	1	

1) Background:

221104 will be the first Class 221 to enter service with modified auto sanding equipment on 26th June 2015. A rolling programme of fitment will see the remaining fleet complete by early September 2015. The existing sand bottles will be removed and replaced with sand hoppers as per the Class 390.

Operation of the auto sand is identical to the Class 390, and includes the isolation of the lead axle to maintain an accurate reference speed, however there are visible differences within the Voyager cab.

2) Instructions

2.1 In Cab changes

The level 3 lamp previously labelled 'WSP Activity' has been re-labelled 'Sander' with the former 'Primary Sanding Activation' lamp re-labelled 'Sandbox Level Low' – see Fig 1.



Fig 1: In cab changes

The 'Sanding C/Over' switch on the rear wall will be permanently isolated and labelled as such. This is a temporary measure until the switch is removed and a blanking plate fitted – see Fig 2.



Fig 2: rear panel

Introduction of Automatic Sanders

continued ...

2) Instructions (continued)

2.2 External changes

An electrical box (housing a sanding test button and level indicator) has been positioned adjacent to the No 2 bogie on the non-driver's side. This button and indicator are for use by maintenance staff only. See Fig 3.

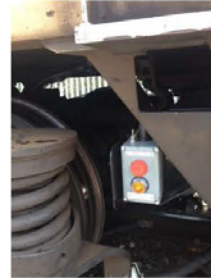


Fig 3: Test button and indicator lamp

A "Sanders Air Supply Isolating Cock" or SASIC has been provided for use in case of air leakage from the sanding pipework that prevents the maintenance of main reservoir pressure. Maintenance will advise when this must be used. It is positioned adjacent to No 2 bogie on the Driver's side. See Fig 4.



Fig 4: SASIC

2.3 Auto sanding indications and operation


Sand will be dispensed automatically on the leading vehicle during braking, when Level 2 WSP activity occurs at speeds of 8mph and above.

A manual sanding function is available (the same as on the Class 390) – operated by pressing the 'Sander' button and available only when braking, which will dispense sand for 10 seconds. Unlimited repeat applications may be made by the driver.

The **Sandbox Level Low** lamp will illuminate, accompanied by a TMS level 2 alarm, when there is around 20% of sand remaining in the hopper. This is only a warning indication – Drivers should advise Maintenance at the first convenient opportunity who will decide on the next actions needed.

Should sand level fall to 5% or less, then the **Sandbox Level Low** Lamp will illuminate accompanied by a level 3 TMS alarm. Drivers should treat the train as having no sand and apply the existing instructions as for deployment of both pairs of sand bottles(VI - Module 7).

When the emergency plunger is pressed, sand will be dispensed automatically whether WSP is present or not, sand deployment will cease below 3 mph.

<p>Authorised By</p>  <p>Chris Duddy Driver Standards Manager Virgin Trains</p>	Virgin Trains Safety Reference Number:	221/OPS/091
	Depot Reference Number:	
	Notice to be posted:	26/06/15 – 25/08/15
	Date Posted:	
	Date of Transfer:	
	Notice transferred to Notice Case Number:	
	Date of withdrawal:	