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

RAIB Report: Runaway of a road rail vehicle and the resulting collision in Queen Street High Level Tunnel, Glasgow

I write to provide an update¹ on the action taken in respect of recommendation 4 addressed to ORR in the above report, published on 17 July 2014.

The annex to this letter provides details of the action taken. The status of this recommendation is now '**Implemented**'. We do not propose to take any further action in respect of these recommendations unless we become aware that any of the information provided becomes inaccurate, in which case I will write to you again.

We will publish this response on the ORR website on 17 August 2015.

Yours sincerely,

Andrew Eyles

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

Recommendation 4

The intention of this recommendation is to reduce the likelihood of RRV parking brakes being inadequate by improving the quality of RRV parking brake tests.

Network Rail, in conjunction with the M&EE Networking Group, should review and improve the requirements and guidance for testing of RRV parking brakes so that such tests reliably demonstrate that the brake will be effective in all foreseeable operating conditions. The review should include, but not be limited to, consideration of:

- demonstrating sufficient safety margins (including any related to uncertainties in the testing method);
- allowing for foreseeable degradation, such as brake pad wear;
- allowing for varying environmental conditions, including variations in contamination at the brake/wheel interface;
- ensuring that test methods used are repeatable and consistent; and
- testing to be carried out by RRV suppliers, users and maintainers.

Steps taken or being taken to address the recommendation

4. On 13 July 2015 we reported to RAIB that Network Rail had reviewed the industry standard pull test and, following the finding of significant inadequacies, a new improved torque test method had been developed, trialled and updated within COP0025² - *Code of Practice for Brake Testing of RRVs* (published on 6 June 2015).



COP0025 Iss 3.pdf

5. Whilst ORR was satisfied that the development of the new test addressed the requirements of recommendation 4 it was seeking confirmation from Network Rail that the key issues specifically identified by RAIB had been considered as part of the review.

Update

6. Network Rail has provided confirmation that each of the specific bullet points within the recommendation have been addressed by the following documents (see Annex A):

- COP0025 Issue 3; and
- NR/TS/DWB/R003 – DRWB: Assessment of performance degradation and the associated control measures

² Available at <http://www.rssb.co.uk/rgs/oodocs/COP0025%20Iss%203.pdf>.

ORR Decision

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

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

Status: Implemented.



1 Publications

Two documents have been produced to address the recommendation:

- COP0025 Issue 3 – Code of Practice for Brake Testing of RRVs – M&EE Networking Group – 06/06/15 (Planned)
- NR/TS/DWB/R003 – DRWB: Assessment of performance degradation and the associated control measures – Network Rail – 03/03/15

NR/TS/DWB/R003 quantifies the performance degradation associated to brake pad wear, and critically reviews brake system maintenance plans.

COP0025 describes a test method whereby the torque required to rotate individual wheels against the brake is measured (torque test). This replaces the Pull Test.

2 Response to Recommendation

The approach adopted has been to:

- Develop an improved brake test methodology
- State the supplier's responsibility for quantifying modes of degradation
- Provide guidance on quantifying modes of degradation

2.1 The review should include...consideration of: demonstrating sufficient safety margins (including any related to uncertainties in testing)

Sufficient safety margins are dependent on quantifying the modes of performance degradation, and allowing for these in test pass/fail values. See section 2.2.

Uncertainty during testing has been significantly reduced through development of the torque test:

- Pull Tests give an average performance measure for all braked wheels
 - Torque tests give a performance measure for each braked wheel
- Pull Tests are effected by forces in the wheel rail interface
 - Torque tests measure only the force in the brake calliper

2.2 The review should include...consideration of: allowing for foreseeable degradation, such as brake pad wear

It is the supplier's responsibility to incorporate foreseeable degradation between maintenance into the brake test pass/fail values.

NR/TS/DWB/R003, Recommendation 3 and 4:

“Suppliers of DRWB systems should quantify foreseeable degradation of brake systems”

“Suppliers of DRWB systems should select brake test pass/fail values sufficient to maintain mandated brake performance between routine tests”

COP0025, Paragraph 3.1.3

“The manufacturer should provide the minimum torque figures...with an allowance for degradation and wear between tests such that the absolute figure is never reached”

NR/TS/DWB/R003 quantifies the performance degradation associated with brake pad wear. The methods employed may be used by suppliers to assess a variety of degradation modes.

NR/TS/DRWB/R003, section 10.1.1 provides a non-exhaustive list of possible modes of degradation.

2.3 The review should include...consideration of: allowing for varying environmental conditions, including variations in contamination at the brake/wheel interface

Contamination of the braked surface is a mode of degradation that the supplier must quantify; it is included in the list of possible modes provided in NR/TS/DWB/R003.

NR/TS/DWB/R003, Recommendation 7 reads:

“Suppliers...should define, through experimentation, the relationship between static brake torque and stopping distance. Such tests should consider a variety of environmental conditions”

2.4 The review should include...consideration of: insuring that the test methods used are repeatable and consistent

The torque test provides significantly improved consistency over the pull test. See Section 2.1.

The test methodology requires tests to be performed with no contamination on the braked surface; this ensures consistency in test conditions.

2.5 The review should include...consideration of: testing to be carried out by the RRV suppliers, users and maintainers

The guidance provided in COP0025 and NR/TS/DWB/R003 is aimed at suppliers and maintainers of RRV brake systems.

Users of RRV brake systems undergo pre-start functional checks. It is the supplier's responsibility to specify adequate pre-start checks. Guidance on minimum requirements is given in NR/TS/DWB/R003, Section 10.1; contemporary pre-start checks are critically reviewed against these criteria (Section 10.2 to 10.10).