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29 January 2014

Ms Carolyn Griffiths
Chief Inspector of Rail Accidents
Cullen House
Berkshire Copse Rd
Aldershot
Hampshire GU11 2HP

Dear Carolyn,

Collision of a road-rail vehicle with a buffer stop at Bradford Interchange station, 25 March 2012

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 July 2013.

The annex to this letter provides details of the consideration given/action taken in respect of each recommendation where the status of:

- Recommendations 1, 2 and 5 are 'In-progress'; and
- Recommendations 3 and 4 are 'Implementation on-going'.

We expect to update you on progress on

- Recommendation 1 and 2 by 31 July 2014; and
- Recommendation 5 by 30 January 2015.

We expect to confirm that actions to address recommendations 3 and 4 have been complete by 3 October 2014.

We will publish this response on the ORR website on 12 February 2014.

Yours Sincerely

Chris O'Doherty

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

Initial Consideration by ORR

1. All 5 recommendations contained in the report were addressed to ORR when RAIB published its report on 27 July 2013.

2. After considering the report / recommendations, on 15 August 2013, ORR passed:

- Recommendations 1 & 2 to Quattro Plant Ltd; and
- Recommendations 3, 4 & 5 to Network Rail

asking them to consider and, where appropriate, act upon them.

3. Details of consideration given and any action taken, in respect of these recommendations are provided below.

4. ORR also brought this report to the attention of London Underground Limited, Docklands Light Railway, The Heritage Rail Association, The Light Rail Engineers Group and the Rail Plant Association as it was concluded that there are equally important lessons for them. ORR did not ask these organisations to provide a reply.

Recommendation 1

The intention of this recommendation is for Quattro Plant Limited to better control the design and modification of safety critical equipment by using appropriate measures of engineering safety management.

Quattro should review, and amend, its procedure for the management of modifications to on-track plant, such that any future modifications which could affect the safety of RRVs follow the principles of engineering change management, whether the work is done by third parties or in-house.

As a minimum, the review should identify and action the changes required to existing procedures to ensure that:

- a. modifications that have the potential to affect the safety of operation are risk assessed, and any residual risk or newly introduced risk is suitably mitigated by design measures or inclusion within inspection, testing and maintenance procedures;
- b. safety critical design work on RRVs is checked and subject to independent verification;
- c. safety critical design work on RRVs is fully and accurately documented;
- d. systems that are critical to safe operation are formally tested to a documented specification during the initial commissioning, or subsequent modification, to verify that they are operating correctly in all modes of operation, including checking the protection against all credible faults; and
- e. the access to safety critical systems, such as the rail axle interlocking circuit and its override, are reviewed and suitable restrictions are applied.

Details of steps taken or being taken to implement the recommendation

5. Quattro Plant Limited, in its initial response on 26 September 2013, advised that:

The procedure RMP09 – “Control of Modifications to On Track Plant” is in the process of being reviewed. The review has not yet been delivered as it has been subsumed into a wider process review following the change of business ownership effective 1 August 2013.

A complete prohibition on all in-house modifications that have the potential to affect safety of operation has been imposed following the incident. All such modifications are being performed by approved external engineering companies; these companies are being subjected to an enhanced supplier audit regime. This ensures that the relevant recommendations of the RAIB report are complied with.

When RMP09 is up-issued it will include suitably robust arrangements to ensure that any and all future in-house modifications comply with the recommendations of the RAIB report. It is not our intention to carry out any in-house in scope modifications but adherence to the provisions of RMP09 will ensure that if ever this stance is revised a robust design and design verification / validation process will be followed.

Furthermore, Quattro recognise the requirements within RIS-1530-PLT issue 4, in respect of the VAB [Vehicle Acceptance Body] ensuring that the engineering authority has complied with the Supply of Machinery (Safety) Regulations 2008 – as amended by the Supply of Machinery (Safety) (Amendment) Regulations 2011, and the Provision and Use of Work Equipment Regulations 1998 (3.3.1 and GN8) and that an FMEA [Fault Mode and Effects Analysis] has been produced for all elements within the design (5.10.6 and GN156) will go some way to ensuring an external review of the end-to-end design process. Notwithstanding this, we fully appreciate our need to meet our legal responsibilities and, by so doing, comply with the recommendations of the report.

In specific response to 1(e), this action has already been taken. The push button switch formerly used to energise & activate the rail axle interlock circuit has been renewed with a key switch. This change of switch is supported by documented processes which require that the key used to activate the control circuit is retained within a key-safe on the machine. Access to the key-safe is controlled by a unique 4-digit combination. The key-safe access code is retained by Quattro’s 24 Hour Control and is only issued once compliance with the requirements of the documented work instruction has been confirmed by the person requesting the access code.

This modification and associated arrangements have been discussed and agreed with the ORR. Independent verification of the modified arrangement is to be undertaken; Quattro is currently in the final stages of contract negotiations.

ORR Decision

6. ORR is not satisfied that Quattro Plant Limited’s response adequately addresses the recommendation, as there is insufficient detail and commitment to timescales, and is planning to meet with Quattro Plant Limited to discuss these concerns.

Status: In-progress.

ORR will update RAIB by 31 July 2014 on action being taken to address this recommendation.

Recommendation 2

The intention of this recommendation is for Quattro Plant Limited to better manage the competence of its personnel and the provision of information to them.

Quattro should review and improve its existing systems for the management of staff that are engaged in the maintenance, inspection and operation of road-rail vehicles and as a minimum the review should identify the most effective means of:

- a. creating sufficient working documents for installation, test, inspection, maintenance and operation of safety critical systems on Quattro's RRVs;
- b. providing appropriate warning labels informing staff of the precautions to take when overriding safety critical systems on RRVs;
- c. improving management systems to ensure that:
 - all technical staff and machine operators are fully trained in the specific operations of safety critical systems on each type of RRV that they inspect, maintain and/or operate, and the safety measures to take when it is necessary to override them;
 - controls are in place to ensure that only competent persons are able to override safety critical systems;
 - depot staff and operators have access to information for the installation, test, inspection and maintenance tasks they are undertaking on safety critical systems; and
 - any unexpected behaviour of an RRV is reported and results in an investigation by a person competent to do so to fully discover the cause of the fault and that it is rectified appropriately before use.
- d. establishing monitoring systems to check that staff are correctly applying the inspection and maintenance procedures, and are competent to do so, including:
 - enhanced surveillance and regular audits; and
 - checks that staff are familiar with, and have access to, documentation that is relevant to the safety critical tasks they are undertaking.
- e. checking that the RRVs supplied for use on rail are fully operational and compliant with Quattro's own maintenance documents (these should include physical equipment checks at their depots and on worksites).

Details of steps taken or being taken to implement the recommendation

7. Quattro Plant Limited, in its initial response on 26 September 2013, advised that:

Fundamental to the runaway of the dumper was the presence of the bridging wire. Quattro does not consider that it is reasonably practicable for maintenance staff to perform detailed checks of all electrical installations. However, Quattro does recognise that the potential to identify the presence of the bridging wire and rectify the circuit was not afforded by our current arrangements. Quattro therefore propose to embark upon a programme to ensure that all housings containing such electrical assemblies are fitted with tamper proof seals. Inspection of the integrity of the

tamper proof seal will form part of regular maintenance and therefore the disturbance of any such seal will trigger a suitably thorough investigation.

a) As stated in our response to recommendation 1, Quattro are no longer undertaking in-house design and installation of safety critical systems, therefore Quattro currently does not intend to provide working documents in respect of installation. If in the future Quattro change this stance, then the amendments to RMP09 will be suitably robust to ensure the creation of appropriate work instructions to control installation and all subsequent verification and test activity.

In respect of on-going test, inspection and maintenance we are currently reviewing our Maintenance Plans to ensure they are robust and provide suitable and sufficient instruction to maintenance personnel. The content of the RAIB Report is a key consideration in this review.

In respect of operating instructions, the work instruction referred to in our response to recommendation 1(e) is sufficient to control the operation of the axle interlock override circuit. Quattro is undertaking no new in-house design and development work. Quattro is reliant upon Quattro's approved suppliers to provide Quattro with adequate work instructions. If in the future Quattro change this stance, then the amendments to RMP09 will be suitably robust to ensure the creation of appropriate work instructions to control operation of the affected machines.

b) Warning labels informing staff of the precautions to take when overriding rail axle interlock systems have already been produced and fitted to the affected machines; both in the machine cab and adjacent to the rail axle interlock override key switch. In addition, Quattro has provided relevant staff with a safety briefing on this matter which additionally reminds of the potential legal consequences of uncontrolled and/or unauthorised override of safety systems. Quattro is currently assessing the desirability of fitting labels warning against the override of RCIs.

c) Machine operators are currently instructed in the specific operation of safety critical systems on each type of RRV they are authorised to operate. Quattro has recognised that our current arrangements for issuing Authority to Work permits are not sufficiently robust in as much as the operator is not required to sign to acknowledge that they have received all machine specific training. Quattro is in the process of reviewing and revising these arrangements so that a declaration is added to the Authority to Work which is then signed by the operator as an acknowledgement that they are in possession of suitable machine specific training. These Authorities to Work are countersigned by a responsible manager.

Quattro's current arrangements for machine specific training of technical staff revolve around senior technical staff receiving training from the converter and/or OEM [Original Equipment Manufacturer]. This training is then cascaded within the organisation. Quattro recognise that the methods we currently employ to capture some external training events and most internal training events are not sufficiently robust. Quattro is currently discussing means by which such machine specific training can be adequately and accurately recorded; any such training record must include a signature of the recipient to demonstrate that suitable training has been provided. In addition, Quattro is considering undertaking a machine knowledge gap analysis for all technical staff; however Quattro recognise the potential magnitude of this task and have not yet devised a reasonably practicable methodology to achieve it.

As part of Quattro's revised internal audit arrangements, we will ensure that we verify the machine specific training records of both operators and technical staff using representative samples on a depot specific and/or pan-organisational basis.

The arrangements to ensure that only competent persons are able to override safety critical systems has already been addressed in Quattro's response to recommendation 1 (q.v.).

As previously stated in our response to recommendation 1, Quattro is not undertaking any installation of any safety critical systems. The method by which depot staff are provided access to information for the test, inspection and maintenance of safety critical systems has already been addressed in our response to recommendation 1 (q.v.). Quattro is currently completing a review of the method by which operators are provided with such information and are likely to provide copies of relevant operator pre-start checks (which will be extracted directly from the applicable accredited Maintenance Plan) in the machine. Once this task has been completed, operators will be provided with a suitable briefing to inform them of the new arrangements. The PDI [Pre-Detailed Inspection] check will be modified to include verification that such maintenance instruction is present on the machine.

Quattro's current arrangements for reporting unexpected behaviour of an RRV are considered suitably robust but are entirely reliant on the operator and/or fitter identifying the fault reporting it through the correct channels. After due consideration, we propose that we devise and issue a briefing reminding staff of the importance of accurately reporting all machine defects and of the potential consequences of any failure to so report.

d) The RAIB Report, and particularly recommendation 2, is one of the factors which has lead the Rail Plant Association [RPA] to begin thorough review and re-issue of its Rail Plant Maintenance and Repair Competency Standards (these documents are commonly used throughout the industry to provide assurance of fitter competence). As an RPA Member, Quattro are actively supporting this review.

As part of the overall review of Quattro processes and procedures referred to in our response to recommendation 1, Quattro's arrangements for internal audit, process checking and end product checking are currently being revised. The revised processes will cater for a multi-tier approach to on-going surveillance of the output of maintenance activities coupled with end product audits utilising Network Rail TTA [Traction & Rolling Stock T&RS Technology Assurance audits] audit check sheets to form an integral part of our internal audit process; such checks will be undertaken both on-site and in-depot.

As part of Quattro's on-going arrangements, our fitter competence assessment regime has been amended to include a check that maintenance staff know the location of, and can readily access, maintenance plans and associated documentation. Furthermore, Quattro is verifying that fitters can demonstrate a suitable understanding of the cross reference between the job reference numbers contained within the check-sheets and the job descriptions within the Maintenance Plan.

e) As previously stated in Quattro's response to recommendation 2(d), as part of the overall review of Quattro processes and procedures referred to in our response to recommendation 1, Quattro's arrangements for internal audit, process checking and end product checking are currently being revised. The revised processes will

cater for a multi-tier approach to on-going surveillance of the output of maintenance activities coupled with end product audits utilising Network Rail TTA audit check sheets to form an integral part of our internal audit process; such checks will be undertaken both on site and in depot.

ORR Decision

8. ORR is not satisfied that Quattro Plant Limited's response adequately addresses the recommendation, as there is insufficient detail and commitment to timescales, and is planning to meet with Quattro Plant Limited to discuss these concerns.

Status: In-progress.

ORR will update RAIB by 31 July 2014 on action being taken to address this recommendation.

Recommendation 3

The intention of this recommendation is that Network Rail and its rail plant suppliers should minimise the risk of runaways of RRVs that rely upon procedures for their safe operation.

Network Rail should review the adequacy of existing measures to prevent RRV runaways of RRVs that are not yet fitted with direct rail wheel braking and implement necessary improvements. This review should consider reinforcing procedures, briefing and training associated with the safe operation of RRVs. Priority should be the prevention of RRV runaways, but consideration should also be given to the means of regaining control should a runaway occur.

Details of steps taken or being taken to implement the recommendation

9. Network Rail, in its initial response on 7 November 2013, advised that:

A review has taken place following this incident and a further runaway of a Z60 RRV MEWP [Mobile Elevated Work Platform]. A decision was made by the Network Rail Executive that the Network Rail RRV [Road Rail Vehicle] Safety Improvement Programme (RRV SIP) Direct Rail Wheel Braking initiative should be extended to cover the remaining Type 9b vehicles, which includes all RRV Dumpers and MEWPs.

This programme has already gained funding authorisation and is due to be completed by August 2014. It is believed that this will exceed the remit of the recommendation and will be delivered in a similar timescale to a re-briefing and post implementation review programme. Governance to this programme will be provided by the RRV SIP Programme Board on which the ORR sits.

In the interim period, the operational rules for this type of Plant have been changed so that it must be planned with the following hierarchy, contained within Module P501 'Systems of Work' in the Infrastructure Plant Manual:

If you are using road-rail vehicles on a gradient, then they shall be selected for use in the following order of preference:

a) Type 9a, self-powered rail wheels (hydrostatic or direct drive), or Type 9b, high ride systems upgraded with direct acting rail wheel brakes as shown in Figure 4.

b) Type 9c, low-ride or Type 9b high ride with knurled drive hub extensions as shown in Figure 5.

c) Type 9b, high-ride standard systems as shown in Figure 6. This type of machine is NOT to be used on gradients of 1 in 75 or greater.

If you are using a rail trailer on a gradient of 1 in 75 or greater, then only trailers fitted with service brakes shall be used.

August 2014 is the end date for this programme of work; however, Network Rail will be continuously upgrading items of Plant to have direct acting wheel brakes between now and then.

Timescale: 31 August 2014

ORR Decision

10. **Operator and Machine Controller training:** Since the 'Glen Garry' and 'Brentwood-Snowhill' RRV RAIB reports were published significant specific briefings and associated material from these events, in particular Glen Garry, were given across Network Rail and its contractors.

11. Wider than this the RRV Operator and Machine/Crane Controller competence and training materials were reviewed and rewritten, by Network Rail, to cover the issues from RRV incidents, this type of training material is on a regular update cycle.

12. **Briefing of Machine Controllers:** Code of Practice for RRV & RMMM Machine / Crane Controller Checklists, COP0016, has been updated to incorporate a documented briefing requirement to identify hazards, such as gradients, the likely effect on machine operation & any required mitigation measures. This document was published in January 2011. This information has been incorporated in to the revised Network Rail Plant Manual, published March 2013. This is further supported through information contained within the core training module for Machine Controllers.

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

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

Status: Implementation on-going

ORR will confirm that all actions are complete by 3 October 2014.

Recommendation 4

The intention of this recommendation is that Network Rail should review the scope of the compliance monitoring and assurance activities conducted upon, and by, its rail plant suppliers, and ensure that audits are more comprehensive.

Network Rail should review the processes for audits of engineering safety management systems and the competence of technical staff that it conducts, or requires others to conduct, on rail plant suppliers. The objective of the review is to identify ways of improving the focus on engineering safety management and the quality of the end products. The findings of this review should be implemented and documented in revised management processes. In addition, Network Rail should

take steps to improve the extent to which plant suppliers' own audits are directed in a similar manner.

Details of steps taken or being taken to implement the recommendation

14. Network Rail, in its initial response on 7 November 2013, advised that:

At the inception of the Asset Management Services function within Network Rail, it was agreed that the Network Rail OTP [On-Track Plant] assurance function required strengthening. To this end, work is in progress to develop a competent audit team with expertise in Safety Management Systems and OTP equipment to undertake audits on all of Network Rail OTP Suppliers.

Network Rail's Safety and Sustainable Development team are working with the Railway Industry Supplier Qualification Scheme (RISQS) to improve the assurance framework within the existing (On-Track) Plant Operations Company (POC) Scheme (managed by Achilles 'Link Up'). The programme has already drafted the new scheme rules and these are currently out for stakeholder review with the scheme scheduled to be launched in November 2013.

In detail:

- The existing Rail Plant Support Engineers are receiving training and mentoring to produce sufficient resource to adequately service the audit requirement. There will be an on-going review process of auditor performance.*
- The audit plan has been reviewed and now runs in parallel with the Achilles Link-up audit plan.*
- It has been agreed that Link-up will undertake the system audit and Network Rail will undertake a technical audit on the equipment.*
- The combined Link-up and Network Rail audit will result in an improved focus on engineering safety management and the quality of the end products.*
- The technical content of the POC (Plant Operating Company) scheme audits will be undertaken by the same Network Rail OTP auditors, thus the ability to spread best practice and understand industry wide issues will be efficiently achieved.*
- Part of Network Rail's audit process will be to look at the suppliers own internal audit regime and stipulate its development.*
- The Network Rail audit team will be ideally placed to provide feedback to the industry accelerating the implementation of best practice and learning (on all sides).*
- Contact will be maintained with Link-up to ensure that their audit team is part of the reporting and learning process.*
- The Suppliers will be encouraged to submit their own internal audit findings for industry learning.*

It is anticipated that by 30 April 2014, the audit team will have reached the critical mass stage and the audit plan progress and the industry learning process will be an integral part of Network Rail's management process.

Timescale: 31 August 2014

ORR Decision

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

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

Status: Implementation on-going.

ORR will confirm that all actions are complete by 3 October 2014

Recommendation 5

The intention of this recommendation is that the vehicle acceptance process applicable to modifications to RRVs should be more widely understood.

Network Rail should:

- a. brief all suppliers of RRVs on the scope of the engineering acceptance process, and the importance of submitting accurate, vehicle-specific information to VABs when seeking acceptance of modifications to RRVs; and
- b. clarify with all suppliers of RRVs, and vehicle acceptance bodies, the extent to which reliance on 'first-of-class' approval is appropriate when modifications are made to a number of different vehicles that fulfil the same functional requirement but are significantly different in their design.

Details of steps taken or being taken to implement the recommendation

16. Network Rail, in its initial response on 7 November 2013, advised that:

Network Rail has agreed with the RSSB to work in partnership to address Recommendation 5.

Actions will include:

1. *Review of RIS 1530PLT issue 4;*
2. *Review of VAB [Vehicle Acceptance Body] requirements;*
3. *Assist in cascading the appropriate briefing information.*

Briefing to include:

- *the scope of the engineering acceptance process and the importance of submitting accurate, vehicle-specific information;*
- *clarification on the extent to which reliance on 'first-of-class' approval is appropriate when modifications are made to a number of different vehicles.*

Timescale: 31 October 2014

ORR Decision

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

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

We will update RAIB on the results of the Network Rail/RSSB reviews and the content of the briefings when we receive this information from Network Rail.

Status: In-progress

ORR will update RAIB by 30 January 2015 on the action being taken to address this recommendation.