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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: Derailment at Bordesley Junction, Birmingham, 26 August 2011

I write to provide an update¹ on the action taken in respect of recommendations 1, 2 and 3 addressed to ORR in the above report, published on 19 August 2012.

The annex to this letter provides details of the action taken regarding these recommendations, the status of which 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 20 April 2017.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Oliver Stewart', written in a cursive style.

Oliver Stewart

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

Recommendation 1

The intent of this recommendation is to reduce the risk of operating a privately owned wagon over the national network once a fleet wide problem has been identified. It aims to improve the likelihood that the Network Rail Network Certification Body (previously known as the PWRAMG), in conjunction with private wagon owners, will implement short term measures, such as additional maintenance checks, to manage the risk in advance of a longer term solution.

Network Rail through its Network Certification Body should review its own processes to make sure that the risks of continuing to operate a fleet of wagons are managed once a fleet wide problem is discovered. The review should consider including processes for:

- assessing the risk of continued operations and identifying the need for any immediate measures that need to be taken to control the risk;
- identifying the long term measures that need to be taken to resolve the fleet wide problem; and
- assigning responsibilities, priorities and timescales for implementing and managing both the immediate and long term measures.

Once the review has identified what reasonable improvements can be made to the processes, the Network Certification Body should implement them.

ORR decision

1. The introduction of the Entities in Charge of Maintenance (ECM) regulations sought to address a number of issues, including the identification of fleet-wide issues with freight wagons and then taking action to address them. Wabtec has introduced new procedures (taking into account the ECM regulations as well as the CSM risk assessment and ROGS) to improve how they discover and then act upon issues that may have an impact across a fleet of wagons, as well as sharing that information with other ECMs and operators for a particular type of wagon or component.

2. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, Network Rail, in collaboration with Wabtec and Tarmac has:

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

Status: Implemented.

Previously reported to RAIB

4. Our last report to RAIB on this recommendation was on 4 December 2013 where we reported the following:

Previously reported to RAIB on 1 August 2013

5. We previously reported that Network Rail, through its Network Certification Body, has an established set of working practises and systems that enable the management of risk arising from continued operation of wagons when a fleet wide problem is identified. However, Network Rail has recognised that there is a need for improvement in the quantitative risk assessment process and the prioritisation of internal and external activities. Network Rail's original response is at Annex B. The original timescale for completion was 31 May 2013, however we were aware that this had slipped.

On 26 July 2013, Network Rail provided the information below:

Procedure developed and risk assessment undertaken. Identified on going level of risk with MKIV's which require further reduction.

Short term measures in place:

- *Current vehicles going through mods program.*
- *Outstanding unmodified vehicles are dynamically risk assessed for priority attention according to evolving empirical and field data and mileage assessment.*

Long term measures in place:

- *Wheelchex data being monitored on both MKIV and MKII's. Action plan in place to continue capture of seasonal variation data for use in final assessment.*
- *Brake testing being undertaken to determine if response times are still within acceptable limits. NCB Engineering team members are actively progressing workstreams with owner and maintainer to target plan.*

Revised timescales: *The review has identified a number of improvement measures and actions that still require to be implemented in conjunction with the owner and maintainer. Some of the longer term measures that were identified after the initial RAIB report, including additional brake system testing, will require additional time for set up and implementation. This is presently targeted for completion by end of September – 30/09/13.*

Interim mitigation: *Interim risk has already been reduced through the release of POCL 651 Issue 2, which requires periodic inspection and the implementation of the modifications program. Monitoring of progress to achieve the additional testing program to the target plan is being undertaken on a monthly basis by the NCB engineering team together with the wagon owner, maintainer and RU.*

6. ORR became aware that Network Rail's programme had slipped and the timescale of 30 September had not been met. We wrote to Network Rail on 15 October 2013 requesting an update and received the information below on 8 November 2013:

Short term measures:

1. *Current vehicles are still going through the modifications program with a level of 63% completion of the fleet so far. There has been slippage*

in the program of works attributed to owner and ECM who are responsible for organisational issues and additional works that have been introduced beyond the prescribed modifications.

2. *The outstanding unmodified vehicles continue to be dynamically risk assessed for priority attention according to evolving empirical PPM and field data and mileage assessments that are being reviewed periodically.*

Long term measures in place:

1. *Wheelchex data is continuing to be monitored for both MKIV and MK II vehicles to identify any seasonal variation and for use in a final assessment.*
2. *Brake testing (which is not in the RAIB report) remains to be completed with owner and maintainer.*

The revised target completion date for the modifications is 30/04/14. We plan to seek closure of this recommendation with an accompanying action plan demonstrating the proposed modification program and final date for completion of the prescribed modifications.

The delay to the end of April 2014 is not unreasonable considering that the opportunity is being taken to build in other reasonable adjustments and changes to the wagons.

Status: In progress, we will update RAIB by 30 June 2014

Update

7. Following two meetings to review draft versions of the report, on 8 February 2017 Wabtec Rail Ltd (in collaboration with Network Rail and Tarmac) produced a report addressing recommendations 1, 2 & 3. For recommendation 1, the report contained the following information:

4.2. RAIB recommendation 1 as detailed in figure 1 is considered to be closed. Vb c4.2.1. Wabtec Rail Limited (WRL) has worked closely with Network Rail and Tarmac to resolve the issues raised by the RAIB recommendations

4.2.2. Following publication of RAIB report 19/2012 the Entities in Charge of Maintenance (ECM) regulations have come into force. In achieving ECM certification, WRL has a documented procedure for risk management which takes into account the requirements from the above recommendation.

4.2.3. WRL has created a new quality assurance procedure 6.6 – Entity in charge of Maintenance (ECM) Management. This procedure is used to ensure that adequate management is performed to supply safe and reliable products and services that meet the required Railway Group Standards (RGSs),

Technical Specifications for Interoperability (TSIs), Notified National Technical Rules (NNTRs) and other Regulations.

4.2.4. The procedure describes how Wabtec Rail manage and control engineering change in order to conform with the requirements of the Railways and Other Guided Transport Systems (Safety) (Amendment) Regulations 2011 (ROGS), Railways (Interoperability) Regulations 2011 (RIR) and the Common Safety Method (CSM) Regulations on risk assessment and evaluation. It includes the assessment process to follow when identifying the applicable process against which each engineering change must be assessed. The process applies to the introduction of a new vehicle, the modification of an existing vehicle and a change to the maintenance, repair or overhaul of a vehicle. It also considers risk management, component substitution and the review of data that may influence vehicle maintenance.

4.2.5. An extract from the WRL risk register showing the Tarmac (Lafarge Aggregate) Gloucester pedestal suspension “lock-up” is shown in appendix 1.

4.2.5.1. WRL use this risk assessment structured approach to assess risks associated with all freight wagons they maintain.

4.2.5.2. The structured risk approach details the following steps which address the processes with dealing with recommendation 1.

- *When a project or safety risk is identified it is entered on to the Contract Issues and Risk Log, and marked up with the priority level Low, Medium or High.*
- *An initial Risk Assessment is produced in the Risk Log to identify the level of risk associated with the issue.*
 - *Each assessment of the risk includes a control measure, mitigation or action to prevent it occurring or reduce the risk to an acceptable level.*
 - *An action holder is identified along with an appropriate timescale to reduce the risk to an acceptable level.*
- *Following the control measure, mitigation or action proposals a second Risk Assessment is produced in the Risk Register to identify the revised level of risk associated with the issue and that the revised risk level is acceptable.*
 - *If the risk level is not acceptable then ‘A Significance of Change Assessment’ is conducted.*
 - *If the result shows the change is ‘significant’ then a Competent Person (CP) is assigned to manage the risk.*
 - *If the risk result is ‘non-significant’ then the process is to be repeated until the proposed control measure, mitigation or action reduces the risk to an acceptable level.*

- *With a view to improve safety, performance and control long term risk, periodic reviews of the vehicle maintenance information and data including any new control measures are carried out with the vehicle owner. The aim is to continually improve the vehicle maintenance documentation, safety, performance and reliability.*

Recommendation 2

The intent of this recommendation is to prevent a PHA wagon from entering into service with worn suspension components, which can increase the likelihood of the suspension locking-up, increasing the risk of a derailment. This can be achieved through a detailed review, from first principles, of how the suspension components on a PHA wagon wear. The maintenance plan should then be revised as necessary. The review should also address the current anomaly in the PPM & VIBT maintenance plans which calls for certain components to be examined when they cannot be seen if the wheel set is in place.

Network Rail, through its Network Certification Body, and in conjunction with Lafarge Aggregates Ltd and Wabtec Rail Limited, should lead a fundamental review of how the suspension of the PHA wagon is maintained. The review should call upon relevant technical expertise to:

- look at how the suspension works as a whole and understand the role that each individual component performs; and
- use this knowledge to document the actions for maintaining a fully functioning suspension, which may include monitoring, measuring and setting limits for the permitted overall amount of wear in the suspension and also individual component wear, including specific actions and limits set to account for those components that are not fully visible when the wheel set is in place.

Once the review has decided what actions it is reasonable to take, they should be implemented in the maintenance plans for the PHA wagon fleet.

ORR decision

8. The report from Wabtec addressing all three recommendations, included as an annex a document showing how Gloucester Pedestal Suspension MkIV works and detailed preventative maintenance instructions. The process is designed to ensure faults that may prevent the suspension operating properly can be identified at the earliest possible opportunity.

9. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, Network Rail, in collaboration with Wabtec and Tarmac has:

- taken the recommendation into consideration; and

- has is taken action to implement it

Status: Implemented.

Previously reported to RAIB

10. Our last report to RAIB on this recommendation was on 4 December 2013 where we reported the following:

Previously reported to RAIB On 1 August 2013

11. We previously reported that a further review of the PHA suspension is planned to be undertaken by the Network Rail Certification Body, in conjunction with Lafarge Aggregates Ltd, Wabtec Rail Ltd and other industry experts, to better understand the influence of the existing modifications on the suspension together with the present maintenance regimes. Network Rail's original response is at Annex B. The original timescale for completion was 31 May 2013; however we were aware that this had slipped.

12. On 26 July 2013, Network Rail provided the following information:

We are continuing to harvest liner wear data with owners and maintainers. This is on-going and dependent upon progress of the overhaul program. In accordance with our action plan, further data is required for 6 months in order to arrive at an informed conclusion regarding extent of in service wear and on-going risk.

Revised timescales: Further data relating to the wear characteristics of modified and unmodified vehicles requires to be collated from vehicles in service. This is being undertaken by the owner together with the maintainer and timescales are determined by factors within their control. Additional time is therefore required to capture and evaluate data from vehicles in service following modification. This is presently targeted for completion by end of November - 30/11/13.

Interim mitigation: In the interim period, continued exposure is being reduced by the program of modifications to the pedestal suspensions on the vehicles together with dynamic reassessment of priority vehicles in accordance with measured wear criteria. This is being monitored by the NCB engineering team together with wagon owner and the maintainer. Monitoring of progress to the target plan is taking place and being reviewed with the respective parties on a monthly basis.

13. ORR became aware that Network Rail's programme had slipped and the timescale of 30 November 2013 was unlikely to be met. We wrote to Network Rail on 15 October 2013 requesting an update and received the information below on 8 November 2013:

Network Rail are continuing to harvest liner wear data of modified and unmodified vehicles with owners and maintainers and this is being affected by the slippage of the overhaul program which has prolonged the retrieval of data.

In accordance with our action plan, we anticipate data will still be required to be collated for at least 4 months after end November in order to arrive at an informed conclusion regarding extent of in service wear and on-going risk.

Additional time will be required to capture and evaluate data from vehicles in service following modification (or by alternative methods being considered). This was targeted for completion by end of November - 30/11/13 but will require an extension to 30/03/14.

In the interim period, we continued to diminish exposure by the program of modifications to the pedestal suspensions on the vehicles together with dynamic reassessment of priority vehicles in accordance with measured wear criteria. This is still being closely monitored by the NCB engineering team together with wagon owner and the maintainer. Monitoring of progress to the action plan continues to take place and is being reviewed with the respective parties on a monthly basis.

ORR decision

14. *ORR continues to monitor progress with this recommendation and agrees in principal with the approach being taken, however, whilst understanding that Network Rail are to some degree reliant on WABTEC we do have some concerns about the time being taken. ORR continues to monitor and intends to meet with Network Rail before 31 December 2013 to discuss progress.*

Update

10. In their report of 8 February 2017, Wabtec Rail Ltd (in collaboration with Network Rail and Tarmac) included the following information regarding recommendation 2:

4.4. RAIB recommendation 2 as detailed in figure 2 is considered to be closed.

4.4.1. The role that each individual suspension component performs and the operation of the suspension system as a whole has been investigated and summarised in technical report TD – 62, Gloucester Floating Axle MK IV Pedestal Suspension. The report gives an overview of how the suspension system functions and the role each suspension component performs.

4.4.2. The current maintenance plan WMP007/BM - A Balanced Maintenance Strategy for Tarmac (previously Lafarge) 51T GLW Hopper

Wagons Self Discharge Train, details the actions required for maintaining a fully functioning suspension. It has been updated taking into account the requirements detailed in POCL 651. In conjunction with the safety performance monitoring reports for the fleet, which are an integral part of ECM management, the ongoing suitability of the maintenance plan with regard to risk management is ensured. Appendix 2 highlights the details added to prevent the PHA wagons entering service with worn suspension components.

4.4.3. Following completion of the suspension upgrade program in October 2014 further instrumented testing was carried out to assess the ongoing effectiveness of the modification following the extended bedding in process. The test data was reviewed by an independent vehicle dynamics expert and it was concluded that when maintained in accordance with the wagon maintenance specifications, the friction damped suspension performed acceptably as per its design intent. The executive summary from the independent analysis (Mott MacDonald) is shown in appendix 3.

15. Appendix 3 of the Mott MacDonald report states:

Executive Summary

Network Certification Body (NCB) has requested that Mott MacDonald complete a review of data collected by Serco on the Gloucester Floating Axle type suspension fitted to PHA wagons. The wagons are owned by Lafarge Aggregates and maintained by Wabtec.

The investigation into this type of suspension was prompted by a number of incidents involving derailments of this type of wagon or wagons with a similar suspension set up. It is believed that these derailments were caused by the suspension locking in an unloaded position allowing a wheel to flange climb to the point to derailment.

To determine how the suspension behaves in normal service Serco has completed three phases of data gathering and analysis to identify how often the suspension does not move. Mott MacDonald has been provided with the raw data gathered from the third phase of service measurements undertaken in 2015, and the Serco analysis that identifies potential events where the suspension is not moving, Ref 2 and Ref.3

Through reviewing the raw data and analysis data provided to Mott MacDonald a validation of the process used to identify non-movement events was completed. The position of the non-movement events in relation to the mean of the displacement data was also assessed. The ride of the wagons has been evaluated and compared to the Freight Acceptance Curves detailed in Appendix D of GM/RT2141 Issue 3 (Ref 7) and the geographical locations of the recorded events have been reviewed.

The conclusion from the review of the data is that the suspension is behaving as designed; throughout the review no events that posed a significant risk of derailment were identified (to the extent possible from the data recorded).

Recommendation 3

The intent of this recommendation is to reduce the risk of operating the PHA wagon fleet by implementing modifications that have been tested and shown to reduce the number and duration of suspension lock-ups on these wagons. It will also require Lafarge to set a timescale for rolling out the modifications to all of its PHA wagons.

Lafarge Aggregates Ltd should, with reference to POCL 651, implement suspension modifications to its fleet of PHA wagons as soon as practicable to reduce the likelihood of suspension lock-ups.

ORR decision

16. Lafarge Aggregates Ltd are now part of Tarmac Ltd. POCL 651 was issued by Network Rail in December 2011. Following this the Tarmac PHA wagon fleet underwent a programme of work to implement the modification to the saddle wear plate width, which was completed in October 2014. Tarmac, in conjunction with Wabtec has employed a consultant to review the dynamics of the modified wagons when loaded and tare. They concluded that the changes made had substantially reduced the risk of the type suspension lock-up that occurred at Bordesley junction happening again.

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

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

Status: Implemented.