Oliver Stewart
RAIB Recommendation Handling Manager

23 October 2025

Mr Andy Lewis
Deputy Chief Inspector of Rail Accidents

Dear Andy,

RAIB Report: Derailment of a passenger train at Carmont, Aberdeenshire on 12 August 2020

I write to provide an update[1] on the action taken in respect of recommendations 3 & 18 addressed to ORR in the above report, published on 10 March 2022.

The annex to this letter provides details of actions taken in response to the recommendations and the status decided by ORR. The status of recommendations 3 & 18 is **'Closed'.**

We do not propose to take any further action in respect of the recommendations, unless we become aware that any of the information provided has become inaccurate, in which case I will write to you again.

We will publish this response on the ORR website.

Yours sincerely,

Oliver Stewart

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

Recommendation 3

The intent of this recommendation is for Network Rail to use learning from events at Carmont and the subsequent investigation of this to improve the design of drainage systems.

Network Rail should review and update its drainage-related procedures so that the output from the design process takes full account of likely impacts on railway safety due to flooding and/or debris washed from drains and/or surrounding ground. The review should take account of:

- water flow return periods and climate change allowances appropriate for both normal operation of the drain and for assessment of drain performance during more extreme events

- the extent to which site-specific information about topography and ground conditions should be obtained, taking into account the extent to which modern technology (such as LiDAR) can assist this

- the full range of drain types available, including those recently developed

- the circumstances in which each type of drain should be used and the detailed specification necessary to suit particular locations

- potential failure modes such as blocked pipes and catchpits

- preventing flooding and/or material displaced from a drain endangering the safety of train movements, allowing for potential exacerbating factors such as the use of gravel-filled drains on steep slopes.

This recommendation may also apply to other infrastructure managers in the UK.

ORR decision

1. Network Rail has provided a closure statement setting out the actions taken in response to the recommendation, principally an update of the Drainage Design Manual CIV/005, specifically Drainage Design (module 09) and Drainage Evaluation (module 06); analysis and creation of catchment surface run data set; and new and updated drainage standard details and design drawings.

2. We consider that every element of the recommendation has been addressed and in some cases Network Rail has gone beyond what RAIB stipulated. For example, while training, capability and competence are not specifically part of the recommendation, Network Rail has provided information on how training and competence of designers and asset engineers on the new and revised processes will be covered.

3. To ensure the full potential of these changes is realised, ORR is writing to Network Rail about post-implementation assurance activities to ensure these changes are embedded and sustained.

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

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

Status: Closed.

Previously reported to RAIB

5. On 14 May 2025 ORR reported the following:

In the immediate aftermath of the fatal derailment at Carmont in August 2022 Network Rail commissioned Lord Robert Mair to undertake a review of its management of earthworks, including the role of drainage. He made many observations relevant to the points raised by this RAIB recommendation. Network Rail Earthworks Review Final Report

Work was already underway, as a result of the Mair recommendations, to review and revise drainage-related procedures. This work has continued and is close to closure. Taking account of the factors listed in the RAIB recommendation, and the findings of the Mair review, Network Rail has completely overhauled its approach to the whole lifecycle of its water management processes: design, installation, inspection, maintenance, rapid response and renewal. Its activities to address the RAIB recommendation include:

- Carrying out improved modelling of water catchment and concentration features and the link to surface water threats to drainage asset integrity
- Producing enhanced guidance to staff to enable them to identify and deal with potential failure modes
- Increasing dedicated drainage resource in each region of Network Rail to ensure there are sufficient staff to carry out necessary tasks
- Introducing an improved competence management scheme for drainage staff to promote better skills and understanding of the impact of interventions on the infrastructure (at our most recent update in early September, Network Rail reported that more than 630 staff had completed e-learning modules on inspection and maintenance since it had gone live)
- Comprehensively revised guidance to staff about the range of drainage types available and criteria to indicate what works best in certain locations with specific topographical and ground conditions
- Completely revised drainage design manual and handbook. These will now include catchment analysis and water hazard maps, and 3D definitive design

drawings. All of the revised material has been prepared but must go through the revised company standard procedures before going live. The standards concerned are NR/L3/CIV/15101 (for the drawings and technical user manual) and NR/L2/CIV/005/09 for the drainage design standard.

- CIV/005/09 was published in March 2025 and CIV/15101 will be published in June 2025. There is a three month implementation period for COV/005 for briefings and minor changes, so Network Rail has extended its anticipated closure date to June 2025. CIV/15101 will take effect as soon as it is published.
- To support update of training regions have developed timebound plans to train their staff aligned to available training budgets. training material has already been developed for drainage inspection, maintenance, design, construction, survey and assessment, evaluation and rapid response... This will be followed by a two-day training course to gain deeper understanding – but timescales for that are in the gift of the regions who will be delivering the training and freeing staff to attend. Closure of this recommendation is not strictly dependent on delivery of the training, as the recommendation required Network Rail to 'review and update' its drainage-related procedures, which it has done – but ensuring effective delivery is dependent on Network Rail demonstrating that relevant staff have the capability to interpret and comply with revised guidance.

We have reviewed the draft drainage manual and consider it to largely address the issues raised in the Carmont RAIB report. Since receiving the draft modules, we have met with Network Rail to discuss the document in greater detail. We await details of what post-implementation review activity Network Rail is planning to monitor compliance with its revised water management processes. We want to see credible evidence of embedment and assurances about sustaining improvements before we can report that the recommendation has been fully addressed.

Update

6. On 5 August 2025 Network Rail provided the following closure statement

[N242-11] Carmont Rec 3.docx

Recommendation 18

The intent of this recommendation is for corrosion limits in maintenance and overhaul plans to be based on an adequate engineering analysis so that ageing rail vehicles retain their structural integrity to original design standards.

Owners of mark 3 coaches and other rail vehicle fleets susceptible to significant levels of corrosion and operating on the mainline network, should develop and implement a timebound plan to:

a) Review vehicle maintenance and overhaul plans to check there are clear criteria in place for the allowable extent of corrosion in safety critical areas. These criteria should be supported by an adequate engineering assessment that takes into account the intervals between corrosion inspections, so that vehicles maintain compliance with their original structural design load cases throughout their service life.

b) Amend vehicle maintenance and overhaul procedures as necessary to take account of findings from the review in a) and any practical issues with inspection of areas which are not normally readily accessible.

ORR decision

7. RSSB published a Technical Note TN2302 (originally numbered TN102) to provide guidance to industry regarding the effects of corrosion, including how to detect and manage it and the impact on vehicle structural integrity. The TN complements existing industry standards, namely RIS-2004-RST Rail Vehicle Maintenance and RIS-2780-RST Rail Vehicle Structures.

8. With regard to Part B of the recommendation, the closure statement includes a timebound plan for a review of the susceptibility to corrosion and any changes to maintenance documentation for each applicable fleet. We will also consider how the safety learning from this recommendation informs the specification of new rolling stock.

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

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

Status: Closed.

Previously reported to RAIB

10. On 14 May 2025 ORR reported the following:

Actions to address this recommendation have been coordinated by CRSG. RSSB published a Technical Note TN102. This provides guidance to the industry regarding the effects of corrosion on vehicle structural integrity, and therefore the need to consider corrosion both during design and maintenance. Since then, owners, operators and maintainers of vehicles have begun a review and revision of maintenance and overhaul instructions, in the light of the guidance in TN102.

There have been examples of good co-operation between those affected. Porterbrook and Angel trains, for example, have shared their completed instructions with owners of smaller fleets and offered solutions to issues of inspection of areas which are not normally accessible, such as solebar scanning.

Further, owners have addressed the point in the RAIB recommendation about considering fleets other than HSTs which are susceptible to significant corrosion. This multiplies the volumes of maintenance and overhaul procedures that have to be modified. Network Rail, for example, has extended the principles of TN102 to its fleet of Class 150 and 153 diesel multiple units operating on the mainline.

CRSG has continued to provide support and oversight to those implementing this recommendation. In May 2024 it reported to us that: “A report drawing together the known areas of corrosion on the HST trailer cars and the acceptable corrosion limits is nearing completion. This considers 16 different areas on the vehicles where corrosion is known to occur (based on various inspections of the vehicles) and using the corrosion limit criteria identifies the improvements required to the maintenance instructions, to manage corrosion within the maintenance plan.”

We receive regular updates from end-implementers. There are a lot of them, and each has different challenges and therefore different compliance dates. We received an update from RSSB, as the coordinator of the working group, in March 2025. It confirmed that RSSB has produced TN2302 Iss 1 Corrosion of Rail vehicles, published Dec 2022. We were told that a joint ROSCO group, as part of CRSG, has identified susceptible fleets, as well as those of significant risk. Specific finite element models have been produced where this didn’t exist previously. Maintenance documentation has been updated to provide heightened awareness during maintenance events. We anticipate receiving a full closure statement in April 2025.

Update

11. On 22 July 2025 RSSB provided the following closure statement:

RSSB Response to Carmont Recommenc

Previously reported to RAIB

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The intent of this recommendation is for Network Rail to use learning from events at Carmont and the subsequent investigation of this to improve the design of drainage systems.

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- **water flow return periods and climate change allowances appropriate for both normal operation of the drain and for assessment of drain performance during more extreme events**
- **the extent to which site-specific information about topography and ground conditions should be obtained, taking into account the extent to which modern technology (such as LiDAR) can assist this**
- **the full range of drain types available, including those recently developed**
- **the circumstances in which each type of drain should be used and the detailed specification necessary to suit particular locations**
- **potential failure modes such as blocked pipes and catchpits**
- **preventing flooding and/or material displaced from a drain endangering the safety of train movements, allowing for potential exacerbating factors such as the use of gravel-filled drains on steep slopes.**

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ORR decision

1. In the immediate aftermath of the fatal derailment at Carmont in August 2022 Network Rail commissioned Lord Robert Mair to undertake a review of its management of earthworks, including the role of drainage. He made many observations relevant to the points raised by this RAIB recommendation. Network Rail Earthworks Review Final Report

2. Work was already underway, as a result of the Mair recommendations, to review and revise drainage-related procedures. This work has continued and is close to closure. Taking account of the factors listed in the RAIB recommendation, and the findings of the Mair review, Network Rail has completely overhauled its approach to the whole lifecycle of its water management processes: design, installation,

inspection, maintenance, rapid response and renewal. Its activities to address the RAIB recommendation include:

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3. We have reviewed the draft drainage manual and consider it to largely address the issues raised in the Carmont RAIB report. Since receiving the draft modules, we have met with Network Rail to discuss the document in greater detail. We await details of what post-implementation review activity Network Rail is planning

to monitor compliance with its revised water management processes. We want to see credible evidence of embedment and assurances about sustaining improvements before we can report that the recommendation has been fully addressed.

4. After reviewing the information provided 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 close it.

Status: Open

Previously reported to RAIB

5. See Annex B para 11 – 15 for previous ORR response to RAIB.

Update

6. On 28 January 2025 Network Rail provided the following update

Carmont rec 3 milestones update

- *Agree methodology and approach – Completed*
- *Issue preliminary guidance for L3 A9.16 – Completed*
- *National roll-out of Catchment Analysis and Water Hazard Map – Completed*
- *Drainage Standard Design and Detail Drawings – June 2025. Delays from consultant have led to publication in June. 48 drawings will be checked for Form A or B engineering assurance and align to updated CIV/005 standards.*
- *NR/L2/CIV/005/09, Drainage Design Standard – Completed publication on 8 March on standards hub site.*
- *Training – eLearning is now live for inspection, maintenance, design, construction and evaluation (Awareness proficiency). Practical training modules (Understanding proficiency) are ready for April engagement aligned to Routes' training programme. Drainage Survey and Drainage assessment included in scope for delivery by end March 2025.*

Recommendation 18

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ORR decision

7. Actions to address this recommendation have been coordinated by CRSG. RSSB published a Technical Note TN102. This provides guidance to the industry regarding the effects of corrosion on vehicle structural integrity, and therefore the need to consider corrosion both during design and maintenance. Since then, owners, operators and maintainers of vehicles have begun a review and revision of maintenance and overhaul instructions, in the light of the guidance in TN102.

8. There have been examples of good co-operation between those affected. Porterbrook and Angel trains, for example, have shared their completed instructions with owners of smaller fleets and offered solutions to issues of inspection of areas which are not normally accessible, such as solebar scanning.

9. Further, owners have addressed the point in the RAIB recommendation about considering fleets other than HSTs which are susceptible to significant corrosion. This multiplies the volumes of maintenance and overhaul procedures that have to be modified. Network Rail, for example, has extended the principles of TN102 to its fleet of Class 150 and 153 diesel multiple units operating on the mainline.

10. CRSG has continued to provide support and oversight to those implementing this recommendation. In May 2024 it reported to us that: “A report drawing together the known areas of corrosion on the HST trailer cars and the acceptable corrosion limits is nearing completion. This considers 16 different areas on the vehicles where corrosion is known to occur (based on various inspections of the vehicles) and using the corrosion limit criteria identifies the improvements required to the maintenance instructions, to manage corrosion within the maintenance plan.”

11. We receive regular updates from end-implementers. There are a lot of them, and each has different challenges and therefore different compliance dates. We received an update from RSSB, as the coordinator of the working group, in March 2025. It confirmed that RSSB has produced TN2302 Iss 1 Corrosion of Rail vehicles, published Dec 2022. We were told that a joint ROSCO group, as part of CRSG, has identified susceptible fleets, as well as those of significant risk. Specific finite element models have been produced where this didn't exist previously. Maintenance documentation has been updated to provide heightened awareness during maintenance events. We anticipate receiving a full closure statement in April 2025.

12. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, RSSB has confirmed that end implementers have:

- taken the recommendation into consideration; and
- are taking action to close it

Status: Open.

Previously reported to RAIB

13. See Annex B para 51 – 56 for previous ORR response to RAIB.

Update

14. On 10 March 2025 RSSB provided the following update

The approach to addressing Carmont Recommendation 18 has been previously agreed and work is well under way using the same approach as that taken to address HST corrosion and crashworthiness Rec 19a.

RSSB has produced TN2302 Iss 1 Corrosion of Rail vehicles, published Dec 2022.

TN2302-Iss-1.pdf

A joint ROSCO group has identified susceptible fleets, as well as those of significant risk. Specific finite element models have been produced where this didn't exist previously. Maintenance documentation has been updated to provide heightened awareness during maintenance events.

Expected closure will be offered in April 2025.