

Oliver Stewart
RAIB Recommendation Handling Manager



28 November 2022

Mr Andy Lewis
Deputy Chief Inspector of Rail Accidents
Cullen House
Berkshire Copse Rd
Aldershot
Hampshire GU11 2HP

Dear Andy,

RAIB Report: Derailment of a freight train near Wanstead Park, London on 23 January 2020

I write to provide an update¹ on the action taken in respect of recommendation 1 addressed to ORR in the above report, published on 16 November 2020.

The annex to this letter provides details of actions taken in response to the recommendation and the status decided by ORR. The status of recommendation 1 is **'Implemented'**.

We do not propose to take any further action in respect of the recommendation, 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 on 29 November 2022.

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 that track maintenance staff miss defects identified by track recording vehicles; it is likely that work already started by Network Rail will assist implementation of this recommendation.

Network Rail should take measures to improve the clarity of information provided from Track Recording Vehicle systems, and the procedures adopted by those investigating defects, to assist track maintenance staff to correctly locate all recorded defects. The improvements shall include consideration of:

- ways of identifying discrete defects when these occur within one area of relatively poor track quality where multiple defects are currently reported as a single defect at one location due to the ‘hysteresis threshold’ feature of the track recording vehicle system
- the extent to which staff should look for defects beyond a nominal defect position due to inaccuracies in locations determined using global positioning system (GPS) equipment

ORR decision

1. Network Rail undertook work to identify possible improvements for improving the clarity of gauge information reported from the Track Recording Vehicles (TRVs). Three options to improve data were identified, with feasibility work on each option carried out by OBB (owner of the TRV software systems) and then passed to Track Leadership Group (TLG) for consideration. Due to the impact on “downstream systems”, such as Track Quarterly Stewardship Report reporting tools, none were considered reasonably practicable to adopt. Network Rail have provided information to support this decision. Network Rail advised these options will be kept under review as systems evolve in the future. However, other significant changes have been made to improve the clarity of information provided and enable better identification of faults affected by the hysteresis effect.

2. TruTrack2 has been introduced on the New Measurement Train (NMT) and is being rolled out across other TRVs (TRU vehicle goes live in December, with the other 4 vehicles dates planned). The system provides enhanced trace reports, highlighting all gauge exceedances in red. Although this information can’t be incorporated into the software that produces the TRV fault reports, it is reported in the Track Integrated Geometry Engineers Report (TIGER) tool, allowing clear visibility and analysis of faults (including wide gauge) by the Section Managers (SMs) and Track Maintenance Engineers (TMEs) when reviewing the data from TRV runs and creating associated work orders.

3. These changes and information on how to analyse through TIGER are included in the updated TWI 3T046. The revised TWI also includes updates on positional accuracy of faults. This is in addition to changes in the TRK standard regarding review by SM and TME where faults not found. The TWI will be published and briefed out in December 2022. This information, when considered alongside the closure statement and information provided at earlier meetings demonstrates that the recommendation has been addressed so far as is reasonably practicable.

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 implement it

Status: Implemented.

Previously reported to RAIB

5. On 15 November 2021 ORR reported the following:

Having reviewed the initial response received on 23 February 2021, we asked Network Rail to clarify if the hysteresis effect can affect other geometry fault types other than gauge faults and if so, if the work in progress also addresses the hysteresis effect on these other fault types. We also asked for Network Rail to clarify what would be covered by the revision of the Track Worker Information sheet (TWI).

Network Rail confirmed all track geometry channels have a hysteresis filter applied, but they are not aware of any instances where the hysteresis issue affects, fault reporting on the other channels. i.e. this issue only affects wide gauge data. This will be fully explained when the closure statement for the recommendation is submitted.

Standard NR/L2/TRK/001 Module 11-Track Geometry Inspections and Minimum Actions (see Network Rail action plan below) has been published and Network Rail have provided a copy and flagged the key changes (see Annex A para 11). The revised TWI will incorporate the gauge channel guidance paper in more detail and the changes made to NR/L2/TRK/001 Module 11 regarding hysteresis.

Update

6. On 30 March 2022 Network Rail provided the following closure statement.:



[N198-05]
Wanstead Park Rec

We reviewed the closure statement in detail and identified we needed clarification on a number of issues to determine if the action taken by Network Rail addressed the recommendation SFAIRP, to this end we held a meeting with NR to discuss, subsequent to that NR provided the update on 26 October.

7. On 26 October 2022 Network Rail provided the following update:

1 - Share a copy of the final TWI, highlighting areas of change in response to Wanstead Park

See attached 3T046 Track Geometry Manual,



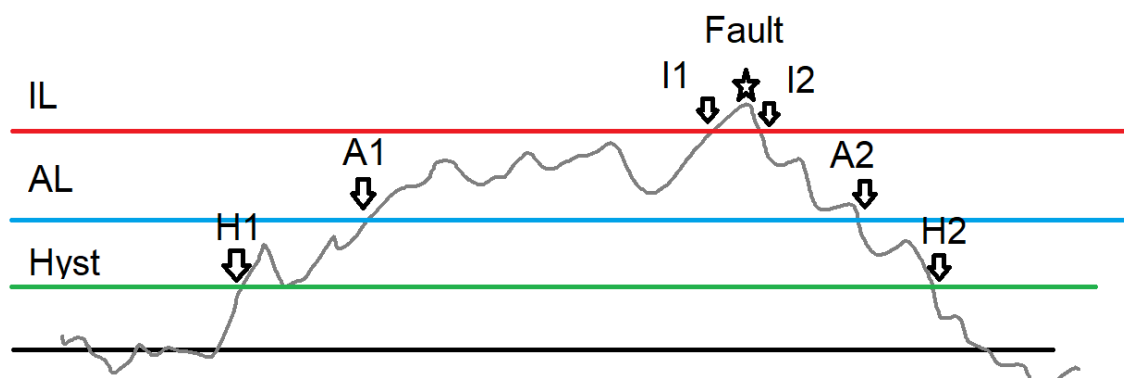
3T046_Track
Geometry Manual_OF

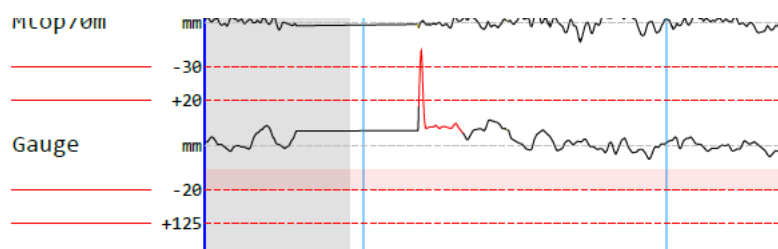
which will be published in December. The sections highlighted in green provide clarity on what has changed in the TWI to accommodate recommendations following Wanstead Park, with details of the change provided in the table below:

Page No.	Comment
1	Addition of the overview and reference documents that have been updated either in the TWI or include further guidance on locating faults or faults suppressed by the hysteresis
16	Added to emphasise the importance of reviewing the current and previous trace to identify features to support the location of faults
17	Detail of how the hysteresis suppresses gauge exceedances on the trace, demonstrating how two wide gauge points are still visible on the trace but not reported in the L2D file
36	Added the emphasis for reviewing the previous trace
40 - 42	Detail added explaining how to use the My Work App, Where Am I App and GPS App to locate track geometry faults. Information on how to know the GPS accuracy of the app used and how to scope for faults when the accuracy is known. Reference to the No Fault Found, requiring the checking +/-22yds either side of the fault when a fault cannot be located, is also mentioned.

2 - Details on changes with TrueTrak2 on the presentation of wide gauge on the trace

The suppliers for the new TrueTrak2 recording software currently operating on the NMT confirmed wide gauge faults on the trace will be highlighted red from point A1 to H2, as shown on the trace diagram below. An example of how this is presented on the new trace is also provided.





3 - When will the other TRVs be updated with TrueTrak2

This will be a gradual roll out to each of the TRV fleet. Currently only NMT is live with TrueTrakTwo. TRU is being prepared to go live in December 2022. Dates for the other vehicles (PLPR1, PLPR2, TRC and PLPR4) is currently in negotiation.

4 - When will downstream systems (such as CDMS) be reviewed, providing an opportunity to incorporate changes in data processing

AIS are currently exploring whether there is scope to upgrade CDMS in CP7, however confirmation on the approval to upgrade CDMS is not expected to be known soon. As will be mentioned in point five below, the upgrade to CDMS and other downstream systems associated to track geometry processing will provide an opportunity for Network Rail to review incorporating reporting the spatial location of wide gauge faults into TGR and TIGER.

5 - Why not feasible in current TrueTrak to change recording output (downstream impact, unrealistic, unfeasible due to age of software and level of support)

It is feasible to report the spatial distance of wide gauge faults from the TRV fleet, and the project between Technical Authority and the track geometry supplier Omnicom Balfour Beatty confirmed the software can be changed to output the data. However, the issue is with downstream systems used to process the track geometry data. These systems require significant upgrading which will need a separate project scope. One challenge is with a software called CDMS, this has limited technical support and operates on a Java platform. When liaising with AIS and RSIT (Network Rail's IT support team) on changing CDMS to accommodate the additional report from the TRV reporting wide gauge, it was confirmed such changes would be significant and result in the risk of CDMS falling over or its performance being impacted. CDMS has been in line for an upgrade for several control periods, however the costs associated with the upgrade has been prohibitive. Despite this, I am still in conversations with our supplier OBB, RSIT and AIS on the detail of costs/changes involved to help TA understand the level of business case required to change the reporting of gauge spread.

We reviewed the information provided by C Fuller along side the earlier closure statement and determined that the further information addresses the outstanding issues as discussed at the meeting with C Fuller on 30/9/22. When this information is combined with the closure statement and information provided at earlier meetings as this recommendation has been progressed it demonstrates that the

intent and detail (both key bullet points) of recommendation have been addressed SFAIRP.

Previously reported to RAIB

Recommendation 1

The intent of this recommendation is to reduce the risk that track maintenance staff miss defects identified by track recording vehicles; it is likely that work already started by Network Rail will assist implementation of this recommendation.

Network Rail should take measures to improve the clarity of information provided from Track Recording Vehicle systems, and the procedures adopted by those investigating defects, to assist track maintenance staff to correctly locate all recorded defects. The improvements shall include consideration of:

- ways of identifying discrete defects when these occur within one area of relatively poor track quality where multiple defects are currently reported as a single defect at one location due to the 'hysteresis threshold' feature of the track recording vehicle system
- the extent to which staff should look for defects beyond a nominal defect position due to inaccuracies in locations determined using global positioning system (GPS) equipment

ORR decision

1. Having reviewed the initial response received on 23 February 2021, we asked Network Rail to clarify if the hysteresis effect can affect other geometry fault types other than gauge faults and if so, if the work in progress also addresses the hysteresis effect on these other fault types. We also asked for Network Rail to clarify what would be covered by the revision of the Track Worker Information sheet (TWI).

2. Network Rail confirmed all track geometry channels have a hysteresis filter applied, but they are not aware of any instances where the hysteresis issue affects, fault reporting on the other channels. i.e. this issue only affects wide gauge data. This will be fully explained when the closure statement for the recommendation is submitted.

3. Standard NR/L2/TRK/001 Module 11-Track Geometry Inspections and Minimum Actions (see Network Rail action plan below) has been published and Network Rail have provided a copy and flagged the key changes (see Annex A para 11). The revised TWI will incorporate the gauge channel guidance paper in more detail and the changes made to NR/L2/TRK/001 Module 11 regarding hysteresis.

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 implement it by 31 January 2022.

Status: Implementation ongoing. ORR will advise RAIB when actions to address this recommendation have been completed.

Information in support of ORR decision

5. On 23 February 2021 Network Rail provided the following initial response:

Action Plan

Please provide milestones with dates

Actions being progressed (timeframes are estimated and cumulative):

Following the publication of the Wanstead Park report the Technical Authority has initiated a project to review the reporting of gauge exceedances and the impact of hysteresis– see attached proposal (please note commercially sensitive information has been removed).

- endorsement of the proposal and agreement of funding by R&D Board (27/01/21)
- hysteresis R&D project delivery by Omnicom Balfour Beatty (12 weeks)
- Review of project findings by TA, Track RAM community, etc. (12 weeks)
- Publication of final report (4 weeks)

The outcome of the hysteresis R&D research and the feasibility of any application to the existing track recording fleet will need to be reviewed, with any enhancements to existing systems and processes undertaken as a separate project. NRRP will be advised as to additional timeframes once known.

The Technical Authority is proposing changes to standard NR/L2/TRK/001 Module 11 'Track Geometry Inspections and Minimum Actions' to support the review of trace data, an output of the on-train systems, that would help maintenance teams identify individual faults that may not appear in fault reports due to masking by the hysteresis thresholds.

By identifying all the faults within the vicinity of the GPS location given in the formal fault report, it will also help mitigate the risk of Maintenance teams addressing the fault closest to the location which due to variations in GPS location given by on-train systems and handheld devices may not be the correct fault.

As the proposed wording also requires the review of previous trace data, this will help Maintenance teams identify faults that had previously thought to have been address but that are subsequently reported again by track recording vehicles.

The proposed additional or changed wording is:

5.1 Analysis of track recording data

Review the trace and other output from TGR and TIGER for runs recorded at nominal planning frequencies for the following:

- a) Geometry faults;
- b) Repeat and reoccurring geometry faults;
- c) Eighths in the Maximum band;
- d) Geometry fault trends (including prediction of future faults);
- e) Eighths in the Very Poor band;
- f) Track geometry quality trends;
- g) The identification and prioritisation of work;
- h) The effectiveness of completed work;
- i) Sites which may require proposing for renewal.

Review the previous trace to look for adverse trends and any features to assist in identifying the location of faults.

Note: Features on the trace that assist in identifying the location of a fault includes, but are not limited to, S&C units, dip angles, transitions, AWS magnets, etc.

For gauge, it is not uncommon for multiple peaks over a length of track to be reported as one fault due to the hysteresis algorithm. Review the previous trace to assist in identifying the number of gauge channel peaks visible and the length of track required to inspect during the site visit.

In the event that a fault is not found at the GPS location given in the fault report, there is already a requirement for the most severe fault within +/- 22 yards of the original fault location to be recorded and reviewed at an appropriate level. This requirement is also being strengthened by proposed changes to the NR/L2/TRK/001 Module 11 standard:

6.7.1. Fault Not Identified

The 'Fault Not Identified' script in the 'My Work' app should be used on the initial site visit where the fault cannot be identified, and shall be recorded by the person in charge of the work.

6.7.2. Investigation

Where recorded geometry faults cannot be located, investigation and endorsement of the findings shall be undertaken in accordance with Table 6. Record on 'No Fault Found' script in the 'My Work' app.

Table 6 – Actions where geometry faults cannot be located

Limit	Fault Type	Investigated by	Endorsed by (within 3 days of expiry of repair timescale)
Immediate Action	Twist	Track Maintenance Engineer	Infrastructure Maintenance Engineer
Immediate Action	All Other	Section Manager [Track]	Track Maintenance Engineer

*Intervention**All**Section Manager [Track]**Track Maintenance Engineer*

Actions being progressed:

- Review of proposed changes to standard prior to final draft
- Formal key stakeholder review of final draft standard
- Publication of standard – October 2021
- Compliance with standard – January 2022

In addition to proposed changes to the above standard, Technical Working Instruction 3T046 'How to Understand Track Geometry Reports' is being updated to draw attention to existing functionality in the 'Where Am I?' app that identifies the relative accuracy (+/- x meters) of the device being used to find the reported GPS location of the fault.

- Issue of the updated TWI 3T046 – October 2021 (the compliance date of NR/L2/TRK/001/mod11)

Evidence required to support closure of recommendation

- Output report from hysteresis R&D project
- Review into applicability of findings and impact of existing track recording systems
- Project plan for system enhancements (if applicable)
- Publication of uplifted TWI 3T046 - How to Understand Track Geometry Reports
- Publication of uplifted NR/L2/TRK/001/mod11- Track geometry - Inspections and minimum actions