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11 December 2014

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

Dear Carolyn,

RAIB Report: Derailment of a freight train at Barrow upon Soar, Leicestershire

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 11 December 2013.

The annex to this letter provides details of the consideration given/action taken in respect of each recommendation where the status of recommendation 1 is 'in progress' and recommendations 2 and 3 is 'implemented'.

We do not propose to take any further action in respect of recommendations 2 and 3 unless we become aware that any of the information provided becomes inaccurate, in which case I will write to you again². We expect to update you on progress with recommendation 1 by 3 April 2015.

We will publish this response on the ORR website on 31 December 2014.

Yours sincerely,

Chris O'Doherty

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

² In accordance with Regulation 12(2)(c)

Initial Consideration by ORR

1. All 3 recommendations contained in the report were addressed to ORR when RAIB published its report on 11 December 2013.
2. On 12 February 2014 ORR passed the 3 Recommendations to Network Rail asking it 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 and Nexus Rail as it was concluded that there are equally important lessons for them. ORR did not ask these organisations to provide a reply.
5. The HRA brought this report to the attention of its members in its newsletter: Operating and Safety Matters, Issue 2, February 2014.

Recommendation 1

The intent of this recommendation is to reduce the risk of an embankment failure due to flooding by providing the Route geotechnical team with information that will trigger an earthwork evaluation.

Network Rail should amend its company standards so that track maintenance staff are required to notify the Route geotechnical team if the foot of an embankment is saturated, flooded or has recently been flooded and a track geometry defect or loss of ballast is found on top of the embankment.

Details of steps taken or being taken to implement the recommendation

6. Network Rail, in its initial response to ORR on 24 February 2014, stated that:
Network Rail will consider amending Company standards to include a requirement to advise the Geotechnical Team in the event that a track geometry defect or loss of ballast is found at the top of an embankment that does not have a track generated cause.

- *Consideration Complete by: 27 June 2014*
- *Amendment of Standard: 6 December 2014*

As part of the Business Critical Rules programme consideration will also be given to the inclusion of a threat line for 'loss of geometry due to embankment failure' and the development of appropriate Means of Control. This will be considered within the suite of Track Bowties as well as 'System' related ones.

- *Consideration Complete by: 27 June 2014*
- *Amendment of Standard: 6 December 2014*

Network Rail also recognises the need to build in learning from its response to the winter flooding and will do so through close involvement and consultation with the recently established Strategic Crisis Management team.

Network Rail recognise the risk and believe that the actions described above will deliver the intent of the recommendation in a practicable way. However, Network Rail does not consider it practical or appropriate to place an obligation on track maintenance staff to observe and report on environmental issues which are outside

their technical competence. The situations described require assessment and interpretation of complex conditions (saturation) or knowledge of preceding events about which they do not have evidence (it was previously flooded and the effect of cyclic inundation cannot be assessed).

Timescale: 6 December 2014

7. On 20 June 2014, ORR wrote to Network Rail requesting the outcome of its consideration and any proposed amendments to be made to the standard. On 30 October 2014 Network Rail stated:

Network Rail's Professional Head of Track has given careful consideration to the above recommendation and is satisfied that the requirement is adequately covered by the existing company standard for Inspection and Maintenance of permanent Way, NR/L2/TRK/001, in particular:

Clause 4 *Key principle; management of risk: The key principle that underpins this standard is that risk from the track assets has to be understood so that appropriate controls can be selected and applied. Risk may be related to safety, performance, cost, or shortened asset life. The Track Maintenance Engineer (TME) and Section Manager [Track] (SM[T]) identify risk from the track assets, assess those risks and take action to control them. This is a continuous process that TMEs and SM[T]s follow, using the results of inspections and the full range of track asset information that is available to them.*

Clause 5, *Asset knowledge: Newly appointed TMEs and SM[T]s make themselves familiar with their area and its high risk locations as soon as possible. Examples of high risk locations include: high speed S&C on timber bearers, complex junctions, high cant deficiency curves, longitudinal timber bridges, weak embankments, trespass sites, etc.*

Clause 15 *Earthworks and structures: Track can be obstructed by earth slips and rock falls in cuttings. Weak embankments are a common cause of poor track geometry. Where track faults occur at a structure, such as a bridge, culvert or platform, the relative positions of track and the structure is considered and clearances checked if necessary. Problems with earthworks and structures are reported to the responsible engineer.*

In addition NR/L2/TRK/001/mod11, Clause 5 requires the TME to review the traces and other output from TGR (Track Geometry Reports) and use this to formulate a maintenance plan which includes sites where there is ground instability (from desiccation, animal burrowing, rotational or sliding ground movement or mining subsidence).

Flooding is just one example of an external factor which might influence the asset so it is not appropriate to single these out in standards as it would give precedence to this event over other weather and exposure issues that can occur.

From the briefing that was given to Track Maintenance Engineers following the derailment and subsequent discussions with track managers, the Professional Head of Track is satisfied that TME's do liaise with the local geotechnical team and provide them with data regarding earthworks stability and known problems with support from the sub-grade.

8. On 28 November 2014, Network Rail provided an update stating:

To align the RAIB recommendation with Network Rail's formal investigation recommendation A5.2 an extension to the timescale was required.

A5.2 - Network Rail should introduce into their processes a requirement for the Route Geotechnical Team to be informed when there is deterioration in track quality on an embankment and there is evidence of saturation or recent flooding at the embankment foot.

The intention is to provide information to the Route Geotechnical Team that would enable an informed decision to be made regarding an earthworks evaluation.

Time extended to 30 July 2015

ORR Decision

ORR is not satisfied that the recommendation has been adequately addressed and is seeking further information on how water saturation at the foot of embankments, putting track geometry and stability at risk, will be recognised and reported to the Route Geotechnical Team .

Status: In-progress, ORR is continuing to engage with Network Rail and will update RAIB by 3 April 2015.

Recommendation 2

The intent of this recommendation is to reduce the risk of an embankment failure by improving the process used by the Route geotechnical team to determine if an earthwork should be included in the flood warning database.

Network Rail should amend its processes so that when assessing whether an embankment should be included in the flood warning database, the assessment should include additional factors which are relevant to its stability such as how the embankment was constructed (as far as can reasonably be determined) to understand the effect of water on any planes between different types of materials, and the history of flooding or ponding at the foot of the embankment.

Details of steps taken or being taken to implement the recommendation

9. Network Rail, in its initial response to ORR on 24 February 2014, stated that:

Network Rail will address this recommendation with the following action plan:

- 1) *Develop a risk assessment and identification method for earthworks that are subject to special risk of flood action. Include in risk assessment the form of construction.*
 - *Action owner: Professional Head [Buildings & Civils]*
 - *Action completion date: 4 August 2014*
- 2) *Undertake risk assessments and identify earthworks subject to special risk of flood action. List of earthworks susceptible to flooding developed.*
 - *Action owner: ADIP/Route Asset Manager (Geotechnical)*
 - *Action completion date: 4 February 2015*
 - *Completed 7th November 2014 in a report from JBA.*

- 3) *Develop and implement process for managing risk of flooding and build into a database or other appropriate tool.*

Flood Warning Database on 065 data-base linked to EA flood warnings has been set up. Sites identified from risk assessments, once trialled and tested on Routes, can be uploaded. The system will then give live warnings of earthworks subject to overtopping or flood.

- *Action owner: Professional Head [Buildings & Civils]*
- *Action completion date: 4 August 2015.*

Timescale: 4 August 2015

10. On 20 June 2014, ORR wrote to Network Rail requesting details of the risk assessment and identification method for earthworks that are subject to special risk of flood action and a more detailed action plan, with justifications for timescales, to deliver parts (2) and (3) of its action plan. On 29 August 2014 Network Rail responded stating:

A vulnerability assessment methodology for embankments at special risk of flood action, such as overtopping, piping and rapid drawdown, has been developed. A trial run across the entire embankment portfolio has been completed. This has enabled validation of the vulnerability assessment methodology against historic embankment failures, which is currently in progress (completion expected 31 October 2014). When finalised, the methodology will be applied at a national level to all embankment assets, subject to Route peer review when knowledge of local assets will be incorporated.

Vulnerable assets identified will be recorded in the 065 Database [NR/L3/CIV/065 Examination of Earthworks] and, in response to Environment Agency flood alerts / warnings affecting those assets, will be flagged to users. Vulnerable assets with high criticality and therefore high risk will be considered for inclusion Adverse / Extreme Weather Plans.

11. On 7 November 2014, Network Rail provided an update stating that:

The initial validation exercise has been completed.

In addition, the list of vulnerable assets based on this criteria is due for production on the 7th of November 2014 covering all embankment assets nationally.

The list of assets will then be subject to Route peer review before being recorded in the 065 Database [NR/L3/CIV/065 Examination of Earthworks] and, in response to Environment Agency flood alerts / warnings affecting those assets will be flagged to users. Vulnerable assets with high criticality and therefore high risk will be considered for inclusion Adverse / Extreme Weather Plans by the target date of August 2015.

ORR Decision

12. The additional activities (extending to August 2015) are about refining and assuring the process; the changes required by the recommendation have been made.

13. 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
- has taken action to implement it.

Status: Implemented

Recommendation 3

The intent of this recommendation is to reduce the risk of an embankment failure by improving the quality of the earthwork evaluation process used by the Route geotechnical team.

Network Rail should amend its company standards so that when an earthwork evaluation is carried out on an embankment, the evaluation should consider how the geometry of the track on top of an embankment has changed over time, using data recorded by Network Rail's track geometry recording trains. If the evaluation has been triggered by a change in track quality, flooding or the ponding of water, and includes an assessment of the embankment's susceptibility to flooding or water action, the levels of recent rainfall onto the top of the embankment should be considered as part of the assessment.

Details of steps taken or being taken to implement the recommendation

14. Network Rail, in its initial response to ORR on 24 February 2014, stated that:
Network Rail will review NR/L2/CIV/086 'Management of Earthworks' to consider the following factors when an embankment evaluation is carried out:

- a) *Inclusion of track geometry changes with time on track supported by embankment; and*
- b) *Susceptibility of embankments to flooding or water actions.*
 - *Action owner: Professional Head [Buildings & Civils]*
 - *Action completion date: 4 August 2014*

Timescale: 6 December 2014

15. On 7 August 2014, Network Rail advised a time extension to 31 October 2014.

Network Rail Company Standard NR/L2/CIV/086 has been rewritten to explicitly mandate review of track performance data, risk from flooding/water action, and risk from adverse/extreme weather by Asset Engineers during Earthwork Evaluations.

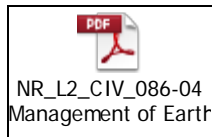
In addition Technical Services has sought and obtained assurance that the LNE/EM RAM [London North East / East Midlands Route Asset Manager] team is already reviewing track performance data by using the Linear Asset Decision Support (LADS) tool.

The NR/L2/CIV/086 rewrite, including stakeholder review and steering group approval, has been completed and sent to Business Standards (along with an implementation plan) for publication on 5 September 2014 (as NR/L2/CIV/086 Issue 4). The compliance date is 1 October 2014 in advance of the Examination / Evaluation season commencing c.21 October 2014.

Embedment of the changes will be reviewed in due course. The future aspiration is to make track performance data available via the Civils Strategic Asset Management System (CSAMS) to be implemented for the 2015-16 Exam season.

Timescale: 31 October 2014.

16. On 30 October 2014, Network Rail confirmed that the reissued standard had been published.



ORR Decision

17. 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
- has taken action to implement it.

Status: Implemented