Russell J Keir
HM Inspector of Railways
Telephone: 020 7282 3719
E-mail: russell.keir@orr.gsi.gov.uk

OFFICE OF RAIL REGULATION

13 March 2015

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

Dear Carolyn,

RAIB Report: Collision between a train and a car at Beech Hill level crossing, near Finningley, 4 December 2012

I write to provide an update[1] on the action taken in respect of recommendations 1 to 4 addressed to ORR in the above report, published on 13 September 2013.

The annex to this letter provides details of the action taken. The status of each recommendation is:

Network Rail

- Recommendations 1-4: Implementation on-going: ORR will advise RAIB when actions to address this recommendation have been completed.

Nexus

- Recommendations 1, 2, and 4: Implemented.
- Recommendation 3: In progress: ORR will update RAIB by 31 July 2015.

We will publish this response on the ORR website on 27 March 2015.

Yours sincerely,

Russell J Keir

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

Recommendation 1

The purpose of this recommendation is to replace, with LED units, all remaining 36 W wig-wags at level crossings, with those having 'Bliss' lenses a priority. Network Rail issued Special Inspection Notice SIN121 on 9 May 2013 to locate all such crossings on its infrastructure. This inspection is to be completed by 27 September 2013.

Infrastructure managers should determine which level crossings are fitted with 36W road traffic light signal (wig-wag) units or with 'Bliss' lenses and draw up a time bound plan so that their replacement with LED units is done as soon as possible, those with 'Bliss' lenses being dealt with first.

Actions taken or being taken to address the recommendation

Network Rail

1. On 3 March 2014, Network Rail reported that a Special Inspection Notice (SIN) had been issued to the Routes to identify all sites currently fitted with 36W road traffic light signal units or Bliss lenses. A sponsor has been allocated to the work and this recommendation informs the sponsor's remit – to replace the units with LED units. The sponsor was at that time reviewing the scope and the scale of the project and was working to pull together the timescales for delivery, which were risk based.

2. On 12 November, Network Rail informed ORR that of 420 sites in scope, 153 had been completed and the remaining sites were due for completion by 30 June 2015.

ORR decision

3. ORR having reviewed the responses from Network Rail has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations, it has:

- taken the recommendation into consideration; and
- is taking action to implement it with completion by 30 June 2015.

Status: Implementation on-going: *ORR will advise RAIB when actions to address this recommendation have been completed.*

Nexus

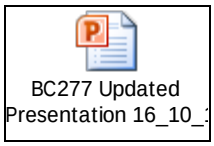
4. In its response on 3 December 2013 Nexus stated:

Please note, that work on implementing a range of improvements at Nexus' AOCL's was in progress before this incident occurred and report produced. Attached is a copy of a presentation covering the range of considerations and progress against them. This presentation was given to ORR as part of an inspection carried out on 13 November 2013, which was a follow up to a collision incident at our Callerton crossing on 2 September 2013.

Please note, from the attached that Nexus is also considering installing LED wig-wags at all five of its crossings but have an issue to resolve with regard to LED's in conjunction with red light enforcement cameras (Gatso's), which Nexus has fitted at

three of the crossings. Again, ORR is currently helping us to clarify the position so that Nexus can make an informed decision.

Nexus responded previously on the issue of 36W halogen lamps with Bliss lenses following the issue of USA Incident report No. 619 stating, Nexus changed to the recommended 50W lamps in the late 80's/early 90's in line with the standard and do not have any Bliss lenses fitted.



5. ORR understands that Nexus completed a programme of improvements including LED wig-wag fitment at the end of 2014. ORR is inspecting all of the crossings as part of its level crossing order making process during March 2015.

ORR decision

6. Having considered the response from Nexus, ORR has concluded that Nexus had already addressed the risk the recommendation seeks to address, all 36W lamps have previously been changed to 50W lamps.

Status: Implemented

Heritage Railway Association

7. In its response on 27 January 2014, the Heritage Railway Association stated:

This will be passed to our members in February when they will be requested to take the actions suggested.

ORR decision

8. The ORR is satisfied that the Heritage Rail Association has brought the recommendation to the attention of its members.

Recommendation 2

The purpose of this recommendation is to devise a method of assessing the risk of a bright background and glare preventing wig-wags, and other crossing equipment, from being seen and propose means of mitigating this (e.g. higher powered LED wig-wags, barrier skirts or other means of improving barrier conspicuity).

Infrastructure managers should put in place a method of identifying those locations where there is a significant risk from sunlight impairing the visibility of level crossing wig-wags and barriers propose suitable mitigation measures where appropriate and implement these measures. The method should be based on suitable research and include specific consideration of the possibility of glare, and the wig-wags being seen against a bright background and the barriers against a dark background, taking into account environmental factors and seasonal daytime variations. A programme of training and briefing of the staff carrying out the assessment should be implemented

Actions taken or being taken to address the recommendation

Network Rail

9. In its response on 2 December 2013, Network Rail provided the following information:

Currently there is not enough known about glare at level crossings to produce guidance on a method of identification and suitable mitigation measures. Glare has been noted to be a contributory factor for some accidents but has not been looked at in detail during previous RSSB research projects including T756 Research into traffic signs and signals at level crossings. Whether the effects of glare on wig-wag signals could be mitigated has not been looked into.

Network Rail considers that the glare issue would be best tackled by a bespoke piece of research: in effect a separate project to T756. The National Level Crossing Team are currently evaluating requirements to form a project remit to submit to RSSB to understand the issues with specific consideration of the possibility of glare, the wig-wags being seen against a bright background and the barriers against a dark background, taking into account environmental factors and seasonal daytime variations and glare on road surfaces. The research project will also look to identify possible engineering solutions and suitable mitigations. The research proposal and consideration will be completed by the end of February 2014. The resulting project will include the training and competence requirements.

10. On 4 August 2014, Network Rail provided the update below, including details of an extension to the timescales:

Network Rail has completed a desktop review of available research in this field. This established that new research would need to be undertaken as Network Rail could not identify any research findings that fully met the criteria stipulated within the RAIB recommendation. Network Rail has drafted a research remit and has engaged with specialists in this area. Network Rail has received a proposal from the specialists which outlines a recommended approach and identifies likely outputs and deliverables for incorporation into the level crossing risk assessment process.

The proposed estimates that completing the research will require 30 weeks from acceptance of the proposal and the receipt of a contract. Network Rail is working towards having a contract in place by the end of July 2014. Network Rail therefore anticipates being in receipt of the results of the research at the end of February 2015. This extension date aligns with the information provided in response to the Coroner's Regulation 28 letter of concern that was sent to network Rail after the inquest into the death of Emma Lifsey

11. On 27 February 2015, Network Rail provided an update including reasoning for an extension to the timescale:

Specialist optical consultants were engaged to undertake research into the causes of glare from road surfaces at level crossings. This included identifying mitigation measures that have the potential to reduce the adverse effects of glare on the vision of approaching road vehicle drivers. The programme of research work, which was completed during February 2015, consisted of the following stages:

- *Understand the processes involved in glare from roads and how this might affect the visibility of wig-wag signals and barriers;*

- *Identify level crossings that are susceptible to high levels of glare;*
- *Develop a means of testing glare and establish the level of glare that is just tolerable and set this as a threshold;*
- *Viewing trials of different types of wig- wag signals to assess the best performing signals under daylight viewing conditions;*
- *Identify those crossings that might fall outside the safe glare threshold and consider suitable mitigation measures*

This has resulted in the development of:

- *A glare scale which includes a threshold 'just tolerable' level;*
- *A process for assessing the risk of glare at road crossings, taking the effectiveness of wig- wag signals into account;*
- *Training material for the risk assessment process;*
- *Criteria that could result in level crossings being susceptible to glare, e.g. sun angles, road direction, road gradient and I or characteristics of road surfaces. These have been used to generate a list of crossings which might be susceptible to high levels of glare;*
- *Details of mitigation measures which are suitable, achievable and cost-effective.*

Copies of the reports, process for assessing the risk of glare, training material, review of mitigation measures etc. are available as supporting evidence in CMO [Reporting & Management software used by Network Rail].

A time extension is required so that the process for assessing sun glare can be briefed to Level Crossing Managers (LCMs). This will enable LCMs to assess those public road crossings that are most susceptible to sun glare and determine if any mitigation measures need to be applied.

Revised timescale: 31 August 2015

ORR decision

12. ORR, in reviewing the information provided by Network Rail, has concluded that in accordance with the Railway (Accident Investigation and Reporting) Regulations 2005. It has:

- taken the recommendation into consideration; and
- is taking action to implement it by 31 August 2015

Status: Implementation on-going: *ORR will advise RAIB when actions to address this recommendation have been completed.*

Nexus

13. In its response on 3 December 2013, Nexus stated:

Nexus has recently gone through an exercise covering all five of the AOCL's on the system to identify a range of improvements. This exercise included visibility of Wig Wags at crossings taking account of sunlight conditions. Two of the five crossings have subsequently been fitted with extended hoods to mitigate the issue of sunlight impeding visibility/conspicuity. In addition two further crossings have had LED Wig-

Wags fitted. In the case of the remaining, fifth crossing there are currently no changes identified or planned.

14. On 12 March 2015, Nexus informed ORR that:

Nexus has fitted LED Wig-Wags to all five crossings.

ORR decision

15. Having considered the additional response by Nexus, ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, it has:

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

Status: Implemented

Heritage Railway Association

16. In its response on 27 January 2014, The Heritage Railway Association stated:

This will be passed to our members in February when they will be requested to take the actions suggested.

ORR decision

17. The ORR is satisfied that the Heritage Rail Association has brought the recommendation to the attention of its members.

Recommendation 3

The purpose of this recommendation is to introduce a new 'brighter' type of LED wig-wag for use at sites where sunlight glare has been identified as a factor.

Infrastructure managers should, in conjunction with the other industry parties, develop a new type of wig-wag unit with higher luminous intensity than the existing LED units for use at crossings where high background luminance and sunlight glare is a particular problem, and install these units at the appropriate locations.

Actions taken or being taken to address the recommendation

Network Rail

18. In its response on 2 December 2013, Network Rail provided the following information:

Network Rail will carry out a study over the next 12 months to investigate the feasibility of increasing the luminous intensity (light output) of the LED-type level crossing wig-wag units. The scope of the work will need to include a human factors study of the effects to pedestrians and road traffic vehicle users of the increased luminous intensity for a flashing road traffic signal.

A period of 12 months is required to conduct this feasibility study, also being dependent upon the required timeline for specialist ergonomic support. The outcome

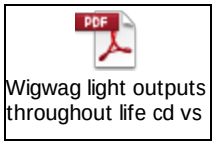
of the feasibility study will be considered by the Professional Head and further actions as necessary.

19. On 11 November 2014, Network Rail confirmed that full product acceptance had been awarded to the Mk2 LED Wig Wag unit as investigation had confirmed that high intensity wig wags are the appropriate solution.

20. On 12 March 2015, Network Rail informed ORR that:

a) *Higher light output LEDs have been developed, the first of these were Product Accepted on 09 June 2014*

b) *The manufacturers (Dorman) had been improving the intensity of their LEDs anyway. These were used in the manufacture of wig-wags supplied from October / November 2013, see attached scatter graph. Therefore, the LED wig-wags used from an early stage of the rollout programme in replacing 36w bulbs were already at a higher spec than 400 candelas. The closure date for this rollout programme is as per Recommendation 1 (June 2015).*



c) *All the remaining sites with 50W halogen and lower spec LED wig wags will be assessed using the new [sun glare] risk assessment tool (development of which is associated with recommendation 2) as part of the normal risk assessment regime as a business as usual activity.*

Therefore, closure of Recommendation 3 should be linked to the closure of both Recommendations 1 and 2.

- *Recommendation 1 in completing the replacement of 36w wig-wags; and*
- *Recommendation 2 in rolling out the method of risk assessing glare a public road level crossings.*

ORR decision

21. ORR, having reviewed the responses from Network Rail has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations it has:

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

The work to ‘product accept’ an improved level crossing traffic light has been completed. Implementation of on-site work is dependent upon the outcome of recommendation 2 at which time Network Rail has confirmed it will provide time bound implementation plan.

Status: Implementation on-going: *ORR will advise RAIB when actions to address this recommendation have been completed.*

Nexus

22. In its response on 3 December 2013, Nexus stated:

Nexus would support other more influential Infrastructure managers in seeking to develop new, improved brighter wig-wag units and when available would consider replacing existing units.

ORR decision

23. Having considered the response from Nexus, ORR has concluded that it would be willing to consider further action if options become available as result of the work being undertaken by Network Rail.

Status: In progress: *ORR will update RAIB by 31 July 2015.*

Heritage Railway Association

24. In its response on 27 January 2014, The Heritage Railway Association stated:

The HRA does not propose taking any action on this recommendation. The recommendation to develop a new higher intensity lamp requires significant technical research and, the HRA understand, a change in the current Regulations as agreed within Europe. The HRA does not consider that its members can usefully contribute to this development. If such a lamp is developed, approved and recommended for use, the HRA will review its position.

ORR decision

25. Having considered the response the Heritage railway Association, ORR has concluded that it would be willing to consider further action if options become available as result of the work being undertaken by Network Rail.

Recommendation 4

The purpose of this recommendation is to ensure the inspection and maintenance process confirms that wig-wag light units continue to meet their specification (types other than 36 W, which will have been dealt with in Recommendation 1). This may be achieved by means of testing/inspection or by replacing lamps at the end of a defined service life.

Infrastructure managers should enhance the inspection and maintenance process for wig-wag lamps to provide assurance that they continue to meet their specified performance standard.

Network Rail

26. In its response on 2 December 2013, Network Rail provided the following information

Network Rail will conduct a national sample survey of wig-wag lamps and lenses over the next 12 months. A sample number of 24V 50W RTL lamp units will be removed from level crossing sites during annual maintenance inspections of level crossing equipment and will be submitted for specialist testing to determine the performance characteristics measured against the required specified performance criteria for 24V 50W wig-wags.

27. On 30 0ctober 2014 Network Rail informed ORR that original timescales to complete this recommendation had been extended. The reason for this was that Network Rail had been unable to obtain supplies of the 50W halogen lamps for testing despite a long standing request for these to be sent by delivery units. The revised completion date is 30 April 2015.

28. On 12 March 2015, Network Rail informed ORR that:

Due to a failure of some of the test equipment used by the supplier, the anticipated completion date for this work is now 30 June 2015.

ORR Decision

29. ORR, having reviewed the responses from Network Rail has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations it has:

- taken the recommendation into consideration; and
- is taking action to implement it by *30 June 2015*.

Status: Implementation on-going *ORR will advise RAIB when actions to address this recommendation have been completed.*

Nexus

30. In its response on 3 December 2013, Nexus stated:

Nexus has implemented an enhanced inspection and maintenance regime of 4 weekly inspections (previously 12 monthly) of wig-wags for visibility/conspicuity taking account of the prescribed sighting positions.

31. On 16 April 2014 Nexus confirmed that its enhanced inspection regime also included a site specific diagram for each of its crossings with a clear focus on the visibility of the wig wag lamps (i.e. this has been delinked from other level crossing works).

ORR decision

32. ORR, having reviewed the responses from Nexus, has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations it has:

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

Status: Implemented

Heritage Railway Association

33. In its response on 27 January 2014, The Heritage Railway Association stated:

The HRA will remind its members that they should have an inspection and maintenance system that checks for the alignment and conspicuity of wig-wag units, but the HRA does not propose to take any action to advise members to undertake more technical testing to specifications when as yet there appears to be no objective

method for doing so. If research by Network Rail manages to develop a cost effective method for doing this then the HRA will review its position.

ORR decision

34. Having considered the information provided by the Heritage Railway Association, ORR has concluded the position adopted by the Heritage Railway is reasonable and is linked to the work being undertaken by Network Rail.