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

Dear Carolyn,

RAIB Report: Fatality at Johnson's footpath crossing near Bishop's Stortford, Hertfordshire, 28 January 2012

I write to provide an update¹ on the consideration given and action taken in respect of recommendation 1, published on 13 December 2012.

Annex A to this letter provides details of the action taken to address this recommendation. The status of this recommendation is now 'Implemented'. (Annex B to this letter provides details of what was previously reported).

We will publish this response on the ORR website on 30 January 2015.

Yours sincerely,

Chris O'Doherty

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

Update to RAIB

Recommendation 1

The intent of this recommendation is to identify reasonably practicable ways of improving the conspicuity of miniature stop light indications at pedestrian crossings, in order to reduce the potential for a level crossing user to be unaware of a red light.

This is increasingly important where pedestrians may be distracted by personal music devices and smartphones.

Network Rail should investigate ways to make cost-effective improvements to the conspicuity of visual warnings of approaching trains, taking account of the findings of relevant RSSB research projects.

Such improvements might include moving existing miniature stop light indications to the near side of the railway, or the provision of 'back-to-back' or 'side-to-back' indications.

The results of this investigation should be used to determine the optimum configurations for new installations, as well as the situations in which it would be reasonably practicable to enhance existing installations.

If appropriate, Network Rail should then arrange for the Level Crossing Risk Management Toolkit to be updated accordingly.

Update

1. On 16 December 2014, Network Rail provided ORR with a justification to extend the timescale for full implementation of the recommendation:

The final report from the trial of back-to-back MSL lights at Farnborough North has been issued. The conclusions of the trial indicate that, at crossings where MSLs cannot be seen until reaching the crossing entrance, back-to-back or side-to-back lights would enable users to see the lights earlier on approach to the crossing. This would allow users to better anticipate when and where they needed to stop and wait. The additional lights might also prove useful to users crossing in large groups where they can be seen over the crowd.

The trial findings have been used incorporated into updates to be made to the Level Crossing Risk Management Toolkit (LXRMTK). The entries to be updated are:

- *Risk Influencing Factor ID 22 'Conspicuity of flashing lights'*
- *Mitigation Measure ID 34 'Back-to-back or side-to-back MSLs'*

The updates will be included in the LXRMTK as part of RSSB research project T1053. The scope of this project is to complete a thorough update of the content of the toolkit, which is a RSSB resource. T1053 includes incorporating research findings and recommendations from RAIB investigation reports.

It is anticipated that the updates to the LXRMTK will be completed in the first quarter of 2015.

Network Rail has completed the part of the action plan for which it is wholly responsible. The extension is to enable full implementation of the recommendation via T1053.

ORR Decision

2. Network Rail has identified reasonably practicable ways of improving the conspicuity of miniature stop light indications at pedestrian crossings, in order to reduce the potential for a level crossing user to be unaware of a red miniature stop light.

3. ORR has confirmed that, as at 23 December 2014, the Level Crossing Risk Management Toolkit had been updated accordingly with mitigation IDs 34 (back-to –back/ side-to-back MSLs) and 22 (conspicuity of flashing lights).

4. 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*

Previously Reported to RAIB

Recommendation 1

The intent of this recommendation is to identify reasonably practicable ways of improving the conspicuity of miniature stop light indications at pedestrian crossings, in order to reduce the potential for a level crossing user to be unaware of a red light.

This is increasingly important where pedestrians may be distracted by personal music devices and smartphones.

Network Rail should investigate ways to make cost-effective improvements to the conspicuity of visual warnings of approaching trains, taking account of the findings of relevant RSSB research projects.

Such improvements might include moving existing miniature stop light indications to the near side of the railway, or the provision of 'back-to-back' or 'side-to-back' indications.

The results of this investigation should be used to determine the optimum configurations for new installations, as well as the situations in which it would be reasonably practicable to enhance existing installations.

If appropriate, Network Rail should then arrange for the Level Crossing Risk Management Toolkit to be updated accordingly.

Brief Summary on what was previously reported to RAIB on 31 May 2013

1. Network Rail in its response on 20 February 2013 stated that:

The National Level Crossing Team was in the preparatory phase of trialling a back-to-back Miniature Stop Light (MSL) system at Farnborough.

Civil work was to be completed by the end of February 2013 followed by installation of the new back-to-back MSLs. The output of the trial was to be analysed and the benefits considered.

The results of the trials would be considered in conjunction with on-going human factors research. The results were to inform guidance on future installations, specifically optimum configuration.

Depending on the conclusions of the trial, suitable sites were to be identified and considered for implementation. The investigation results were to be incorporated into an update to the Level Crossing Toolkit by 31 March 2014.

Update

2. On 12 September 2013, Network Rail provided ORR with a Progress update:

Back-to-back lights were to be installed at Farnborough North level crossing in July 2013 and at Rushton No.2 level crossing in August 2013.

To understand how 'back-to-back lights' actually affect user behaviour at the crossing; video footage at the crossing was to be collected, along with 'before and after' data whereby users would be interviewed and observed (on site observations and video data). The data collected was then to be analysed.

Network Rail's approach was to collect data:

- *Over a 7-day period prior to back-to-back lights being commissioned – to provide baseline data against which can be compared later footage.*
- *Over a 7-day period immediately post commission of the lights – to assess immediate impact of the new lights.*
- *Over a 7 day period 3 months after lights have been commissioned – to understand whether the lights are having a sustained impact on behaviour in the short term.*
- *Over a 7 day period 6 months after lights have been commissioned – to understand whether the lights are having a sustained impact on behaviour in the medium to longer term.*

The introduction of back-to-back lights will reduce risk to users of the crossing by:

- *Providing redundancy;*
- *Increasing information provision - user can check the status of the crossing when they are traversing;*
- *Improving situational awareness and accuracy of decision to cross;*
- *Reducing likelihood that users will fail to recognise the crossing or the decision point;*
- *Reducing likelihood that users will fail to read crossing instructions; and*
- *Reducing likelihood that users will be unaware of an approaching train.*

A written report at the end of the trial will summarise the approach and findings, including consideration of the benefits of implementing back-to-back lights more widely on the network.

Timescale: January 2014

3. On 30 September 2013, Network Rail provided a further update on progress to install back-to-back lights at Farnborough North level crossing and at Rushton No.2 level crossing:

- *Farnborough North: Works now completed; back to back lights installed; civil works complete on platform approaches; signs removed to bare minimum; audible warning levels tested and suitable level applied.*
- *Rushton No2: The work had not yet started but the plan was for the work to be undertaken in the first week of December [2013]. However, on 2 April 2014 Network Rail informed ORR that installation had been delayed until the end of May 2014. Consequently, Network Rail does not expect to receive ERM's full data and report until sometime in November [2014].*

4. On 28 January 2014, ORR wrote to Network Rail requesting full details of the findings from the trial or further action it may be taking to address the recommendation, including timescales. On 14 February 2014, Network Rail provided a copy of RSSB / ERM report titled '*Trial of Back-to-Back Lights Supporting information for Network Rail in Response to RAIB Recommendations; February 2014*'. The document stated that:

Context and Timescales

- *Network Rail is currently trialling back-to-back warning lights at one level crossing site (Farnborough North) and will shortly commence a second trial at Rushton No.2 crossing in Dorset.*
- *ERM is participating in both trials to evaluate the impact of back-to-back lights on user behaviour. A 'before and after' study has been designed that incorporates video data analysis at 4 intervals (before installation, immediately afterward, 3 months afterward and 6 months afterward), plus user observations and interviews post light installation.*
- *Interim findings from the Farnborough North trial were to be provided to Network Rail on 11th February 2014, but it should be stressed that these were not the final trial results. Those will be reported at the end of the trial in summer 2014.*

Further RAIB Requirements

- *To address RAIB's recommendation in full, the following is required of Network Rail in addition to the trial of back to back lights:*
 - *Investigation into cost effective improvements to the conspicuousness of visual warnings of approaching trains.*
 - *Details and timescales for planned implementation of any improvements identified above.*
 - *Optimum configurations for new installations of back-to-back lights as well as criteria for enhancing existing installations.*
 - *Updates to the LXRMTK on the basis of trial findings.*
 - *ERM provides input, where possible, to each of the above points in the slides that follow, based on trial findings to date and knowledge of wider RSSB research findings of relevance.*

Improvements to Visual Warnings

- *The following measures have or are being considered in RSSB research projects to improve visual warning of approaching trains:*
 1. *Back-to-back MWL repeater lights;*
 2. *Wider use of the flashing red man pedestrian signal;*
 3. *Upgrade wig-wags from incandescent bulbs to LEDs;*
 4. *MWL gate LED repeater lights;*
 5. *Projected stop signs (active crossing).*

- Options 1-3 are already established in GB, options 4 & 5 are novel in GB but have precedent overseas. Relevant research findings will be published in April 2014 (RSSB T984 and RSSB T756).
- Cost effectiveness must be judged on a case by case basis but all are judged to be reasonably straightforward to implement.
- In general, visual warnings have the greatest impact on users when provided in combination with an active auditory warning. This is supported by findings to date in the trial of back-to-back lights.

Optimum Configuration of Back-to-Back Lights

- Suggestions for the optimum configuration of back-to back lights will be given in the final trial report and will be based upon video data analysis and user feedback. However, some basic preliminary guidelines are provided below:
 - The lights should not obstruct the user's view up and down the tracks at the edge of the position of safety (2m from the line).
 - Safety critical signs, e.g. user instructions, should not be obscured by the lights.
 - The lights should be positioned at a height where they can be seen and read by users of all types (children, adults, wheelchair users etc.). Specific guidance on height and viewing angles will be given in the final report.
 - The lights on the far side of the crossing should be positioned higher than those on the near side so that they can be seen above groups of users traversing at the same time.
 - All lights should be angled into the crossing such that they can be seen both at the crossing gate (where present) and on the approach to the crossing.
 - Elongated sun hoods should be provided at crossings where bright sunlight could affect aspect conspicuity (e.g. crossings with East-West layout).

Updates to LXRMTK

- The trial of back-to-back lights is scheduled to end in summer 2014.
- This coincides with a planned update of the Level Crossing Risk Management Toolkit by RSSB.
- All trial findings will be incorporated into the LXRMTK at this stage and would include:
 - Updated information on costs associated with back-to-back light installation.
 - Optimum configuration/layout.
 - Case studies (Farnborough North and Rushton No2) including photographs and lessons learned.

ORR Decision

5. ORR notes that the installation of back-to-back lights at Rushton No.2 level crossing has been delayed until the end of May 2014. Consequently, Network Rail does not expect to receive ERM's full data and report until sometime in November [2014].

6. Once Network Rail has concluded the trials ORR will be seeking further information on how the LXRMTK is to be revised, including timescales.

7. After reviewing all the information received ORR 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.

Status: *Implementation on-going.* ORR will confirm that all actions have been complete by 30 January 2015.