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10 November 2015

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

Dear Andrew,

RAIB Report: class investigation into rail breaks on the East Coast Main Line

I write to report[1] on the consideration given and action taken in respect of recommendations 1, 2, 3, 4 and 5 addressed to ORR in the above report, published on 13 November 2014.

The annex to this letter provides details in respect of each recommendation. The status of recommendation 5 is '**Implemented**'. We do not propose to take any further action in respect of this recommendation unless we become aware that any of the information provided becomes inaccurate, in which case I will write to you again.

The status of recommendation 1, 2, 3 and 4 is '**Implementation ongoing**'. ORR will advise RAIB when further information is available regarding actions being taken to address these recommendations.

We will publish this response on the ORR website on 13 November 2015.

Yours sincerely,

Oliver Stewart

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

Initial consideration by ORR

1. All 5 recommendations were addressed to ORR when the report was published on 13 November 2014.

2. After considering the recommendations ORR passed each of them to Network Rail asking it to consider and where appropriate act upon them and advise ORR of its conclusions. The consideration given to each recommendation is included below.

Recommendation 1

This recommendation is intended to reduce the risk of rail breaks by taking advantage of technological developments in the UK and elsewhere, not restricted to ultrasonic techniques, to allow detection of smaller cracks in rails.

Network Rail should undertake or commission research to identify any opportunities for reducing the size of cracks and defects which can be identified in rails in circumstances likely to be associated with rail breaks. The research should be targeted at providing reliable information using equipment capable of operating routinely throughout its infrastructure (paragraph 121d).

Steps taken or being taken to address the recommendation

3. On 19 February 2015, Network Rail provided the following information:

> *Network Rail has undertaken work to identify any opportunities for reducing the size of cracks and defects which can be identified in rails in circumstances likely to be associated with rail breaks. This work has resulted in two ultrasonic detection processes.*
>
> ***Improved detection of small bolt hole and horizontal defects at rail ends.***
>
> *Detection of cracks at rail ends and bolt holes at the earliest stages of growth is predominately determined by the sensitivity of the 370 channels. The DAC system (Distance Amplitude Correction) enables the sensitivity to be increased in areas where crack signals are likely to occur.*
>
> ***Identify small surface defects on the head of the rail***
>
> *Train based eddy current inspection will be used to identify RCF. The existing process depends on the RCF sites being initially identified by visual inspection (which then generates a targeted ultrasonic test programme).*
>
> *The eddy current system (which is not an ultrasonic process) will allow us to better understand and predict the actual depth and deterioration of RCF, allowing detection of surface defects from 0.1mm to 5mm deep. Eddy current effectively measures depth, rather than surface length, of the cracks.*
>
> *The eddy current system will be fitted to all four UTUs. Geographic coverage will be as existing UTU coverage.*
>
> *Work is progressing to finalise an automated report to enable Sperry to process the eddy current data. The output will give a validated pocket depth / depth of crack result in a practical and efficient way.*

Revised procedures are required to make use of this more accurate and consistent data. These procedures will be revised and briefed to all appropriate staff.

Network Rail will also explore the possibility of providing pedestrian eddy current testing (new equipment/process required) and implement the results of this work.

Timescale: 15 December 2015

4. On 10 August 2015, Network Rail provided the following additional information:

Network Rail is working to initiate improvements to its ultrasonic rail management processes and against this background of research introduced a number of initiatives that have provided opportunities for improved rail management; specifically:

Introduced an additional (fourth) UTU to improve the extent of ultrasonic testing

The fourth UTU was primarily introduced to enable train based ultrasonic inspection of lower category track to be carried out at the required frequencies. Previously the UTUs were focussed on defect detection in higher speed, higher tonnage routes and only operated on Track Categories 1A, 1, 2 and 3. The fourth UTU enables this programme to be extended to cover the remaining lower speed, lower tonnage track in categories 4, 5 and 6. The additional vehicle also provides additional spare shifts which are used to free up other vehicles for planned maintenance and to implement and trial new measuring and inspection techniques which is more difficult if all vehicles are fully utilised for compliant testing.

Improved the identification of rail foot defects, or indicators that there is a relatively high risk of such defects, using improved testing equipment mounted on the UTU (i.e. testing the full depth of the rail but acknowledging that irregularities on the foot underside may both prevent crack identification but permit recognition of corroded areas liable to cracking).

Network Rail has undertaken initial trials of a modified ultrasonic procedure to enable the foot of the rail to be scanned to try and detect any transverse defects that may initiate in the middle of the rail foot. This has been refined to improve the results with all four UTUs now modified to allow the deep 37 degree probe data to be captured routinely. Current work is validating the results from initial runs carried out on ECML between London and Peterborough and on West Coast Main Line south of Rugby.

Work is currently underway to understand the capability of the new process and to assess the potential for introducing this technique on all Routes.

If the procedure is validated and shows a benefit in reducing the risk of rail breaks further work is required to develop analysis procedures to process the data and determine new minimum action codes to target the removal of at risk rail before failure is likely to occur.

Revising how rail head ultrasonic data is processed to increase the likelihood of detecting rail head defects…

Revisions to the analysis procedures have been put in place since September 2013 to improve the detection of longitudinal defects in the head of the rail based on repeated sections of rail with a loss of rail bottom signal. These types of defect are difficult to detect with conventional ultrasonic testing due to their orientation and small cross sectional area. This has improved the early detection of a number of vertical longitudinal split defects that would have not been detected previously.

Fitted additional equipment to the UTU trains intended to improve the detection of cracks on the rail head

Eddy Current based wheel probes have been developed, installed and operational on all UTU vehicles to measure the length and depth of surface defects such as rolling contact fatigue. Since February 2015 test data has been gathered from all vehicles and work is ongoing to validate surface crack length with depth through the removal of samples of rail tested in track.

Initial comparisons using rails removed from West Coast Mainline show that both the vehicle-mounted and pedestrian Sperry Eddy Current Systems measured crack depths with sub-millimetre accuracy when compared to the definitive milling results. Further samples, which have been measured by the UTUs, are currently being gathered and will also be sectioned to provide a larger population of results from a wider range of rail conditions. Benchmarking of measured data is also difficult and time consuming as a range samples of rails measured in track need to be removed and sectioned to provide a definitive answer on the depth of real defects being measured.

The system has been developed to be fully automated and is mounted to existing inspection vehicles to minimise the potential for human error or operator appraisement errors which were significant with the existing visual inspection process. Initial results show a step change improvement in the reliability and repeatability of the data being collected by the eddy current technology which has identified new sites which had not been identified at all and given depth data which was only ever estimated in the past. The system is intended to replace the current visual assessment of surface length which was used to give an approximate indication of crack depth and replace it with a direct measurement of crack depth and thus much more accurate results compared to what has been used for the last 13 years. It is already providing better data than was previously available. Work is currently underway to make the data accessible to the Routes whilst upgrades are being made to the rail defect management system RDMS to allow eddy current data to be automatically loaded and managed within the system.

Other work not previously provided to RAIB:

Improvements to the current UTU procedures to improve the detection of smaller defects at bolt holes and rail ends (results of trials and developments since April 2014).

Sperry ultrasonic systems use ultrasonic pulses directed at 37 degrees to the vertical to interrogate bolt holes for the presence of so-called "Star Cracks". These grow at approximately any of the four diagonal directions and horizontally from bolt

holes mainly where rails lengths are joined together using bolted fishplates. The fishplates cover growing cracks and prevent crack detection using visual inspection and so it is important that ultrasonic inspection is comprehensive and reliable in detecting and identifying any growing cracks. The Probability of Detection of cracks at the earliest stages of growth is determined by the sensitivity of the 37 degree channels. Unfortunately as the sensitivity is increased there is a tendency for spurious signals (noise) from various sources to degrade the quality of the signals. This usually sets a practical limit to the capability to detect cracks.

One way of overcoming this limitation is the have a system that enables the sensitivity of the system, normally expressed as Gain, to be varied as a function of time. This system enables the sensitivity to be decreased in areas that are likely to generate noise and increased in areas where crack signals are likely to occur. This functionality is called Distance Amplitude Correction (DAC).

The results of the trials showed that in all cases there is either an equal number of hits when DAC is applied but in the majority of cases there is an increase in the number. Furthermore there is no increase in spurious signals recorded by the system. The trials showed that the "hard-to-find" d cracks are detected with greater probability when DAC is used. In the comparative trial 89% of the d cracks were detected when DAC was used compared to only 27% when it was not.

The introduction of DAC means that extra sensitivity can be used in the areas around bolt holes where Star Cracks are known to originate.

In view of the successful trials DAC was implemented on all UTUs from November 2014 to improve the detection of defects at rail ends.

1. ORR wrote to Network Rail challenging them explore the practicability of implementing solutions beyond existing knowledge, products and innovations around ultrasonic techniques, both within and outside the UK, as per the intent of the recommendation

2. ORR met with Network Rail on 6 October 2015 to review progress and agree further information required to demonstrate that Network Rail has addressed this recommendation. Network Rail summarised their approach to ensure that they have taken account of emerging technology and European knowledge, and will provide a written response to our September letter.

ORR decision

3. ORR, in reviewing the information received from Network Rail has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, it has:

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

Status: Implementation on-going. **ORR will advise RAIB when further information is available regarding actions being taken to address this recommendation.**

Recommendation 2

This recommendation is intended to ensure that all parts of Network Rail obtain the maximum benefit from knowledge gained by work intended to reduce the risk of rail breaks on the East Coast Main Line and is a formalisation of a process which Network Rail states is already in progress.

Network Rail should review the actions already being taken to reduce the incidence of rail breaks on the East Coast Main Line (including those described in paragraphs 128 and 129) in order to identify whether similar actions would provide significant safety benefits elsewhere on its infrastructure. If such benefits are identified, Network Rail should modify its processes so that they are applied more widely (paragraph 123).

Steps taken or being taken to address the recommendation

4. On 19 February 2015, Network Rail provided the following information:

> *The benefits of adopting more onerous threshold limits in certain areas (high tonnage/high speed lines) have been identified and discussed by the Track Leadership Team (Professional Head, RAMs, Principal Engineers from the centre).*
>
> *It has been agreed that it is not appropriate to mandate these tighter threshold limits nationally. Instead the RAMs will determine themselves where to apply these, by risk assessment, prompted if one of the following statements apply:*
>
> *1. There are High Axle Loads;*
> *2. Line speed is 90mph or greater;*
> *3. There are clusters of rail end failures;*
> *4. The trend of broken rails within that Route (or part) is outside of normal margins.*
>
> *If (3) or (4) applies, there will be an immediate review undertaken. The assessment notes will be included in the next update of NR/L2/TRK/001/mod11.*
>
> *Timescale: 30 June 2015*

5. Network Rail provided a closure statement on 20 July 2015 containing the following additional information:

> *Network Rail, Professional Head [Track], has considered the intent of this recommendation by reviewing the management of dip angles, introduction of the Linear Decision Support tool (LADS) and the introduction of enhanced precursor information provided by Plain Line Pattern Recognition technology (PLPR). Consideration has also been given to the identification of lessons learned following a review of 2014/2015 broken rail performance indicators. This has been undertaken within Technical Services, part of the Safety, Technical & Engineering Directorate and involved subject matter engineering experts.*
>
> *Network Rail has reviewed the actions already being taken to reduce the incidence of rail breaks on the East Coast Main Line in order to identify whether similar actions would provide significant safety benefits elsewhere on its infrastructure. Consideration has focussed on four specific issues:*

a) *NRIL21TRK/001/mod11, Track geometry - Inspections and minimum actions, (Issue 7; Sept 2014)*
b) *Dip Angle Management*
c) *Introduction of the Linear Asset Decision Support tool (LADS)*
d) *Plain Line Pattern Recognition technology (PLPR)*
e) *Review of 201412015 broken rail performance indicators*

a) *NRIL21TRK/001/mod11 , Track geometry - Inspections and minimum actions, (Issue 7 Sept 2014)*

NR/L2fTRK/001/mod11 specifies, in relation to track geometry, the requirements for managing dip angles.

Section 8 specifically addresses the management of dip angles including the frequency of measurement and the minimum actions for dip angle exceedances.

b) *Dip angle measurement*

The management of 'Dip Angle Measurement' has been a key factor in the reduction of rail breaks nationally.

The benefits of adopting more onerous dip angle threshold limits in certain areas (high tonnage/high speed lines) have been identified and discussed as has the process for considering the roll out of enhanced actions at the Track Leadership Group meeting in September 2014.

It has been agreed that it is not appropriate to mandate these tighter threshold limits nationally. Instead the Route Asset Manager [Track] (RAM[T]) will determine themselves where to apply these, by risk assessment. The RAM[T], or their representative , would then have the freedom to consider the benefit of introducing tighter threshold limits and response requirements where:

i. *there are high axle loads*
ii. *linespeed is 90 mph or greater*
iii. *there are clusters of rail end defects*
iv. *the trend of broken rails within that Route (or part) are outside of normal margins*
i.e. where RAM[T] compare their own route statistics to other national and route statistics to understand if there are a greater level of rail issues on their route

Tighter threshold limits are only contemplated where at least one of the above situations applies; only where (iii) and/or (iv) apply would an immediate review be needed.

This aligns with the principles advocated within Business Critical Rules (BCR) allowing Routes to make local variations in BCR procedures where earlier intervention is of benefit.

c) *Introduction of the Linear Asset Decision Support Tool (LADS)*

The national roll out of Network Rails Linear Asset Decision Support Tool (LADS) was completed in 2014. LADS is a solution where linear asset information is aligned and visually represented in an interactive tool that aids decision making.

Manipulation of different sources of data is possible within the tool. Overlaying these different types helps to understand root causes. The tool can also enable searching by different asset types, for example Insulated Rail Joints. This means it is a quicker as well as more reliable means of establishing condition, deterioration and intervention at these locations.

Amongst many business benefits, in the management of the rail asset it is a key enabler for:

- *Understanding asset degradation; enhanced through the alignment of run-on-run data giving repeatability, providing more confidence in degradation analysis*
- *Assessing the effectiveness of interventions*

d) *Plain Line Pattern Recognition Technology (PLPR)*

Network Rail is implementing the OmniVision system to obtain a consistent and quantitative understanding of the asset condition.

The OmniVision system is fitted to the New Measurement Train (NMT) and four other infrastructure monitoring trains. All train consists also have track geometry measurement and ballast profile measurement systems.

The output data is being used to analyse the deterioration characteristics of the inspected assets and the risks associated with their condition profile.

The OmniVision system is being implemented in a number of phases:

- *Phase 1 - consists of implementation on CWR track with Pandrol PR, e and Re, Pandrol Fastclip or SHC fastenings.*

- *Subsequent phases - will be for use on jointed track and/or obsolescent fastening types*

To supplement and improve the decision making of the OmniVision system it is linked to an on train Track Geometry Measurement System (TGMS). The following diagram shows how the system links the two data sources:

In managing dip angles images are extracted and attached to geometry defects. The OmniVision system also uses enhanced dip angle thresholds than those stated in NR/l2/TRK/001/mod11 (Table 8) as follows:

- *Cat 1A, 1 and 2 > 10mrad*
- *Cat 3 and 4 > 15 mrad*
- *Cat 5 and 6 > 20 mrad*

These thresholds supports and enhances frontline management teams decision making for the earlier identification of component defects e.g. wet bed management, voiding , dip joints I welds , visible rail head defects, broken fishplates, rail pad and sleeper degradation to name but a few.

e) *Review of 201412015 broken rail performance indicators*

2014/2015 has seen a reduction in the number of broken rails compared to 2013/2014, 98 compared to 126, with the biggest reductions seen in primary, and in particular, secondary routes (see table below). A number of initiatives combined with the relatively mild winter resulted in this lowest number of broken rails on record:

- *The roll out of train based ultrasonic inspection on track categories 4 to 6 which carry lower speed and tonnage traffic; in the past the train based ultrasonic inspection has only covered higher speed and tonnage routes in track categories 1A to 3.*
- *A focus on actioning geometry faults at an earlier level*
- *A focus on earlier intervention at dipped joints on higher speed, higher tonnage track*
- *Targeted replacement of rail that has carried a higher cumulative tonnage*

Number of Broken Rails						
		2010111	***2011/12***	***2012113***	***2013114***	***2014115***
England & Wales	*Primary*	*87*	*65*	*97*	*59*	*52*
	Secondary	*49*	*42*	*49*	*42*	*23*
	Rural	*13*	*3*	*7*	*6*	*6*

	Total	***149***	***110***	***153***	***107***	***81***
Scotland	*Primary*	*7*	*7*	*5*	*8*	*2*
	Secondary	*15*	*8*	*17*	*11*	*14*
	Rural	*0*	*2*	*3*	*0*	*1*
	Total	***22***	***17***	***25***	***19***	***17***
Network Total	*Primary*	*94*	*72*	*102*	*67*	*54*
	Secondary	*64*	*50*	*66*	*53*	*37*
	Rural	*13*	*5*	*10*	*6*	*7*
	Total	***171***	***127***	***178***	***126***	***98***

The average number of broken rails per year in CPS is currently 112, a 26% reduction compared to 151 in CP4 which is a 53% reduction on the CP3 average of 322 and a 74% reduction on 588, the average number of breaks per year in CP2. These improvements have been achieved despite a significant increase in the volume of traffic running on the network.

Summary

The considered response of the Professional Head [Track] is that though the sharing of lessons learned from initiatives being adopted across the network a corresponding reduction in the risk of rail breaks is being seen.

The sharing of good practice within existing governance frameworks and the adoption of new technology underpins a continuous improvement approach within the Track community.

It is against this background that it is considered the intent of this recommendation has been met and therefore considered CLOSED.

6. ORR wrote to Network Rail requesting further information as to how the approach described in section b) Dip Angles (risk assessment using 4 criteria) are captured and incorporated into their SMS. This could be by incorporating it into NR/L2/TRK/001 module 11 as Network Rail stated in their February 2015 update.

7. ORR met with Network Rail on 6 October 2015 to review progress and agree further information required to demonstrate that Network Rail has addressed this recommendation. Network Rail accepted that further work is required to embed the new approach into their process, and will confirm in writing action taken being taken to achieve this.

ORR decision

8. ORR, in reviewing the information received from Network Rail has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, it has:

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

Status: Implementation on going. **ORR will advise RAIB when further information is available regarding actions being taken to address this recommendation.**

Recommendation 3

This recommendation is intended to reduce the risk of rail breaks due to the deterioration of rail pads.

Network Rail should establish a process throughout its infrastructure for inspecting parts of rail pads beneath rails (on a sample basis) and, if necessary, replacing rail pads outside rail replacement projects in areas where this is justified by benefits, including benefits from reducing rail break risk (paragraph 121b).

Steps taken or being taken to address the recommendation

9. On 19 February 2015, Network Rail provided the following information:

A review will be undertaken around the network to look for good practice which can be shared.

The review will look at how the decision is made currently on where to undertake an inspection of pads (manually lift rail and confirm pad condition) to assess which sites should be included in a pad replacement programme.

Network Rail will then consider the benefit of providing guidance on how to identify where to efficiently target this manual inspection of pads. This guidance could be based on indicators such as:

- *Poor geometry;*
- *Tight radius;*
- *5mm pads originally installed;*
- *High cant deficiency or excess cant.*
- *Loss of toe load/loose fastenings*

There is no current train borne inspection process which can directly assess the condition of pads. A review will be undertaken to determine if any measurements currently taken can provide an indication of pad deterioration.

The process documents (standards or means of control) will be updated following the review and implemented.

Timescale: 30 September 2015

10. On 10 August, Network Rail provided the following additional information:

Identification of worn pads is generally difficult without removing a number of samples so that the centre of the pad can be inspected; normal practice is to sample a number of pads to allow their condition to be assessed. The edges of the pad that are visible with the rail installed can often appear to be in good condition when the centre of the pad is severely degraded.

Some development work is currently being undertaken to see if rail roll, which is measured as part of the train based laser profile measuring system, can be used to provide an indication of pad and / or rail fastening conditions. The theory is based on the condition of the pad and the toe load of the fastening leading to an variation in rail roll. Further work is required to understand he variations in vehicle lateral loading due to vehicle type, curvature and cant deficiency which will also cause significant variations in the rail roll expected at a specific location.

Worn pads are identified normally through sampling and visual inspection with priority given to thinner 5 and 7.5mm pads with the highest tonnages since they were last replaced. Older worn 10mm pads would be expected to be identified in the same way although the expected service lives of the 10mm pads are anticipated to be much greater reducing the need for regular re-padding. This work has already started with plans put in Ellipse based on existing pad condition, tonnage carried and at site with known track circuit failure sites where pads have been identified to be an issue.

11. ORR wrote to Network Rail requesting the outcome of the review referred to in the February 2015 statement, as it is not clear how their August 2015 statement refers to the review or its outcomes. The update of 10 August 2015 also infers that some inspection activity has already been carried out. ORR has asked Network Rail to clarify the scope and geographical extent of that planned inspection activity; and whether this is in response to new process requirements, or part of BAU as required by current NR/L2/TRK/001.

12. ORR met with Network Rail on 6 October 2015 to review progress and agree further information required to demonstrate that Network Rail has addressed this recommendation. Network Rail agreed to provide a closure statement by 23 October for ORR to review; this will cover Network Rail's position concerning the risk mitigation against rail defects provided by the rail pad, the reasonable practicability of assessing rail pad condition in situ, and their regime for identifying and replacing rail pads.

ORR decision

13. ORR, in reviewing the information received from Network Rail has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, it has:

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

Status: Implementation on going. **ORR will advise RAIB when further information is available regarding actions being taken to address this recommendation.**

Recommendation 4

This recommendation is intended to reduce the risk of rail breaks by improving the ability of existing Ultrasonic Testing Unit (UTU) equipment to detect initiator cracks and other defects in the lower part of the rail.

Network Rail should complete the current test programme to establish the practicability of extending current UTU testing and analysis to identify defects throughout the full depth of a rail and/or defects on the underside of a rail. If the test programme shows that this offers a reasonably practicable means of improving the detection of initiator cracks and other defects associated with potential rail breaks, Network Rail should introduce equipment and processes to implement this improved testing and analysis (paragraph 121d).

Steps taken or being taken to address the recommendation

14. On 19 February 2015, Network Rail provided the following information:

Initial trials have been undertaken with the UTU using 'deep 37' degree probe measurements to look at the potential to detect transverse cracks in the middle of the rail foot. Trials on ECML have been carried out, suspects have been verified and samples were removed for further laboratory analysis. This laboratory testing will confirm (or otherwise) if significant pits or defects are present at the suspect locations identified by the 'deep 37' testing.

Initial trials have utilised the existing 37 degree forward and rear facing probes on the UTU at long range to cover the rail foot beneath the web.

The ultrasonic responses from the middle of the foot may also provide an indication of the level of pitting / roughness of the rail foot which may help prioritise re-railing.

Changes to Sperry analysis software will be needed to enable analysis of the raw data which will provide a new list of potential suspects (including possible defects in the rail foot).

Procedures will need to be updated to include this new test process and provide minimum action codes specifying actions (including timescales).

Network Rail will also look at the feasibility of using new pedestrian equipment and procedures to test rails not included in the UTU test programme. The results of this feasibility study will be implemented.

Timescale: 15 December 2015

15. ORR met with Network Rail on 6 October 2015 to review progress and agree further information required to demonstrate that Network Rail has addressed this recommendation. Network Rail stated the trials in LNE and LNW are complete and whilst the findings are inconclusive, they demonstrate there is potential in the system to be of some benefit. Network Rail to fomally write to ORR setting out their conclusions from the trials and planned action in light of those findings.

ORR decision

16. ORR, in reviewing the information received from Network Rail has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, it has:

- taken the recommendation into consideration; and
- is taking action to implement it which they expect to complete by December 2015

Status: Implementation on going. **ORR will advise RAIB when further information is available regarding actions being taken to address this recommendation.**

Recommendation 5

This recommendation is intended to reduce the risk that railway maintenance staff fail to appreciate that an important change has been made to Network Rail standards.

Network Rail should modify existing document preparation processes to ensure that markings intended to show changes to standards and other safety critical documents clearly indicate the change that has occurred (paragraph 124c).

Steps taken or being taken to address the recommendation

17. On 19 February 2015, Network Rail provided the following information:

A secure method to enable text change markings has been developed for use within MS Word 2010.

All Business Critical Rules document templates will incorporate a facility to enable document authors to indicate changes to text. The text changes will be shown using revision marks in the right hand margins of each page.

As Business Critical Rules documents will be replacing Network Rail Standards documents commencing March 2015, Network Rail Standards document templates will not be amended to incorporate this facility.

- *The Business Critical Rules document templates are available and in use.*
- *Guidance for users of the Business Critical Rules document templates will be available and published by 27th February 2015.*
- *From March 2015, all Network Rail control documentation (Standards, Letters of Instruction, etc.) will be subject to transition to Business Critical Rules documentation.*
- *During the transition period, changes to each Network Rail Standard will be clearly indicated on its Briefing Note (embedded within the document), and within the 'change' section of Letters of Instructions.*

Users will be briefed on the availability and guidance for the new facility through the Standards Briefing Report that will be published on 7th March 2015, and through face-to-face briefings at subsequent Business Critical Rules Development Group meetings.

Timescale: 30 April 2015

18. On 9 April 2015, Network Rail provided an update:

A secure method to enable text change markings has been developed for use within MS Word 2010. All Business Critical Rules document templates will incorporate a facility to enable document authors to indicate changes to text. The text changes will be shown using revision marks in the right hand margins of each page.

As Business Critical Rules documents will be replacing Network Rail Standards documents commencing March 2015, Network Rail Standards document templates will not be amended to incorporate this facility.

ORR decision

19. 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
- taken action to implement it.

***Status: Implemented**.*