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Mr Andrew Hall
Deputy Chief Inspector of Rail Accidents
Cullen House
Berkshire Copse Rd
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Dear Andrew,

RAIB Report: Freight train derailment at Angerstein Junction on 2 April 2014

I write to provide an update¹ on the action taken in respect of recommendations 3, 5 & 6 addressed to ORR in the above report, published on 12 August 2015.

The annex to this letter provides details of the action taken regarding the recommendations. The status of all 3 recommendations is **'implemented'**.

We do not propose to take any further action in respect of the recommendations, 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 11 June 2019.

Yours sincerely,

Oliver Stewart

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

Recommendation 3

The intention of this recommendation is to ensure that the control of derailment risk in sidings takes account of the possibility of exporting that risk onto running lines.

Network Rail should review the processes by which track geometry is managed in sidings and connections on the approach to running lines, in order to identify and implement any changes necessary to ensure that the export of risk to running lines is effectively managed. This should include consideration of how dynamic track geometry is assessed on infrequently used lines.

ORR decision

1. We have reviewed the Track Worker Information (TWI) sheet and revised TEF 3267 process to determine track geometry inspection requirements in sidings and concluded that the revised process now applies a more rigorous geometry inspection regime than previous requirements under standard NR/L2/TRK 001 mod 11.
2. As an example, when applied to Angerstein Junction it results in a more rigorous inspection regime than previously. Consequently we believe Network Rail have provided a reasonably practicable response to the recommendation, covering all the key points.
3. 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

4. On 6 July 2016 ORR reported that it was satisfied that Network Rail's initial response demonstrated that work is progressing to deliver the recommendation. Subsequent discussions with Network Rail had provided clarification of how Network Rail would move to implementation of the recommendation by December 2016.

Update

5. Following timescale extensions, Network Rail provided a closure statement on 23 November 2018 which included the following summary:

A review of company Standards, Bow Ties and Means of Controls has been undertaken to establish that the export of risk to running lines is effectively managed. What was found to require enhancement to the existing processes is a consistent approach to the requirement for a risk assessment of sidings concerning frequency of inspection and track recording arrangements. A risk model has been developed and published in TEF3267 which incorporates similar aspects to TEF3064, the

hazard report for track assets. The benefits of TEF3267 enable a consistent application of risk assessment and mitigation for TME's. Subsequently a TWI-3T047 has been drafted & reviewed for publication to provide a guideline on utilising the TEF form.

TEF3267 has been live since June 2017 and referenced in the revised in NR/L2/TRK/038 Issue 2: Process of measurement of track Geometry, Module 2 Issue 1: Manual Track Geometry Recording, clause 9 Tracks to be measured and frequency.

The considered response of the Chief Engineer [Track and Switch & Crossing] is that the above provision for the recommendation is sufficiently addressed. The intent of this recommendation has been met and therefore considered CLOSED.

Recommendation 5

The intention of this recommendation is to encourage use of available monitoring data from wheel impact load detection systems, such as Gotcha, to inform rolling stock maintenance.

Network Rail should review the potential to use wheel impact load detection system data to provide information about possible defects, such as uneven wheel loading or uneven load distribution, relating to specific wagons. The review should include consideration of how this information could be used to improve control of overall derailment risk (such as identifying the need for entities in charge of maintenance to check the condition of suspect wagons and take appropriate remedial action). Network Rail should seek inputs from relevant entities in charge of maintenance as part of the review. If justified by the review, Network Rail should implement track side and reporting processes needed for collecting and disseminating this information.

ORR decision

6. A review of existing systems to detect asymmetric loading was carried out by Network Rail in collaboration with the freight and ECM communities, coordinated through the cross industry freight derailment working group (XIFDWG). In May 2018 Network Rail confirmed that WILD/GOTCHA systems were now operational and providing asymmetric loading information to FOCs and other end users. They are using this information to identify sources of regular asymmetric loading and to monitor the effectiveness of actions designed to reduce it. This has led to changes to maintenance regimes for some types of wagon, but principally changes to loading.

7. 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

8. On 6 July 2016 ORR reported that whilst we were satisfied that Network Rail's initial response demonstrated that work is progressing to deliver the recommendation, we considered that the following two issues needed to be noted to enable the recommendation to be reported as implemented:

- Network Rail state that a business case is required to justify the cost to upgrade and repair the Gotcha Mobile System at High Marnham for uneven load data validation. Without that work, the validation of the GOTCHA concept for monitoring wheel loading to establish asymmetrically loaded vehicles will be severely hindered; and
- On completion of validation, intervention limits and production of downstream processes to manage non-compliant vehicles a Network Change will need to be finalised and agreed.

We were also considering this response in conjunction with the work of the XIFDWG.

Update

9. Following timescale extensions, Network Rail provided the following closure statement on 29 March 2019:

- *Network Rail, working with Railway Undertakings (RUs) and freight end users through the Cross Industry Freight Derailment Working Group (XIFDWG), has assessed the ability of the Gotcha system to measure asymmetric loading. The report (Ref 1), detailing the analysis, was presented to XIFDWG in Sept 2017 and formally issued in Feb 2018. This demonstrated that the Wheel Impact Load Detector (WILD) system "Gotcha" is capable of measuring asymmetric loading, albeit with some uncertainty and the need to exclude data that is less reliable.*
- *The UIC conducted a project in 2012-2014 which included a work package by Chalmers University assessing imbalanced load limits for lateral, longitudinal and diagonal or combination imbalances. This was carried forward into work by Huddersfield University for the Freight Technical Committee. This led to the following lateral & longitudinal limits being adopted by NR to diagnose a vehicle with loading issues:*

	Lateral	Longitudinal
UIC	1:1.25	1:3
UIC + Gotcha tolerance	1:1.3	1:3.05

Combination limits were the subject of further work – see later paragraph.

- *Stopping an asymmetrically loaded vehicle in real time would be impracticable due to the facilities that would be required to address the asymmetry or to offload a container. However, the analysis showed that a relatively small number of origins account for the majority of asymmetrically loaded vehicles, suggesting an element of common cause and, as such, the opportunity to*

address risk at source. This second approach has a further advantage in that it was able to be implemented relatively quickly.

- A key enabler has been the integration of Gotcha measurement data with train operational information (headcode, operator, origin and destination etc). This system has been developed by Network Rail and has the potential to be used more widely. The majority of Gotcha sites also have co-located RFID readers. Where freight vehicles have RFID tags, this provides additional information about the specific vehicle showing an imbalance. However the operational and RFID data provide different perspectives and both are valuable.*
- The main approach taken is to use a weekly report (sample in Ref 2) to look at patterns in the data, for example origins and flows with a high absolute imbalances or a high incidence of lower-level imbalances. However the data is structured to support more detailed assessment; examples include whether a flow shows a systematic imbalance (perhaps a flow where all bulk vehicles are heavy on the left side in direction of travel (indicating a loading process issue) or a tendency for an imbalance to be at a particular position in the train (suggesting a localised access issue). The report also highlights lighter bulk vehicles with imbalances (indicative of a retained load).*
- The report is issued weekly to Freight RUs and the construction sector (and others) showing the details for every vehicle with an imbalance above the limits (UIC plus Gotcha tolerance). For class 4 trains (those with a headcode 4xxx) the data also include vehicles which breach the combination limit identified through the T1119 (Ref 3) modelling undertaken by University of Huddersfield (and colloquially known as the “Huddersfield limit”). Reporting started as a ‘best endeavours’ process due to the manual nature of the process. However the positive reaction from the industry led to the report being issued weekly, albeit still with a relatively manual process.*
- A trend report (sample in Ref 4) has been added to help monitor how flows and origins perform over time. This also provides a measure of progress for XIFDWG.*
- As a result of the analysis and cross-industry discussion, XIFDWG supported the use of the Gotcha asymmetric data to help the industry identify sources of regular asymmetric loading and to monitor the effectiveness of actions designed to reduce asymmetric loading.*
- The weekly report has also helped the industry to estimate the incidence and extent of asymmetric loading and is being used by RSSB to support their risk assessment work.*
- The reporting process continues to be streamlined and updated in line with feedback.*
- RUs and end users have incorporated the report into their respective Safety Management Systems. Where an origin or flow shows a high number of imbalances or imbalances with a particularly high value, the RU &/or end user*

take action to understand the specific issues at the origin and to identify suitable mitigation. To date these actions have included rebriefing staff, amending loading processes and vehicle modifications and changing train paths to extend terminal time. As a result of these actions, a number of flows which had a high incidence of asymmetric loading now have very few imbalanced vehicles. Some examples are given below:

- *Ref 5 shows the reduction in imbalanced loads for one particular flow over a period of three months in 2018. On investigation, this turned out to have a massive retained load and a lateral imbalance of twice the UIC limit. Tarmac did a lot of work including modifying the vehicles, the loading and discharge processes.*
 - *DB Cargo trains from Margam had a high number of lateral imbalances. These were reduced through briefing of loading staff and amendment of processes. In some cases the bulk vehicles now have a white line on the vehicle ends to indicate the centre line; this makes it easier for the loading teams to centre the load.*
 - *Freightliner trains from Lawley Street accounted for the majority of longitudinal imbalances at one point. This was addressed by changing how heavy 20' containers were loaded. A trial was run over a weekend with different loading options and used the Gotcha data to support the risk assessment. Freightliner amended the process and this took effect from the start of January 2019.*
 - *Imbalances on trains from Immingham were also addressed. Again, that was down to better focus on loading.*
- *The reporting process is popular with the industry as evidenced by the feedback and, more importantly, by the willingness of the industry to use the report and the actions taken.*
 - *On a best-endeavours basis, Network Rail support FOCs and end-users in monitoring specific flows on a daily basis to allow an imbalanced vehicle to be investigated at destination.*
 - *On 7th March 2019 NR held a Freight Operator "WILD" meeting bringing together the Fleet Engineers of each of the major FOCs plus engineers from Track and Monitoring STE disciplines within NR. This was an opportunity to brief the Freight Operators on the development of WILD technologies, for Freight Operators to feed back their concerns about consistency of use and commit to working with NR to develop its capabilities further. At the end of the meeting actions were agreed to develop WILD (Gotcha) further and progress the fitment of RFID tags, new technologies and more effective use of 'Level 1' pre-alarm WILD data to manage issues before they could cause delay and damage on the network.*

Next steps

- *Although the reporting has been automated to some extent, it is still not sustainable due to the level of manual work still involved. Work has been carried out to automate the reporting further. However, any wider roll-out and adoption requires business change and industry consultation, including the*

formalisation of the definition and delivery of data to RUs and end users (possibly using the documentation from RSSB's T1010 data sharing project).

- *Long term, the reporting will be dependent upon the ongoing availability and reliability of Gotcha data and the integration of Gotcha data with RFID data.*
- *To date, no clear patterns have emerged to indicate that Gotcha data can identify defective vehicles (e.g. frame twist) as opposed to asymmetric loading. The incidence of vehicle defects is much lower than for asymmetric loading and hence harder to test. RUs have been asked (and are regularly reminded) to notify any relevant vehicle defects to Network Rail to allow the data to be investigated to identify whether the defect could have been identified.*

References

Ref	Title	Authoring organisation	Filename
1	<i>Assessment of Gotcha Asymmetric Capability</i>	NR	<i>Gotcha Asym Capability – 1.1.pdf</i>
2	<i>Freight imbalance weekly report for 29th Jan – 5th Feb 2019</i>	NR	<i>Imbalances 29 Jan to 05 Feb.xlsx</i>
3	<i>T1119 Simulating Offset Loading of Container Wagons on Twisted Track</i>	RSSB	<i>2018-04-T1119-Sim-Twisted-Track-Offset-Load-Containers.pdf</i>
4	<i>Asymmetric Loading Trends Periods 9 & 10 2018/2019</i>	NR	<i>AsymTrend 1819p10.pdf</i>
5	<i>6S89 West Thurrock to Oxwellmains imbalanced loads</i>	NR	<i>6S89 Lateral Imbalances.pdf</i>

Recommendation 6

The intention of this recommendation is to ensure that the distribution of loads in wagons, including partly loaded wagons, is controlled in a manner compatible with wagon and track characteristics. The RAIB notes that action taken in response to this recommendation could be informed by work undertaken as part of the railway industry's response to the ORR's letter of 5 December 2014.

RSSB, in consultation with industry, should review the risks associated with the uneven loading of wagons, with particular reference to partial loads, and propose any necessary mitigation, so that the extent of permitted load imbalance is effectively controlled.

ORR decision

10. Initially working with the XIFDWG and latterly the cross industry freight derailment implementation group (XIFDIG), RSSB has reviewed the risks associated with the uneven loading of wagons. That review led to an update to the freight derailment risk assessment, which is now being used by Duty Holders to implement a range of risk reduction measures, including use of GOTCHA covered under rec 5.

11. RSSB through the XIFDIG has engaged the University of Huddersfield to undertake further analysis of offset loading in bulk wagons, similar to the T119 work.

12. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, RSSB has:

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

Status: Implemented.

Previously reported to RAIB

13. On 6 July 2016 ORR reported that whilst noting RSSB's plans to address this recommendation through the Cross Industry Freight Derailment Working Group, it was not clear to ORR whether the working group would also be considering this recommendation in the light of open and flatbed wagons. RSSB had been asked to comment on this.

Update

14. On 23 May 2018, RSSB provided the following summary of actions taken in response to the RAIB recommendation:

In order to consider the risks associated with the uneven loading of wagons RSSB – through the Cross-Industry Freight Derailment Working Group (XIFDWG) – launched research project T1119 (Investigating the effects of offset loading in containers on risk of derailment on twisted track). A review was also undertaken of loading rules in use on other European railways. The results of this work were used to inform RSSB's update to the freight derailment risk assessment. This updated risk assessment has led to a number of risk reduction implementation measures, which the XIFDWG is overseeing, and which include:

· Gotcha reporting – analysis and improvements to the reporting of activations caused by uneven loads, identification of problem flows and implementation of remedial measures. This is being led by Network Rail and Freightliner. Weekly reports in an agreed format are now being issued by the former to all FOCs. Automation of the reports is also being implemented by Network Rail. FOCs are working up processes on how to identify and address problem patterns. Evidence of ad-hoc interventions have already been reported at the XIFDWG meetings.

· Bulk loading – identification of control measures for bulk loads (i.e. not containers). This is being led by Aggregate Industries. A loading guide for bulk

loading is also being developed through RFOG to reduce the risk of uneven bulk loads.

· Risk assessments and CBAs – individual company risk assessments and cost-benefit analysis of existing and proposed risk control measures. The legal responsibility for this is with each Duty Holder, but RSSB is providing a supporting and co-ordination role.

To recap, RSSB has reviewed the risks associated with the uneven loading of wagons as suggested by the recommendation. That review led to an update to the freight derailment risk assessment, which is now being used by Duty Holders to implement a range of risk reduction measures, including those listed above. With this in mind, RSSB considers the recommendation closed

Period 12 update:

T1119 (Investigating the effects of offset loading in containers on risk of derailment on twisted track) has been published and its findings were used to inform RSSB's update to the freight derailment risk assessment, which was published in December 2017. As a result of this action, the XIFDWG has proposed a phalanx of second-phase research projects.

Previously reported to RAIB

Recommendation 3

The intention of this recommendation is to ensure that the control of derailment risk in sidings takes account of the possibility of exporting that risk onto running lines.

Network Rail should review the processes by which track geometry is managed in sidings and connections on the approach to running lines, in order to identify and implement any changes necessary to ensure that the export of risk to running lines is effectively managed. This should include consideration of how dynamic track geometry is assessed on infrequently used lines.

ORR decision

1. ORR is satisfied that Network Rail's initial response demonstrates that work is progressing to deliver the recommendation. Subsequent discussions with Network Rail have provided clarification of how Network Rail will move to implementation of the recommendation by December 2016.
2. 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 the end of December 2016.

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

Information in support of ORR decision

3. On 17 December 2015 Network Rail provided the following initial response: *Network Rail will review the processes by which track geometry is managed in sidings and connections on the approach to running lines, in order to identify and implement any changes necessary to ensure that the export of risk to running lines is effectively managed.*

3.1. The process to be applied to the review/consideration

- 3.1.1. *Review the guidance currently provided within Network Rail standards with particular reference to BCRP Bowties / MoCs for the creation of a Track Geometry Inspection Plan (by March 2016);*
- 3.1.2. *Providing an overview of available dynamic testing methodologies including the appropriateness of these for differing infrastructure (running lines, sidings etc.) and any limitations i.e. ability to record at slow speed (by March 2016);*
- 3.1.3. *Consider the need to provide a form of risk based approach to inform the development of a Track Geometry Inspection Plan for the*

circumstances described in the recommendation; developing such if necessary (by March 2016);

- Consider how dynamic track geometry is assessed on infrequently used lines by mapping the overview of available dynamic testing methodologies with the current asset register (by March 2016);
- Confirming what the criteria is which should be used to determine whether a piece of Track should be inspected dynamically (by March 2016)

3.2. The rigor to be applied to understanding potential issues

- 3.2.1. *Do the current standards & existing bow ties to date provide clarity on the risks associated with infrequent measured lines? If found inadequate revise Standards & Bow ties*
- 3.2.2. *What are the current methodologies available & any alternatives? Are they effective in notifying the TME of the risk of derailment from geometry irregularities in sidings? Is there sufficient coverage of the network..? What alternatives measures are available & the practicality of employing such?*
- 3.2.3. *What are the additional factors that contribute towards the risk of derailment in sidings, e.g.*
- *Tight Curvature*
 - *Check rail availability*
 - *S&C*
 - *Line speed*
 - *Axle load*
 - *Component type*
 - *Component condition & age*
- 3.2.4. *Where on the network are the 'Gaps' of measurement coverage & what the physical limitations to achieving full coverage are? How does this compare with the risk model*

3.3. The person proposed to be involved in the review/considerations

- 3.3.1. *STE, Principal Track Engineer*
- 3.3.2. *STE, Principal Track Engineer*
- 3.3.3. *STE, Principal Track Engineer leading a workshop of other STE members with members of the RAM track & TME fraternity*
- 3.3.4. *STE, Principal Track Engineer leading a workshop of other STE members with members of the RAM track & TME fraternity*

3.4. How the outcomes of the review/consideration will be documented

- 3.4.1. *If adequate, summarise the salient points in the closure statement. If inadequate, set a programme to undertake an update to the standards / bow ties as appropriate*
- 3.4.2. *Summarise in a report the current state of the art & found deficiencies. Set a programme to conduct any improvements as appropriate*

- 3.4.3. *Develop a risk model that differentiates between low & high risk sidings & set a programme for the model to be applied to the infrastructure to score accordingly*
- 3.4.4. *Produce a summary of the areas where current measurement is inadequate & the risk profile high. Set a programme to undertake an in depth review on how to reduce the risk to acceptable levels. The output of this programmed in depth review shall be the mitigating actions to be in place to reduce the risk of derailment to as low as reasonably practicable.*

Network Rail expects to complete this work by 23 December 2016.

4. At a subsequent meeting Network Rail informed ORR that emerging findings from its review are that whilst the track geometry recording requirements set out in various company standards are generally good, a number of these documents will be updated to take account of the required management arrangements for manual measurement of track geometry and reflect current industry structure.. Remits for this work are completed and Network Rail expects the revised standards to be available for issue by December 2016, with briefing and publication complete by March 2017. Network Rail continues to review the appropriateness of guidance including MOC 5236 and aims to review the local changes made to date under Business Critical Rules (BCR) arrangements.

5. ORR and Network Rail have agreed that, to move this recommendation towards implementation, the work activity under 3.1.2 and 3.1.3 of paragraph 17 above needs to include:

- a review of the criteria to determine if dynamic or manual inspection is required so as to control risk SFAIRP on running lines; and
- guidance to assist an engineer in determining how to deliver track geometry inspection by manual means when dynamic means are not deemed reasonably practicable, including when dynamic movement has to be taken into account, and how that could be delivered.

6. Network Rail envisages that the output of this work will be a Track Worker Information Sheet due by September 2016, with briefing out complete by December 2016.

Recommendation 5

The intention of this recommendation is to encourage use of available monitoring data from wheel impact load detection systems, such as Gotcha, to inform rolling stock maintenance.

Network Rail should review the potential to use wheel impact load detection system data to provide information about possible defects, such as uneven wheel loading or uneven load distribution, relating to specific wagons. The review should include consideration of how this information could be used to improve control of overall derailment risk (such as identifying the need for entities in charge of maintenance to check the condition of suspect wagons and take appropriate remedial action). Network Rail should seek inputs from relevant entities in charge of maintenance as

part of the review. If justified by the review, Network Rail should implement track side and reporting processes needed for collecting and disseminating this information.

ORR decision

7. Whilst ORR is satisfied that Network Rail's initial response demonstrates that work is progressing to deliver the recommendation, it considers that two issues need to be noted to enable the recommendation to be reported as implemented:

- Network Rail state that a business case is required to justify the cost to upgrade and repair the Gotcha Mobile System at High Marnham for uneven load data validation. Without that work, the validation of the GOTCHA concept for monitoring wheel loading to establish asymmetrically loaded vehicles will be severely hindered; and
- On completion of validation, intervention limits and production of downstream processes to manage non-compliant vehicles a Network Change will need to be finalised and agreed.

8. We are also considering this response in conjunction with the work of the XIFDWG, more information about which can be found in paragraphs 13 and 14 above.

9. 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, but ORR has yet to be provided with a robust timebound plan that takes account of other associated activities.

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

Information in support of ORR decision

10. On 25 February 2016 Network Rail provided the following initial response:

Network Rail (NR) has reviewed the potential to use Wheel Impact Load Detection (WILD) for uneven load detection and have designed the next release of the Gotcha Data software (version 4) to do this.

This software is currently undergoing performance and risk assessment by the Network Rail Global Business Services (GBS) team (Software experts). Once GBS release the latest Gotcha Data (v4) software into the NR network, we will have the capability to measure and alert for uneven loading at each Gotcha location in a similar way to how NR alarm for wheel impact damage.

NR GBS preliminary performance and User Acceptance Testing (UAT) results show nine critical issues that are to be resolved or mitigated for before the software can be released for use. Eight of these critical issues are for NR to resolve and the remainder is to be resolved in a software modification by the Original Equipment Manufacturer (OEM).

Once this software becomes available on the NR network, we will have the ability to interrogate the uneven load/diagonal imbalance functionality to measure and monitor trains over each location. To enable implementation of this functionality, NR will need to go through a trial and validation period before a full Network Change application is made.

Network Rail will initially seek input from Safety Technical & Engineering (STE) specialist skills and experience to review the data and the recommended load limits from the Freight Technical Committee (FTC), Huddersfield University and other technical consultants. Once sufficient data has been reviewed, this data will be verified through physical testing of loaded vehicles, most likely at High Marnham, using the Mobile Gotcha system.

Table 1. Project proposed for testing and implementation of Uneven Load Measurement and Alerts:

#	Action	Due Date
1	Gotcha Data v4 software release	May 2016
2	Preliminary Gotcha v4 Data review	June 2016
3	Business Case Approved	August 2016
3.1	Repair & Upgrade Mobile Gotcha	August 2016
3.2	Uneven Load Project Initiation and Scoping	September 2016
3.3	Uneven Load Project - Define test plan to validate limits	To follow
3.4	Uneven Load Project - Operational processes (generic)	To follow
3.5	Uneven Load Project - Formal Communication & Authorisation	To follow
3.6	Uneven Load Project - Process and Local Instructions	To follow
3.7	Uneven Load Project - Network Implementation	To follow

Gotcha Uneven Load Monitoring

1) Gotcha Data v4 software release

- *First round of Performance and UAT tests is complete and a Defect Log has been issued to the OEM.*
- *Waiting on date from OEM for new software release.*

- *Performance and UAT tests second round to complete to pass stagegate for software release to NR network*
- 2) *Review of uneven load data in conjunction with the necessary NR departments.*
 - 3) *A business case is required to justify the cost to upgrade and repair the Gotcha Mobile System at High Marnham for uneven load data validation.*
 - 3.1) *The Gotcha Mobile system is to be used to simulate a permanent Gotcha system on the network and measure uneven load distributions on a passing freight vehicle.*
 - 3.2) *Use of the uneven load functionality of Gotcha requires validation of the data by NR with independent assessment. This project requires scoping and support from operator(s) for vehicle tests at High Marnham.*
 - 3.3) *Carry out data validation work at High Marnham.*
 - 3.4) *Complete uneven load data review in conjunction with the necessary departments within network Rail and in consultation with freight operators and independent assessor to determine the cross industry potential and operational requirements.*
- 3.5 & 3.6) Informal and formal review of process needed to implement uneven load 'alarm' at NOC and National Control Centres. Informal Network Change application sent to operators and Entity in Charge of Maintenance (ECMs) with draft update to Standards and Operational Procedures. Inform Office of Rail Regulation (ORR) and Rail Accident Investigation Branch (RAIB) of project progress.*
- 3.7) *Implementation of uneven load monitoring and alarm notifications. At this stage, this is envisioned to be a similar process that currently operates for WILD Alarms where mitigating action must be taken as soon as reasonably practicable in the form of a Temporary Speed Restriction (TSR) or instruction for Rolling Stock Technician (RST) to stop and inspect and operators/ECMs are notified of the alarm details.*

Gotcha Data Software Functionality

Aspirationally, implementation of the Gotcha Data v4 software will enable:

- 1) *All-Wheel condition data provision, automatically, to train operators for their Remote Condition Monitoring (RCM) use and wheel maintenance planning,*
- 2) *The capability to use Automatic Vehicle Identification (AVI) data to identify each axle/wheel for each activation (wheel damage, overweight and uneven loading).*
- 3) *Functionality to measure and alert for uneven/unbalanced loading. This covers side-to-side, end-to-end, diagonal and combination offset/uneven loads. The various limits that have been recommended as part of the FTC sub group and analysis by Huddersfield University (and other parties) are listed below.*
 - a. *Lateral load imbalance, proposed limit 1.25*
 - b. *Side-to-side axle load imbalance, proposed limit 1.7*

- c. Longitudinal load imbalance, proposed limit 3,
- d. Combination load imbalance, proposed limit 1.

Recommendation 6

The intention of this recommendation is to ensure that the distribution of loads in wagons, including partly loaded wagons, is controlled in a manner compatible with wagon and track characteristics. The RAIB notes that action taken in response to this recommendation could be informed by work undertaken as part of the railway industry's response to the ORR's letter of 5 December 2014.

RSSB, in consultation with industry, should review the risks associated with the uneven loading of wagons, with particular reference to partial loads, and propose any necessary mitigation, so that the extent of permitted load imbalance is effectively controlled.

ORR decision

11. Whilst noting RSSB's plans to address this recommendation through the Cross Industry Freight Derailment Working Group, it is not clear to ORR whether the working group will also be considering this recommendation in the light of open and flatbed wagons. RSSB has been asked to comment on this.
12. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, RSSB has:
 - taken the recommendation into consideration; and
 - is taking action to implement it, but ORR has yet to be provided with a timebound plan.

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

Information in support of ORR decision

13. On 10 November 2016 RSSB provided the following initial response:

With reference to Recommendations 2 and 6 of RAIB's investigation report on the Angerstein Junction derailment of 2 April 2014, having already agreed to consider the derailment risk caused by asymmetrically loaded hopper wagons (due to residual loads), as well as asymmetrically loaded container wagons, the Cross Industry Freight Derailment Working Group also agreed (at its meeting of 23 September 2015) that Recommendations 2 and 6 fell within its scope. The recommendation will therefore be considered as part of the working group's programme.