

Tracy Phillips
Safety Regulation Manager
Telephone: 020 7282 3868
Email: tracy.phillips@orr.gsi.gov.uk



16 August 2016

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

Dear Andrew,

RAIB Report: Runaway of “ironmen” trolleys and subsequent near miss at Raven level crossing, Garnant, Carmarthenshire

I write to report¹ on the consideration given and action taken in respect of recommendations 1 to 6 addressed to ORR in the above report, published on 17 August 2015.

The annex to this letter provides details of the consideration given/action taken in respect of these recommendations, where:

- recommendations 1, 2 and 4 are reported as **‘Implementation ongoing’**; and
- recommendation 3 is reported as **‘Progressing’**.

We will advise you when further information is available regarding actions being taken to fully implement these recommendations.

Recommendations 5 and 6 are reported as **‘Implemented’** and we do not propose to take any further action in respect of these recommendations, unless we become aware that any of the information provided becomes inaccurate, in which case I will write to you again.

We will publish this response on the ORR website on 18 August 2016.

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

Yours sincerely,

Tracy Phillips

Initial consideration by ORR

1. All 6 recommendations were addressed to ORR when the report was published on 17 August 2015.
2. After considering the recommendations ORR passed recommendations 1, 2, 4 and 5 to Network Rail, recommendation 3 to Permaquip and recommendation 6 to Torrent Trackside asking them to consider and where appropriate act upon them and advise ORR of their conclusions. The consideration given to each recommendation is included below.
3. This annex identifies the correspondence with end implementers on which ORR's decision has been based.

Recommendation 1

The intent of this recommendation is for Network Rail to make sure that it takes relevant rules into account and includes appropriate risk mitigations when it plans maintenance work.

Network Rail should review its arrangements for planning work using manually propelled plant. It should implement any changes necessary so that planners are provided with clear and concise information enabling them to assess the risks associated with the use of such plant on the intended gradients. Safe systems of work should include appropriate mitigation for these risks.

ORR decision

4. ORR is content with the plan for implementation presented by Network Rail and is monitoring progress towards completion of the planned work.
5. 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 3 October 2016.

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

Information in support of ORR decision

6. On 9 March 2016 Network Rail provided the following initial response:

The Ironman Improvement Project is leading the activity in this area and will meet the intent of this recommendation. The project proposes to develop a specific strategy for the improvement of the design, planning, maintenance and operation of Ironman units. This will complement the delivery of the National Safety Strategy, implementation and embedding of the Life Saving Rules and the introduction of other associated plant and equipment safety initiatives.

Together these will contribute to the CP5 commitment to eliminate fatalities and major injuries. The Ironman Improvement Project is well under way with the Terms of Reference and an objectives matrix available separately.

There are 7 objectives for the project; one of these is the delivery of a 'Planning Tool' for Ironman usage.

- The Planning Tool combines a Work Plan and Decision Tree for operations using Manually Propelled Rail Handlers. These documents are in final draft ready for introduction into Module P514 of the Infrastructure Plan Manual to be published in June 2016 and complied with September 2016.
- The Planning Tool is to be incorporated into Task Risk Control Sheet (TRCS) NR/L3/MTC/RCS0216/SP07, 'Use of Iron Men'. The TRCS forms a part of the Risk Manual. The Risk Manual is communicated to all stakeholders whom will be enabled to implement the ironmen planning tool as applicable via the New Electronic Permitting (ePermitting) technology or Permit to Work tool, which will replace safe system of work packs. The new Permit to Work tool will bring multiple improvements to all personnel working on the railway. It will guide users through the planning and risk assessment processes to produce relevant paperwork that fully describes the plan, and attached track schematics will allow us to visualise all activity on our infrastructure in one place. The Planning and Delivering Safe Work (P&DSW) programme will be implementing ePermitting amongst other safety changes.

Action Plan

- Add Ironmen planning tool into Module 514 of the Infrastructure Plan Manual (IPM) – May 2016
- Amend Task Risk Control Sheet (TRCS) NR/L3/MTC/RCS0216/SP07 – May 2016
- Publish IPM version 8 – June 2016
- IPM Compliance Date – September 2016

Attachments

- Ironman Improvement Project Terms of Reference (ToR)



- Ironman Improvement Project – Objectives Matrix

7. On 23 March 2016 Network Rail provided a copy of its draft final report into the findings from its Ironman Safety Improvement Project, the aim of which was to deliver a specific strategy for the improvement of the design, planning, maintenance and operation of Ironman units. This project sought to assist in the closure of recommendation 1.



Ironman Project Final
Draft .pdf

8. Network Rail expects this recommendation to be implemented by 3 October 2016.

Recommendation 2

The intent of this recommendation is for Network Rail to clarify the accountability for compliance with the requirements of the Rule Book.

Network Rail should review its arrangements for compliance with the requirements of Handbook 10 of the Rule Book, GE/RT8000, specifically the responsibilities assigned to the person in charge of the trolley (paragraphs 118b, 120a and 120b). It should implement any changes necessary to its procedures and competence management processes so that staff on site are always clearly aware of who is accountable for such compliance.

ORR decision

9. ORR is content with the plan for implementation present by Network Rail and is monitoring progress towards completion of the planned work.

10. 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 3 October 2016.

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

Information in support of ORR decision

11. On 9 March 2016 Network Rail provided the following initial response:

Network Rail standard NR/PLANT/0200 – ‘Infrastructure Plant Manual’ (IPM), which details requirements and gives guidance for the use of plant when installing, renewing and maintaining Network Rail’s managed infrastructure, is to be amended.

Specifically Module P514 – ‘Hand Controlled Trolleys’ is to be revised to make it clear for the staff on site who is accountable for the responsibilities assigned to the person in charge of the trolley as defined in HB10– ‘Duties of the COSS or SWL and person in charge when using a hand trolley’.

The next revision to the IPM is scheduled for release in June 2016, and the subsequent revisions to competence and training material will be made to satisfy this recommendation.

Action Plan

- *Revise Module 514 of the Infrastructure Plan Manual (IPM) – May 2016*
- *Publish IPM version 8 – June 2016*
- *Revised Modules Briefing – September 2016*
- *IPM Compliance Date – September 2016*

12. Network Rail expects this recommendation to be implemented by 3 October 2016.

Recommendation 3

The intent of this recommendation is for Permaquip to improve the design and maintenance of the ironman braking system, taking account of how it is used.

Permaquip should carry out a risk assessment of the braking system on the ironman. Starting with a definition of the function of the brake, this should take account of operational experience from end users, the suitability of the brake for use in controlling the speed of loaded ironmen on gradients and possible degradation of the braking performance through the life of the equipment. Additional measures should be integrated into the design of future ironmen by Permaquip. Permaquip should also advise existing owners and operators of ironmen of any need for equipment modifications, changes in operational rules, changes in maintenance instructions and/or additional training.

ORR decision

13. ORR recognises that Permaquip has conducted a risk assessment of the ironman braking system, and considered the design and performance of the system in the light of the incident. Subsequent Network Rail testing has proven that the brakes were suitable for controlling loaded Ironman on gradients.

14. ORR also notes that Permaquip is taking action to develop and implement a new Runaway Protection System to new and existing manually propelled products, and that it has contributed to Network Rail's Ironman Improvement Project. Permaquip has also published a revised Operating and Maintenance Manual which ORR considers addresses the final element of the recommendation.

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

- taken the recommendation into consideration; and
- is taking action to implement it, but ORR has yet to be provided with a timebound plan for the introduction of the new Runaway Protection System.

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

16. On 10 December 2015 Permaquip provided the following initial response:

Permaquip believes that the report shows the equipment was not used properly and not maintained adequately in accordance with its guidelines. It believes that the report also shows that when used as specified the equipment is safe and performs as required by all the relevant industry standards. Permaquip points out that the braking system is not designed to control the speed of the Ironman, only to bring it to a stop when travelling at walking pace and is tested, with an appropriate factor of safety, on a gradient, to do so. The travelling speed of the Ironman is controlled by the personnel operating the equipment, as is the case with all manually propelled plant. Correct operation is therefore essential to avoid any accidents or incidents.

Permaquip therefore does not believe that any further action is required on the recommendation as it is stated, namely that "The intent of this recommendation is for Permaquip to improve the design and maintenance of the Ironman braking system, taking into account how it is used" as when used and carried out correctly the braking system design and maintenance regime are sufficient for safe operation.

It does acknowledge however that the report now presents it with a new level of understanding on how the equipment is being misused.

Permaquip believes that it has met its obligations as a manufacturer under Clause 1.1.2. (c) - Principles of Safety Integration of the Machinery Directive by specifying clearly how to use the equipment and setting clear limitations of use to avoid misuse. Notwithstanding this, as a responsible manufacturer it will, of course, consider this new information with regard to the Ironman specification.

Permaquip knows that Network Rail has restricted the use of the equipment to gradients no greater than 1:150 under Safety Bulletin Number NRS343. Permaquip is also contributing to the Ironman Improvement Project set up by Network Rail which is due to report its findings before the end of February 2016. It plans to undertake some internally funded Research & Development to look at ways of reducing risks associated with the new information on the misuse of the Ironman and is happy to share this with the ORR when complete. It estimates that initial designs would be ready for review within 6 months.

17. On 19 April 2016, in respect of providing advice to existing owners and operators of ironmen, Permaquip provided the following additional information:

Following Permaquip's involvement in the Network Rail led Ironman Improvement Project it updated the Maintenance Section 10 of its Ironman Operating & Maintenance Manual (reference MAN-M-O-105_18), which has been uploaded to the Permaquip website (<http://permaquip.co.uk/en/product-store/ironman/ironman-cw-lifting-equipment/>) and is available to all its customers.



MAN-M-O-105_18

18. On 25 May 2016 Permaquip provided ORR with a copy of its Ironman Risk Assessment, item 4 of which relates to Brake Failure/Runaway.



PRA001 -
Ironman(Standard & L

19. Permaquip also confirmed that this document is also supported by a range of engineering drawings covering the design integrity of the Ironman braking system and at the time of the incident both the Risk Assessment and design of the braking system were discussed. As a result Permaquip found that operational experience in normal working conditions gave no indication of braking issues. The brakes were suitable for controlling loaded Ironman on gradients and subsequent testing by Network Rail has proven this, and degradation of the braking system is covered by the maintenance and pre-shift checks recommended in its Operations Manual.

20. Permaquip has also confirmed that its efforts have been focused on designing a Runaway Protection System capable of being fitted to all new and existing Permaquip manually propelled products. The design phase is complete and testing is expected to begin shortly.

Recommendation 4

The intent of this recommendation is to ensure that the design and testing of the brakes of trolleys and ironmen is appropriate for their intended use.

Network Rail, in conjunction with RSSB and the M&E Engineers Networking Group, should define the required functionality of the braking systems fitted to manually propelled plant used on its infrastructure. They should then carry out a generic risk assessment of such braking systems, taking account of all foreseeable failure modes and possible misuse. Based on the findings of this assessment, they should revise the requirements and guidance for design, testing and use of the braking systems, and determine what retrospective action is required with respect to existing equipment.

ORR decision

21. ORR is content that Network Rail is working collaboratively with other industry bodies to address the requirements of this recommendation and is monitoring progress towards completion of the planned work.

22. 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 31 January 2017.

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

Information in support of ORR decision

23. On 9 March 2016 Network Rail provided the following initial response:

Required functionality of the braking systems

Network Rail Plant team under instruction from the Professional Head of Plant and T&RS have commenced with brake performance testing of all trolley braking arrangements under controlled conditions to review performance in adverse weather conditions and environments. This work has established the limitations of all types of trolleys in use. Further to this a requirements specification for new trolleys has been generated based upon the inputs of end users and the manner in which trolleys are to be used within the industry aligned to the Network Rail Plant strategy, supported with an analytical approach to defining brake performance requirements for given speeds, conditions and gradients. This work is complete and also informs the revisions to the RSSB standards for this equipment.

Risk assessment of braking systems

In parallel to the practical testing undertaken a series of design risk assessment workshops have been undertaken to conduct a critical review of each braking system in use on the trolleys used on the infrastructure. The activity considered the presence on any single point failures, the use and foreseeable misuse and the effects of maintenance intervention. This work has now concluded and informs the revisions to the RSSB standards and new trolley specifications.

Revise the requirements and guidance for design, testing and use

The output of the brake performance testing, design risk analysis and consideration of end user requirements has informed the revisions to the RSSB Railway Industry Standards for Trolleys (RIS-1530-PLT and RIS-1701-PLT) as an asset and the specifications for new Trolleys and Ironmen. Additionally this work has informed and underpinned the mitigations put in place to control the risk of runaway as a medium term containment measure such as the gradient restriction of 1:150.

Retrospective action required with respect to existing equipment.

There is no retrospective action to drive existing equipment out of the business. This is because the risk imposed from existing equipment is understood and operational restrictions remain in place in the form of a limiting gradient. With the design analysis complete and the standard changes in place it is Network Rail's intent to procure any new Trolleys and Ironmen against the new specifications which once available will be exempt from any gradient restrictions.

The increased operational scope of this new equipment is expected to drive the demand, and at the point of replacement the older equipment will be removed from use pending a supporting business case to either upgrade or scrap. Network Rail will be procuring new fleets of manually propelled rail handlers

and trolleys during CP5. The requirements specification to support this activity has been informed by the lessons learnt from this incident.

24. On 23 March 2016 Network Rail provided a copy of its draft final report (see paragraph 10) into the findings from its Ironman Safety Improvement Project, the aim of which was to deliver a specific strategy for the improvement of the design, planning, maintenance and operation of Ironman units. This project sought to close recommendation 4.

25. Network Rail provided a further update on 18 May 2016 extending the timescale for completion to 31 January 2017 to realign the closure date with changing contracts and procurement tender timelines which were changed to ensure conformance with recent changes in the Utility Regulations governing the tender process. Network Rail has advised that the Manually Propelled Rail Handler Tender Framework Go Live date is now estimated to be October 2016 given suitable responses are received.

Recommendation 5

The intent of this recommendation is for Network Rail to implement any measures required to mitigate the risk from runaway of items of manually propelled plant.

Network Rail should develop a prioritised and time bound plan to implement any mitigation measures necessary to reduce the risk from runaway of existing manually propelled plant to be as low as reasonably practicable.

ORR decision

26. ORR is content with the steps that Network Rail is taking to address the issues identified by RAIB and, as Network Rail has produced an acceptable timebound implementation plan, is satisfied that this recommendation has been delivered.

27. 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
- taken action to implement it.

Status: Implemented.

Information in support of ORR decision

28. On 9 March 2016 Network Rail provided the following initial response:

Risk mitigation measures were put in place immediately via Safety bulletin to control the use of Ironmen and subsequently Link Trolleys based upon the extensive testing undertaken to explore the limits of braking performance of these trolleys. The 1:150 gradient restriction mitigates the effects of poor railhead adhesion, poorly adjusted/maintained brake systems, overload and

use of excessive speed for existing manually propelled plant. The 1:150 gradient restriction shall be built into the Planning Tool for Ironmen usage as a part of the next revision of the Network Rail standard NR/PLANT/0200 – ‘Infrastructure Plant Manual’ (IPM), specifically Module P514 – ‘Hand Controlled Trolleys’. The next revision to the IPM is scheduled for release in June 2016, and the subsequent revisions to competence and training material will be made to satisfy this recommendation.

These containment measures will remain in place until new product compliant with the revised specification for trolleys and brake performance requirements can be procured and rolled out across the infrastructure.

Action Completion History

- *Runaway Incident – 1 November 2014*
- *A Route Safety Alert was issued – 4 November 2014*
- *A National Safety Bulletin, NRS 343 – 6 November 2014*
- *Network Rail Level 3 (Formal) Investigation Report – January 2015*
- *Formation of Ironman Improvement Project – January 2015*
 - *January 2015 – STE Technical Investigation into brake performance leading to publication of Assessment of Braking Systems on Manually Propelled Trolleys and Rail Handlers Report – 5 Feb 2016*
- *Requirements Specification: Railborne Rail handlers – January 2016*

Action Plan

- *Revise Module 514 of the Infrastructure Plan Manual (IPM) – May 2016*
- *Publish IPM version 8 – June 2016*
- *Revised Modules Briefing – September 2016*
- *IPM Compliance Date – September 2016*

29. On 26 March 2016 Network Rail provided a copy of its draft final report (see paragraph 10) into the findings from its Ironman Safety Improvement Project, the aim of which was to deliver a specific strategy for the improvement of the design, planning, maintenance and operation of Ironman units. This project sought to close recommendation 5.

30. Network Rail expects this recommendation to be implemented by September 2016.

Recommendation 6

The intent of this recommendation is for Torrent Trackside to ensure that its processes for maintaining the braking systems of manually propelled plant, including ironmen, adequately take account of manufacturers’ requirements and the differences between types of equipment.

Torrent Trackside should review its arrangements for ensuring that the braking systems of all types of manually propelled plant are correctly maintained. This should include consideration of the required skills and knowledge of its mobile fitters, the maintenance documentation they use, its quality assurance processes and the extent of management oversight. Appropriate action should be taken to address any deficiencies that it identifies.

ORR decision

31. ORR has carried out an investigation of the revised arrangements and maintenance schedules implemented by Torrent Trackside and, in light of the evidence provided below, is content that steps have been taken to fully address the recommendation.

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

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

Status: Implemented.

Information in support of ORR decision

33. On 1 December 2015 Torrent Trackside provided the following initial response:









Torrent Trackside has already taken the necessary steps to address the recommendation made by the RAIB. It has done this by including within our management procedure (PR033 provided) a stipulation which mandates the use of the manufacturers maintenance plan wherever possible (previously it took the information from the manufacturer's plan and converted it into a Torrent formatted document). It now simply adds a front cover to the OEM maintenance plan.



PR033

Torrent Trackside is now going through the process of converting its maintenance schedules, starting with lightweight ironmen and manually propelled hand trolleys. It has provided individual maintenance schedules for each product type (ironmen and trolleys) which supports this action. As can be seen (from the top right hand corner on the first page of each document) these were introduced to the Torrent Trackside management system in August 2015,

and were then communicated to its workforce via document update briefing (DU8215).

Split Trolley (Standard and LUL)		Permaquip Type A Rail Trolley (Standard and LUL)	
Permaquip Ironman (Standard and LUL)		Permaquip Type B Rail Trolley (Standard and LUL)	
Permaquip Scaffold Trolley		Rail Handler (Standard and LUL)	
Link Trolley (Standard and LUL)		Permaquip Link Trolley (Standard and LUL)	



DU 8215

The action taken provides the maintainer with an individual document for each product type, which includes all of the information provided by the manufacturer.

34. ORR sought confirmation from Torrent Trackage of the action it has taken to deliver the full scope of the recommendation, namely how it has considered the required skills and knowledge of its mobile fitters, its quality assurance processes and the extent of its management oversight arrangements, and what outcomes / changes have arisen arising from these reviews.

35. On 16 June 2016 Torrent Trackage provided the following update:

In light of the incident involving the runaway rail handler at Raven level crossing, following the release of the RAIB report in 2015 Torrent Trackage reviewed its arrangements for maintaining all manually propelled hand trolleys,

including rail handlers. This included competence requirements, monitoring arrangements, provision of maintenance information (to fitters) and maintenance records.

Competence

The majority of Torrent Trackside's workforce that maintain manually propelled hand trolleys, including rail handlers have considerable experience in maintaining these types of equipment. Many of these fitters were transferred to Torrent Trackside from Speedy under TUPE following the award of a contract from Network Rail in 2010, and have been servicing and examining rail handlers ever since without any issue.

Torrent Trackside carries out competence assessments to RPA (Rail Plant Association) standards by qualified A1 assessors on all maintainers of manually propelled hand trolleys every two years. Copies of each assessment on manually propelled hand trolleys are attached for the fitter that serviced the rail handler prior to this incident. As you can see these are quite extensive and cover various maintenance elements, including a fault finding assessment which Torrent Trackside introduced in 2012 to measure the skill of the fitter in finding and rectifying defects.



Assessment Manually Assessed Manually Assessed Manually
Propelled Rail Trolley .Propelled Rail Trolley .Propelled Rail Trolley

All Torrent Trackside maintainers are multi-skilled too, being competence assessed (to RPA standards) on a multitude of products, ranging from impact wrenches to on-track plant, whilst training has been provided on a number of disciplines. Examples attached include, but are not limited to;

- Manufacturer training from Permamquip on Kubota RRV, personnel carrier and towing trolley maintenance.
- Manufacturer training from Permaquip on Rail Mover maintenance.
- Lifting equipment inspection from Lloyds
- Portable appliance testing



Kubota Maintenance
30 09 09.pdf

Railmover
Maintenance cert 09 1

Lifting Inspector 06
10 06.pdf

PAT Testing Cert 15
03 11.pdf

As part of Torrent Trackside's competence management system it also carries out management evaluations on portable and transportable plant at least every two years. This allows the fitters' line manager to review performance (not just competence) on a periodic basis. Additionally, it has a documented mentoring programme in place for any person new to maintenance, or new to a specific product which must be completed before any competence assessments are even considered. This system has been in place since 2009 and has been

instrumental in developing the skills for workers new to certain maintenance work. A copy of a blank mentoring form (AP410) is below.



Torrent Trackside therefore believes that its fitters have the necessary skills, knowledge and experience to perform maintenance on this type of kit.

Monitoring

In 2012 Torrent Trackside introduced a comprehensive monitoring regime for line management to conduct inspections on workplace conditions and controls as well as product conformity. This included guidance documents on monitoring lone working and plant maintenance. Guidance documents AP450a and AP451a (below) allow each supervisor to interpret risk in the same way. All of the inspections which are carried out across the company are recorded in a database which provide us with substantial information on;

- *The number of inspections being carried out and by whom.*
- *The performance of the inspector (is the supervisor picking things up, what are they picking up)?*
- *The performance of the fitter.*
- *Product conformity (this allows us to target training needs etc).*



To date Torrent Trackside has over 5000 inspection records, including over 950 records for trolleys and rail handlers alone.

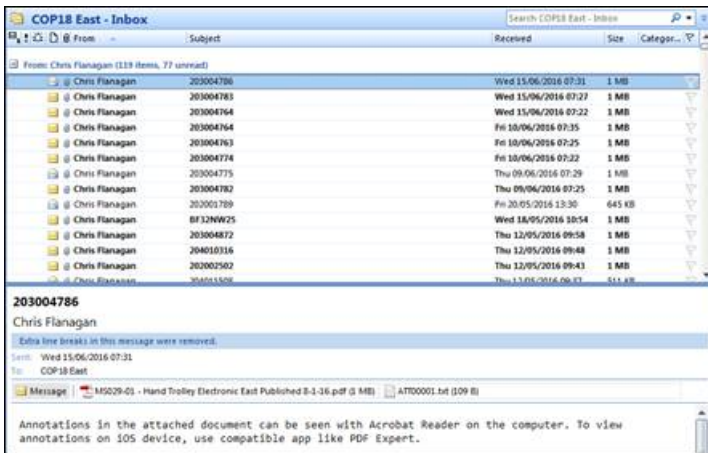
The Torrent Trackside monitoring arrangements also include the management evaluation process and competence assessment as mentioned earlier. Importantly, included within the management evaluation is a section on performance which draws on the information collated from the plant inspection records.

Provision of Maintenance Information

Since the RAIB report Torrent Trackside has altered the way that it manages the provision of maintenance information. Typically, manufacturer's maintenance plans are substantial in size and historically we have always condensed this down into a smaller format by pulling out only the key maintenance requirements. However, this can lead to the omission of some information which may be critical, and therefore Torrent Trackside now keeps the document in its original format, allowing the maintainer to have access to all of the manufacturer's information. All trolleys, including rail handlers were converted this way immediately after the release of the RAIB report.

Maintenance Records

As part of our assurance monitoring arrangements Torrent Trackside has now set up a new system whereby all COP0018 brake test records on trolleys are sent electrically to a designated email address so that they can be accessed immediately and reviewed periodically. The screen shot below shows how this works, whilst the accompanying spreadsheet (COP18 check March 16 onwards) identifies the checks which have been carried out this year. This is done by reviewing completed services from our G42 fleet management system and checking the corresponding service record in the mail system. The COP0018 form itself is also electronic thus reducing the opportunity for error.



Cop 18 Check March 16 Onwards.xls