

Office of Rail Regulation

Further Assessment of Approaches to Improve Efficiency
Review of Network Rail's Consultation Response
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Executive Summary

RailKonsult were commissioned by the Office of Rail Regulation (ORR) to provide a technical insight into the way in which best practice maintenance and renewals is undertaken elsewhere in Europe. As a result of this commission a paper was published in May 2008 reviewing seven specific activities.

As part of the PR08 process, the ORR included this paper, complete with seven technical appendices, in the consultation process. The purpose of this paper is to review Network Rail's response to the initial RailKonsult documents.

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1.0 INTRODUCTION

1.1 RailKonsult Review

As part of its programme of work for the Periodic Review 2008, the Office of Rail Regulation (ORR) commissioned RailKonsult in March 2008 to review current European track engineering best practice. The objective was to identify typical methods, approaches, techniques and systems that RailKonsult considered to be examples of European best practice and which are well suited for adoption by the rail industry in Britain.

These activities were chosen as representative of different asset management approaches adopted by other European railway organisations. The review for each individual activity included:

- Consideration of the differences in approach;
- Potential benefits that would arise from adoption of the revised approach; and
- Identification of any issues associated with implementing the revised approach, including any safety concerns.

1.2 PR08 Process

As part of the PR08 process, RailKonsult's paper was published by the ORR in May 2008, together with seven technical appendices that explained each activity in more detail. These papers were published as part of the ORR's draft determination process. As such, they were included within the overall suite of documentation that was issued as part of the consultation process.

Network Rail's response to the consultation included specific comments on the RailKonsult papers. This document reviews the comments submitted in relation to each of the seven specific activities.

1.3 Structure of Document

The structure of this document is tabular, with Network Rail's comments on the left hand side and RailKonsult's review of these comments on the right hand side. Only the main points have been included in this document.

2.0 ASSET INSPECTION, CONDITION ASSESSMENT AND DECISION MAKING

Network Rail Review Comments	RailKonsult Response
<p><i>Railkonsult identify savings of approximately £12 million per annum that Network Rail could achieve by adopting best practice from the Netherlands. £8.6 million of these savings are attributed to increased automation of patrolling procedures, and £3.1 million from the more efficient targeting of our tamping programme.</i></p> <p><i>Network Rail already has plans which we estimate will allow us to save £16.5m per annum from our patrolling budget between the last year of CP3 and the last year of CP4.² This move to a more automated inspection regime and changed procedures is ongoing. We have already reduced foot patrolling frequencies on the West Coast Main Line from weekly to every two weeks</i></p> <p><i>We acknowledge the Railkonsult assertion that it is possible to use our tamper fleet more effectively.</i></p>	<p>The savings identified in the analysis were applicable to London and South East area only.</p> <p>Although a full analysis has not been undertaken, if mechanised inspection was applied to the whole of Network Rail it is anticipated that the total the savings would be circa £16.5m per annum.</p> <p>Patrolling on the WCML is understood to involve trolley inspection, at night, one week followed by a track inspection run the following week. This methodology appears to offer little efficiency within track maintenance costs as there are higher costs for staff working nights plus additional runs of inspection trains.</p> <p>Adoption of the Dutch mechanised inspection system would significantly reduce staff numbers. It must be noted that the changes in the inspection regime must be accompanied with the introduction of effective analysis and decision making tools. These will be essential to ensure that any reduction in maintenance costs have no detrimental impact on asset condition.</p> <p>The paper only high-lights potential savings for a single maintenance activity (tamping), albeit a significant cost driver. However, other savings would be achievable across the other maintenance activities.</p>

Network Rail Review Comments	RailKonsult Response
<p><i>The fact that our own targets exceed those proposed by an independent consultant demonstrate how much 'stretch' has already been incorporated into the SBP.</i></p>	<p>As noted above, it is not believed that the figures exceed those in the paper.</p> <p>A proactive maintenance regime (rather than a reactive regime) driven by world class inspection and analysis system will significantly reduce costs throughout the asset management cycle. American Engineers have identified that the cost of running a reactive maintenance regime is between two and four times more expensive than a preventative regime.</p> <p>It is noted that Network Rail have acknowledged as such within their main response document to the ORR, where they state they are concentrating on improvements from six key areas including this area.</p> <p>Whilst the paper only focused on demonstrably proven savings from European experience, other similar areas where savings could be made include:</p> <ul style="list-style-type: none"> • Overhead line inspection and maintenance; • Just in time maintenance delivery; • Improved specification of track renewals, including optimisation of intervention time.

3.0 RECYCLING AND REUSE

Network Rail Review Comments	RailKonsult Response
<i>The only statistic Railkonsult provides with regard to recycling or reuse of sleepers is that in the Netherlands 40% of concrete sleepers are recycled. We do not have access to an equivalent statistic, however all our concrete sleepers are reused in the network unless they are damaged, in this case they are recycled</i>	Serviceable concrete sleepers are very rarely specified in any renewals programme today Anecdotal enquiry has failed to identify any site at which serviceable concrete sleepers have been used.
<i>Network Rail has a large and well integrated supply chain for refurbished items that includes entire categories of items not mentioned in the Railkonsult report (e.g. tools)</i>	RailKonsult's report only provided detail on specific issues. It was not intended to be a comprehensive review, just an indicator of the potential opportunities.
<i>Unlike the Swiss, we do not refurbish rail. However, in common with other European railways we do cascade used rail from higher category lines to less used routes when possible.</i>	This used to be the policy previously, but cascading of rail has significantly reduced. However, it is noted that Network Rail have recently appointed a champion to manage cascading of rail which is a positive step
<i>A depot / refurbishment centre on this scale would be very expensive</i>	Network Rail has already published plans indicating that they are planning to spend £30 million on a recycling depot at Whitemoor.
<i>No attempt is made to take account of the fact that refurbished rail has a shorter life-span than new rail and will require replacement in a shorter time period. Given that raw material costs are a relatively small proportion of total track renewal costs, we believe that the decreased interval between renewals occasioned by the use of cascaded rail is too important to omit from the assessment of costs and benefits.</i>	Cascade policy is based on putting new components into heavily used infrastructure and installing recycled materials onto lightly used branch lines where the lower traffic means that the life cycle is not significantly impaired.
<i>We agree that we could use our existing medium output ballast cleaners more intensively, and are developing plans to do so. However, we note that we are unable to use them as frequently as European railways because the relatively poor condition of our underlying formations degrades the condition of our ballast. This reduces the quantity of ballast that can be returned to the track and hence the speed, effectiveness, and cost of ballast cleaning.</i>	The quantity and quality of stone returned from ballast cleaning is driven by intervention time. If the treatment is delayed beyond the optimum time the ballast will suffer further deterioration from both traffic damage and additional tamping. This will have a significantly detrimental impact on the percentage of stone returned.

4.0 THE USE OF DEDICATED TEAMS

Network Rail Review Comments	RailKonsult Response
<p><i>Network Rail and the ORR are engaged in discussion of the cost implications of individual work streams and the engineering philosophy that underlies them.</i></p> <p><i>Suggestions as far-reaching and broad as "use more specialist teams" do not help us deepen our understanding of how to run the most cost-effective railway possible.</i></p>	<p>The paper was intended to describe the concept of dedicated teams, not contribute to a debate of which Railkonsult were unaware.</p> <p>It is proposed that the concept of dedicated teams should be introduced for 'products' such as rail defect replacement, wet bed removal and other high volume, high value maintenance. The concept is also well suited to renewal product line delivery, such as re-railing.</p> <p>Dedicated teams are a proven European solution for the delivery of specific products at optimum efficiency.</p>
<p><i>Additionally, mobile flash butt welding units, which are already in use on the network (see below), are manned by specialists.</i></p>	<p>There appears to be confusion in Network Rail's response document over the difference between dedicated teams and specialists.</p> <p>The operators of mobile flash butt welders (MFBW) may be specialist, but in Britain all the other track staff working with this equipment are generalist. They may not work with that operator and piece of equipment for twelve months or more. This is not the case in the European scenarios described in the paper.</p>

5.0 HIGH OUTPUT STRESSING

Network Rail Review Comments	RailKonsult Response
<i>Network Rail believe that in some cases, where the renewal site is relatively long, savings possible from use of the technique could be equal to those identified by Railkonsult</i>	Agreed
<i>Network Rail believe that Railkonsult have over estimated the applicability of high output stressing on the UK rail network.</i>	<p>It is accepted that there may be items in the renewals work bank where the yardage is too short for the heater stressing and mobile flash butt welding to be the most economic solution.</p> <p>However, it should be noted that Railkonsult have not included any potential efficiency savings that could be achieved if the process were to also be adopted on high output renewal sites.</p>
<i>Railkonsult estimate that 878 jobs per year are suitable for MFBW and heater stressing combined. Based on the 2007/8 work bank for renewals projects we believe that the actual number of jobs is far lower than this.</i>	<p>This number equates to approximately 4 jobs per week per contractor which is not believed to be unreasonable.</p> <p>It does not include jobs being undertaken on enhancements, projects or high output renewals. Nor does it include extended re-railing items undertaken by Network Rail's maintenance organisation.</p>
<i>A number of trials have been carried out to investigate the use of heater trolleys in the UK</i>	<p>RailKonsult are unaware of the results of any trials being undertaken by Network Rail.</p> <p>They are aware of limited trials undertaken by contractors (approved by Network Rail) using European equipment. These have proved the philosophy.</p>
<i>Network Rail continues to work to improve the effectiveness of heater trolleys in stressing rail, but the process will require further work before it is sufficiently controllable to meet Network Rail quality standards</i>	The process is proven and excellent production rates are being achieved in Europe together with the results that meet the local equivalent of Network Rail's quality and engineering standards.
<i>Network Rail agree that MFBW is an effective technology in the right circumstances, and the benefits from its continuing and increasing use on the UK network are already contained in the SBP</i>	<p>Railkonsult agree that MFBW is starting to come into its own now in Britain and look forward to its increased usage during CP4.</p> <p>The efficiency savings of using the MFBW combined with heater stressing are not apparent in the SBP for CP4.</p>

Network Rail Review Comments	RailKonsult Response
<p><i>However, we also believe that the majority of welding on the Network will use thermit technology for the foreseeable future, therefore we continue to invest in the training and equipping of our thermit welding teams</i></p>	<p>The paper is not intended to propose that there is no future for thermic welding.</p> <p>As stated by Network Rail, it is anticipated that the process will continue to be used in the future, particularly for maintenance operations.</p> <p>However, with the availability of MFBW with super pullers for installation of closure rails, it is likely that the use of this technology will increase and be more widely adopted. This could provide future efficiency gains in maintenance for rail defect removal activities.</p>

6.0 LIGHTWEIGHT PLATFORMS

Network Rail Review Comments	RailKonsult Response
<p><i>Network Rail already makes use of lightweight modular platforms as part of its renewal and enhancement plans.</i></p> <p><i>Network Rail has not yet used the Comparon brand of platform</i></p>	As they have no experience of using this system, it must be difficult for Network Rail to compare these lightweight modular platforms with the Comparon version.
<p><i>Network Rail also notes that Comparon platforms have not been accepted by Pro Rail for general use across the rail network in the Netherlands</i></p>	It is understood that the only approval being sought with Pro Rail is for an additional design, which incorporates an overhang of the coping section.
<p><i>Network Rail did consider the use of Comparon platforms at White City in London but did not proceed as the solution was not appropriate given the curvature of the platform</i></p>	Comparon have confirmed that there is no problem using the system to go round curves. They were not approached by Network Rail to discuss the work at White City or offer advice on the use of the system.
<p><i>However, £442 (or 40 per cent) of this gain originates from the assumption that the Dutch system would have lower administration costs. We dispute this assumption.</i></p>	A major cost element in administration is design. Since the Comparon system is of modular design then administration costs would be expected to be lower.
<p><i>We also note that the Comparon platform is assessed as having an expected life of 50 years. This is very low by Network Rail standards, most platforms on the network are assumed to have a life of 100-120 year. Consequently, even if Railkonsult is correct and Comparon platforms have a lower life-cycle cost over 50 years, they still may not represent the lowest life-time cost solution.</i></p>	Network Rail's response raises the issue of whether a design life of 100 – 120 years is appropriate for platforms? Most platforms will receive either full or partial renewal within this period. It is possible that traditional platforms are being over-engineered.
<p><i>There does not appear to be strong evidence to support the idea that Comparon should become the new standard for platform extensions. However, Network Rail believes the Comparon platform could be a useful addition to our 'shopping basket' of possible platform solutions. Given this limited applicability we believe that the fact we have not yet used Comparon platforms does not demonstrate that our platform extension programme is inefficient.</i></p>	Comparon was quoted as an example of a modular platform concept, RailKonsult's report was not intended to be a marketing tool for one particular Dutch company.

7.0 PARTIAL RENEWAL OF S&C

Network Rail Review Comments	RailKonsult Response
<i>Network Rail does not use vacuum plant for partial renewal of S&C, nor does NR use second life systems to repair damaged wooden sleepers.</i>	<p>Network Rail has used vacuum plant for partial renewal of S&C on a number of trial sites since its first inception into Britain in February 2005.</p> <p>The Second Life System (SLS) was first used in Britain in August 2004. Subsequent trials (undertaken as part of the British approval process) have seen its use on over 50 point ends, with 6,500 base plates having now been treated.</p> <p>It is understood that SLS has recently received its product approval for this country.</p>
<i>Network Rail has conducted extensive trials with vacuum plant to assess its usefulness given UK conditions and engineering policies.</i>	<p>Vacuum technology is not new to the UK rail industry. However, the vacuum technology deployed by the Railvac is new and far more effective than other vacuum plant tried. Furthermore it has numerous applications across both maintenance and renewals where efficiencies would be realised if it were to be used effectively.</p>
<i>Network Rail does partially renew S&C and is sharply increasing the rate of partial renewals in CP4 compared with CP3</i>	<p>If reballasting of S&C forms part of the partial renewal specification then the Railvac is an economical way to undertake this type of work due to the fact that the track remains insitu throughout the operation. For example, it significantly reduces the signalling work required.</p> <p>If this technology is used in conjunction with SLS the finished quality would be far superior than if just component renewal were to be undertaken</p>

Network Rail Review Comments	RailKonsult Response
<p><i>The principal reason that Network Rail does not use the techniques recommended by Railkonsult relate to their lack of suitability for use in the UK network.</i></p>	<p>Both processes described in this report have both been used extremely successfully on a number of trial sites in Britain.</p> <p>The only restriction with the current Railvac machine available for use in Britain is that it is built to UIC gauge. This restricts the sites it can gain access to and increases transport costs.</p> <p>The first use of the Railvac in Britain was to remove a 20mph TSR and avoid the line being closed as a result of deteriorating track quality. It was seen as the only effective solution.</p> <p>SLS was used on a site in Ashford in 2006 as the only possible solution to regauge the S&C other than complete renewal.</p>
<p><i>Network Rail has used resin injection systems to prolong the life of wooden sleepers. We have found that the benefits of using these systems do not justify the expense.</i></p>	<p>SLS is a complete process that returns the S&C back to within construction standards. This reduces the wear and tear on other components of the S&C such as the ironwork.</p>
<p><i>We find it more cost effective to replace entire defective timber sleepers with new sleepers</i></p>	<p>Replacing individual timbers does not address track quality issues, such as gauge correction, unless you replace all the timbers through the complete switch.</p> <p>Changing timbers when an alternative system is available is not a sustainable or environmentally sound solution. It is also likely to be a more expensive solution to the problems.</p>
<p><i>Where appropriate we also deal with the problem of loose sleeper screws in timbers by using Vortok coils</i></p>	<p>This is a tried and tested way of achieving screw hold where whole elongation has taken place but it is only short term when compared to SLS treatment. It does not address the issues of gauge through the S&C.</p>

Network Rail Review Comments	RailKonsult Response
<p><i>Network Rail believes that as a result of these trials, that there is not enough work on the network where vacuum plant would be the most cost effective solution</i></p>	<p>The versatility of the Railvac makes it suitable for over 40 different applications across both maintenance and renewals where it would be extremely cost effective.</p> <p>Tubelines introduced vacuum technology in October 2005 in the shape of the TubeVac. In its first year of operation it delivered £1.5 million savings for the business on activities such as reballasting S&C, removing wet spots and improving drainage on all its surface lines. Productivity on wet spot removal was increased by 300%. Due to the success of the machine, Tubelines ordered a second machine in August 2006 to further enhance its efficiency savings.</p>
<p><i>In many parts of the UK network the formation underlying the ballast is in very poor condition, this means that replacing the ballast under the S&C unit produces an insufficient improvement to asset condition, even in the medium term</i></p>	<p>It is also possible to treat and renew the formation when using the Railvac. This could include installation of a sand blanket together with any other type of geo grid or membrane system that is required according to the specification.</p> <p>Geogrid has been installed in Britain on sites where the Railvac has been used. In Sweden, the scope of work undertaken at Railvac sites can include installation of thermal insulation layer, using a similar approach.</p>
<p><i>Network Rail has found that reballasting in this way under S&C units does not provide the improvement in track geometry that would justify use of the vacuum unit.</i></p>	<p>The first use of the Railvac in Britain was to remove a 20mph TSR and avoid the line being closed as a result of deteriorating track quality. It was seen as the only effective solution.</p> <p>Reballasting will not correct problems such as gauge and alignment, whatever methodology is employed.</p>

8.0 FORMATION REHABILITATION TRAIN

Network Rail Review Comments	RailKonsult Response
<p><i>Consideration of large scale mechanised formation treatment must be viewed in the context of our engineering asset policy as it relates to the track sub-base, and formation treatment in general. Our current policy on formation treatment (e.g. blanket installation) is to target short, discrete, sections of track which have exhibited formation failure, and intrusive site investigation has subsequently determined that treatment is necessary. The benefits of a formation rehabilitation train need to be viewed against the number of sites for which the type of formation treatment provided by the train is appropriate, and those which are accessible by a formation train.</i></p>	<p>Use of traxcavation-based approach means that it is necessary to also renew the track as part of the formation treatment as this is considered best practice. Many of the sites do not need renewal and a formation train would enable this treatment to be disconnected from renewal of track components.</p> <p>Network Rail has invested heavily in ground penetrating radar systems and in specialist consultant soils analysis so there is improving clarity in terms of the quantity of work required.</p> <p>It is understood that there is 36km per annum of formation renewal identified in the work-banks. Based on European experience, this quantity could be delivered by a formation train.</p>
<p><i>Network Rail agrees with Railkonsult that the use of a formation rehabilitation train may reduce reballasting and formation renewal costs compared with a traxcavation-based approach. However, Network Rail's experience in replacing traxcavation with high output methods is that the actual cost savings are likely to be closer to 20 per cent. This would equate to annual savings of approximately £4.5 million.</i></p>	<p>The savings proposed by RailKonsult are based on experience of using this type of equipment in Europe.</p> <p>It is noted that the efficient operation of high-output equipment is at an early stage of development in Britain.</p>
<p><i>A formation rehabilitation train would not be purchased to reballast. Railkonsult propose reballasting as an activity to occupy the train during gaps in the formation renewal work bank.</i></p>	<p>The inclusion of reballasting in the analysis was to indicate the potential to further enhance utilisation of the train. However, as indicated above, the potential formation work bank is equivalent to the typical annual output from such machinery.</p>
<p><i>We also note that the only two organisations thanked by Railkonsult for their participation in the report (Eurailpool GmbH and Plasser and Theurer UK) are a plant owner and operator and a plant manufacturer respectively. We believe that Railkonsult should cross reference this data with input from end-users of the formation rehabilitation train.</i></p>	<p>The financial information quoted represents the price at which the service is bought at by the end user.</p>

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