



**Call for participants to
RRUK Association industry-academia workshop**

***The 24/7 Railway: creating capacity by minimising the
impact of maintenance***

-- £100k for feasibility studies available exclusively for workshop participants--

Tuesday 13th December 2011, 9:30 – 17:00

University of Nottingham, Jubilee Campus

Applications are sought from university researchers and industrial representatives to take part in a one-day workshop which will aim to establish creative solutions to the problems of running a “24/7” railway. ~£100k funding for a limited number of initial feasibility studies will be available, on a competitive basis, exclusively for academic-led consortia formed by workshop participants.

Problem Statement

Demand for the railway from passenger and freight transport is increasingⁱ and certain routes are already at capacity with today’s demand. The need to maintain and renew the railway so that it remains safe and operates effectively means that some of the capacity of the railway is taken up with maintenance and engineering works rather than being available for running trains.

To satisfy this increase in demand will require far greater utilisation of the existing infrastructure; and the night-time and weekend periods currently used to maintain the railway and carry out engineering interventions will need to be severely reduced. Coupled with this, the extra utilisation will in itself create a need for additional maintenance, exacerbating the issue.

Network Rail and RRUK-A welcome innovative ideas to overcome this problem; these might be engineering or operational solutions, but they could also be economics or social-science based, and they could apply knowledge and techniques developed in entirely different industries to the railway domain.

New to the railway?

RRUK-A is keen to welcome participation from people who may have had little experience in the rail industry, but may have experience in other fields which could usefully be applied to the rail industry. This document contains some background information about how the rail industry works, which may help you to understand some of the issues faced. There will be experts present at the workshop that you can discuss these with.

Obstacles to achieving the 24/7 railway include:

A - Access and utilisation

- A significant proportion of the 'train-free' time reserved for maintaining the railway (possessions – see *What is a possession?* for more information) is consumed by the time required to setup a possession including preparing the site protection and the logistics of moving staff and equipment to the correct location. As a result, utilisation of the available time for actual maintenance is not optimal.

B - Maintaining traffic around maintenance possessions

- Maintaining traffic around a maintenance possession can be difficult. Closing a single line whilst maintaining traffic on the line next to it (as is done on the highways, diverting traffic to the other carriageway) is possible in only certain locations for certain maintenance tasks. The obstacles to achieving this include:
 - Very few locations have signalling systems which will allow bi-directional operation on one line, this is due to the increased capital cost of these signalling systems.
 - The location of points can also restrict the ability to divert traffic around a work site.
 - On an electric line, if you need to shut down the electricity, you cannot isolate just one line.
 - Work force safety also limits the types of possessions that can be carried out with single line working. Due to the small distance between lines in the UK, certain tasks which require access to the 6ft (the space between two inside rails) is prohibited unless barriers between the line are constructed in order to protect the workers from operational traffic.



C – Technologies for accurate measurement and prediction

- A shift from a 'find and fix' methodology for repairing the railway to 'measure and predict' would allow for predicted maintenance to be carried out during periods where it would have a minimum impact on traffic. For this to be achieved improved condition monitoring and degradation models are required for accurate prediction.

D – The never failing part: component reliability and maintainability

- Component reliability and whole life asset management has drastically improved in other industries such as the automotive industry, but less so for the railway. Increased traffic has a double impact on maintainability; reducing the opportunities available to carry out maintenance as well increasing wear rates. A more reliable railway which requires less frequent maintenance will require fewer interventions.
 - Future components should be designed for maintainability and rapid replacement and new methodologies adopted for rapid replacement of existing components.

E– Resistance to change

- Even if the capability of doing things differently or is achievable, they are not frequently adopted due to a culture of resistance to change and reluctance to use

methods or technologies that are not 'tried and tested'. The railway needs to find ways of removing this resistance and being able to integrate new technology into a maintenance company.

For more information on the opportunities, business case, demand for and obstacles to a 24/7 railway see Network Rail's "2007 Strategic Business Plan for a Seven Day Railway". [http://www.networkrail.co.uk/browse%20documents/strategicbusinessplan/other%20supporting%20documents/seven%20day%20railway%20\(final\).pdf](http://www.networkrail.co.uk/browse%20documents/strategicbusinessplan/other%20supporting%20documents/seven%20day%20railway%20(final).pdf)

Benefits of Participation

This workshop will provide participants with the opportunity to take part in a professionally-facilitated problem-solving process, in which it is hoped that fresh thinking and targeted industry-academia interfacing will generate a rich ecology of ideas and practical solutions.

Approximately £100k will be available to fund a small number of feasibility-sized projects; workshop participants will have the exclusive opportunity to form consortia and compete for a share of these funds. Successful feasibility projects may lead in due course to research council responsive mode bids or other larger projects.

Funding will only be accessible to universities; industry participants will, however, be able to obtain significant benefit in developing partnerships with academia and accessing high-quality research expertise and outputs with the potential to enhance their business and products.

Eligibility to Attend the Workshop

Applications are sought from university researchers and businesses (including supply industry, infrastructure contractors, SMEs working in related or applicable areas) who have a legitimate interest and can make a contribution to solving this problem.

University applicants do not have to be current "railway" researchers, but they should have knowledge and expertise from any discipline that could be applied to the solution of this problem. University applicants must be registered members of RRUK-A at the point of application; those who are not currently members of RRUK-A but are welcome to consider joining RRUK-A in order to access this workshop. For more details on joining RRUK-A please visit: <http://www.rruka.org.uk>

How and when to apply

If you would like to apply for a place, complete our short expression of interest form (available from www.rruka.org.uk and attached to this document), in which you will be invited to make a brief positive statement about why you would like to take part in this event, what value you would be able to add and what aspect of the issue you are interested in contributing to. You are *not required* to propose your solution to the issue in this application. Please then submit this by e-mail to secretariat@rruka.org.uk to be received no later than **Tuesday 1 November**.

A joint industry-academia panel will select approximately 25 applicants to attend the workshop, ensuring that there is a balance of industry and academia and a good mix of disciplines and topic areas in order to facilitate a productive workshop and lead to useful proposals for feasibility studies. They will be joined by a number of invited industry problem owners. The Transport Knowledge Transfer Network (KTN) will facilitate the workshop.

Successful applicants will be requested to carry out a small amount of pre-event reading to reduce the need for long introductory presentations at the start of the workshop.

Summary of application process and schedule

The pre-event application process will be managed as follows:

- 1 November - applications received
- 16 November - successful participants notified and pre-event documents issued
- 5 December - final pre-event documents and joining instructions issued
- 13 December - day of event

After the workshop

In early 2012 participants will have the opportunity to submit an application for funding that will enable them to carry out a feasibility-sized project. Proposals will be reviewed by a joint academic-industry panel and the outcome made public shortly thereafter.

For more information please visit: www.rruka.org.uk or e-mail secretariat@rruka.org.uk

Further information

What is a possession?

Possession is the term used by railway maintenance contractors and Network Rail to indicate that they have taken possession of a section of the track and no trains are running, or a limited service is running. A possession is a safe area of work on the railway which has been closed from operational traffic for the safety of the workforce and also the safety of passengers and vehicles. The protection for a possession will include signalling protection and also include the setting and locking of points to ensure that traffic cannot physically enter the site or the setting of detonators upstream of the possession which will warn a train driver of the hazard ahead in case the red signal has been passed.

Within a possession there may exist more than one worksite, especially for large renewal and upgrade sites. Each worksite within the possession has warning boards at each end of the site to denote the limits of the worksite.

At the start of the possession these protections must be put in place which will involve communication with the signaller to set the signals and points, plus the manual tasks of locking points, positioning and setting detonators and placing the boards at the ends of each worksite and then these must be collected at end of the possession. The types of protection required are set out within the Rule Book

http://www.rgsonline.co.uk/Rule_Book/Rule%20Book%20Handbooks/GERT8000-HB11%20Iss%201.pdf

To minimise the impact to the customers possessions are planned from up to two years before the start of the possession. The lead time between planning and the possession also allows for logistics of arranging labour, plant and machinery and also allows optimisation of the access and combining multiple activities into a single possession. This access is negotiated with the train operating companies and written into the timetables, the amount of access that Network Rail is able to take also specified within the route utilisation strategies for each route (<http://www.networkrail.co.uk/asp/4449.aspx>).

The timetable is set to allow time for shorter regular maintenance slots eg two hours every 4th Sunday and also for the longer renewals activities which may require closure for a whole weekend. The long lead times allows any spare slots in the timetable to be sold for freight paths or for other passenger traffic and allow for the provision of bus services or planned diversions as appropriate. Possessions can be taken at shorter notice where corrective maintenance is urgently required, however, this results in interruptions to the agreed timetable and penalty payments by Network Rail. Similarly overrunning of possessions will

also result in financial penalties. Any disruption to the planned timetable results in reputational damage to the railways.

Railway basics

If you are interested in reading about the basics of railway signalling and interlocking to understand how the railway operations are controlled, some information can be found at http://en.wikipedia.org/wiki/Railway_signalling and <http://en.wikipedia.org/wiki/Interlocking>

What is RRUk-A?

The Rail Research UK Association (RRUK-A) is a partnership between the British rail industry and UK universities. Established in 2010, RRUk-A builds on a recent resurgence in university-based railway research, and seeks to enhance already strong collaborative relationships between academia and the railway industry. The core activities of RRUk-A are funded by RSSB and Network Rail.

ⁱ The European Commission's White Paper - Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system, 2011 sets the target for a modal shift of 30% of road freight over 300km to shift to rail or waterborne transport by 2030 and 50% modal shift by 2050, this equates to 3 times as much rail freight by 2030 and 4 times as much by 2050. The cost to build new railway infrastructure to meet future demand will be prohibitively expensive The European Commission estimates that the cost of infrastructure improvements required to create this capacity across Europe would be 1.5 trillion Euros.