Rail industry leadership welcomes Transport Systems Catapult

The rail industry has welcomed the Technology Strategy Board’s announcement to introduce a new innovation centre (known as a Catapult) for transport systems. The Technology Strategy Board is a business-led government body which works to create economic growth by ensuring that the UK is a global leader in innovation, and is sponsored by the Department for Business, Innovation and Skills (BIS).

The announcement marks the beginning of a process to develop and realise the Catapult as a full-blown operation, and rail is looking forward to exploring the ways the initiative can support longer term strategy.

Enabling innovation is a fundamental theme supported by the rail industry through the cross-industry Technical Strategy Leadership Group (TSLG), which is facilitated by RSSB. It’s one of the key things that will help realise industry’s 30-year vision, to double capacity and maximise customer satisfaction of rail while halving cost and carbon at the same time.

Catapult centres are designed to boost innovation across many different sectors by allowing businesses to access equipment, expertise, funding streams and research capability that would otherwise be out of reach.

Transport now joins other sectors such as high value manufacturing, cell therapy, offshore renewable energy, space applications and the connected digital economy in securing a dedicated ‘Catapult’ making a long-term contribution to UK economic growth.

RSSB’s role managing cross-industry research in rail, together with many ongoing knowledge partnerships being fostered and developed, means it is ideally placed to work with rail industry partners to take advantage of the Catapult opportunity.

For details of changes to Railway Group Standards view the Latest Updates page on the RGS Online website www.rgsonline.co.uk


For details of forthcoming dates for RSSB consultations on standards and associated documents, please see: http://www.consultation.rssb.co.uk/pdf/Forthcomingconsultations.pdf

For more information on any of RSSB’s products and services please contact the RSSB ENQUIRY DESK ON 020 3142 5400 OR ENQUIRYDESK@RSSB.CO.UK
partners to ensure the Catapult is effective and works in rail’s interests. In 2011, RSSB forged a strategic partnership with the Technology Strategy Board, and has been working with the Transport Knowledge Transfer Network (KTN) on behalf of TSLG leading to this announcement.

For more information, contact RSSB’s head of strategy support, James Hardy, james.hardy@rssb.co.uk

Innovation guidance road-tested at RIA conference

The recent Innovation Conference organised by the Railway Industry Association (RIA) in Leicester provided the ideal opportunity to road-test new guidance for smaller firms on how to innovate in rail.

Innovation is the commercial exploitation of new ideas, the complete process of turning a concept into a new product or service that can be sold to generate a commercial return. Suppliers innovate to secure new sources of revenue, sustain a competitive position and distinguish products and services from competitor offerings.

While many people support the goals of innovation, the challenge of combining the right investment with technology and service development to satisfy customer needs in a demanding rail environment can make these goals difficult to achieve. It is widely accepted that it is difficult for both new and existing suppliers to get an audience with the rail industry to introduce innovation. Rail industry customer needs are not always obvious, and suppliers do not always understand what is needed to identify them.

Yet having the right technology at the right time to meet this role is an essential element of GB rail’s success as transport providers. So this calls for a more positive culture of innovation, identified as a key enabler during the 2010 consultation on industry’s Rail Technical Strategy.

In response, RSSB has published a ‘beta version’ of Innovation Guidance for small and medium sized firms in the rail industry. This guide is designed to help small and medium sized firms that wish to introduce innovative products and services into the rail industry. The guide describes the barriers and enablers for innovation and provides practical advice on how to overcome them.

This has been produced as a result of research and development managed for the Technical Strategy Leadership Group (TSLG). Frazer Nash Consultancy was contracted by RSSB to provide the intellectual content for this guidance document.

The guide focuses on the risks associated with innovation in the rail industry and is intended to stimulate thinking around the issues that impact upon innovation. This is because managing risk in the innovation process is crucial if success is to be achieved.

The RIA event provided a valuable opportunity to get feedback from interested parties ahead of the final version being published.

For more information, contact research manager Jesse Baker, jesse.baker@rssb.co.uk

New operational safety magazine: Right Track

Operations Focus Group (OFG) has identified a need to introduce a new magazine aimed at front-line personnel to capture, share and promote safety learning and initiatives.

OFG is a cross-industry group which pursues progressive improvement of operational safety through the understanding and development and promotion of effective campaigns, programmes and tools. It includes Network Rail, train and freight operators, infrastructure maintenance companies, trades unions, Office of Rail Regulation and London Underground.

The new magazine is called Right Track. It is a professional, A4 full-colour magazine, to be trialled for a year initially, as part of the OFG ‘family’ of communications channels, which include the RED briefing DVD, and the on-line resource centre Opsweb. The first edition is scheduled for publication on 23 April.

It is designed to help companies share initiatives and perspectives in an accessible and down-to-earth way, directly to front-line staff. Critical to Right Track’s success will be pitching it with the right language and style will be plain and succinct enough to suit the format and appeal directly to the front-line. Readers could be anyone with a safety critical front-line role in railway operation including train drivers, guards, other on-board staff, dispatchers, and people on stations.
The latest Industry Safety Meeting was held on 16 February 2012 and the chosen topics were “Formation of the SWT Alliance” and “The Workforce Health Challenge”.

The meeting brings together industry leaders of train operators, ATOC, freight operators, Network Rail, ROSCOs, infrastructure contractors, suppliers, ORR and RSSB.

Tim Shoveller (SWT) and Richard O’Brien (Network Rail) delivered a joint presentation about the proposed “deep” alliance between SWT and the Network Rail Wessex route. Some of the key points included:

- NR and SWT will remain separate legal entities with each company ultimately responsible for their own undertaking.
- A legal agreement will specify working arrangements.
- A single, joint management team will direct day job operations.
- The Alliance will provide the opportunity for a better understanding of costs, efficiency and innovation opportunities.
- RSSB has facilitated the systematic identification of safety risks and issues between the “Alliance partners” and other affected train operators.

This was followed by a session on the topic of workforce health.

- Dame Carol Black, Government Expert Adviser on Health Government policy objectives; main worker health issues; the role of employers; current employer attitudes/barriers; the potential and business case for proactive worker health programmes; health at work pledges and challenges for the rail industry.
- Chris Hext, Network Rail Network Rail’s new vision and strategy for safety and wellbeing; need for rail industry co-operation including the need to establish a suitable leadership group; current health and wellbeing issues and key elements of strategy.
- Chris Burchell, Southern Business case for the “in house” provision of health service; subsequent additional benefits; forward challenges and areas where coordinated industry action is required.
- Ian Prosser, ORR ORR Vision and Health Programme; key indicators; risk assessment; need for leadership, commitment and cooperation.

Each session was followed by an open forum discussion. The next Industry Safety Meeting will take place on 27 September 2012.
Statistics show that the rail industry’s safety performance has steadily improved over time. The analysis, review and dissemination of safety intelligence are key activities in support of safety improvement, which RSSB does to support duty holders.

The Annual Safety Performance Report (ASPR) presents information on risk and safety performance trends in many different ways; it looks at the safety of passengers, workforce and public across a range of key indicators, also benchmarks rail safety in Britain against other transport modes and other European railways.

Learning from Operational Experience is the process by which knowledge from the operation of systems is gained, exchanged and used, leading to continuous improvement in both business performance and safety. The Learning from Operational Experience Annual Report looks at some of the ways learning is achieved, including accident investigation reports and recommendations, statistical trend analysis or cross-industry group initiatives.

This year, the two reports will be published together for the first time, as companion documents and strengthen the connection between performance and learning.

In keeping with previous occasions, rail industry safety and operational heads will be invited to a joint presentation of the key findings from the two reports, which will be held at RSSB on Wednesday 27 June 2012. The reports will also be published at this time. If you are interested in attending, please contact aspr@rssb.co.uk

The UK Government has set a target to reduce carbon emissions by 80% by 2050. Transport is a major and growing part of the UK carbon footprint, but at the same time, there is an anticipated reduction in carbon intensity of the road sector. This means the rail industry needs to be able to deliver significant carbon savings, even while growing and improving value-for-money, to retain its ‘green’ image.

There is also an opportunity to limit the increase on energy spend, currently about 4% of industry costs and expected to rise as energy costs go up. Forecasts from the Department of Energy and Climate Change (DECC) suggest that energy costs could increase by £250million a year by the end of CP5 if no efficiency interventions are undertaken.

To support the rail industry’s approach to carbon in CP5 in the Initial Industry Plan (IIP), RSSB has provided the Sustainable Rail Programme’s (SRP’s) input to the Planning Oversight Group (POG). This includes:

- A carbon trajectory for CP5 and two trajectories for the period to 2050
- An allied estimated cost forecast
- A set of possible interventions for CP5, highlighting where it may be cost effective to reduce rail’s carbon footprint

In the long term toward 2050, electrification and decarbonisation are the fundamental drivers of traction carbon emission reductions. In CP5 the key drivers are industry efficiency interventions and biofuels but higher capacity (more trains running) will have an impact on a reduction in carbon emissions.

In order for the industry to measure and manage carbon, the SRP has outlined a ‘carbon management framework’.

Barriers to delivering savings have been identified including inadequate understanding of the value of interventions, the poor status of energy in strategic and operational decisions, a focus on upfront capital costs and a lack of expertise and resources within the industry. In response, SRP has recommended using a ‘carbon management framework’, installing robust energy reduction and measuring requirements in franchises, incentivising traction energy metering through EC4T and industry decision making processes should have whole life energy and cost savings as one of the criteria for investment.

There remains a degree of uncertainty within the carbon trajectories themselves (simply because some factors are more unpredictable). Nonetheless, a key benefit of industry adopting a framework approach is some flexibility in how it manages the carbon challenge in the next control period and in the longer term.

For further information about the SRP, go to http://www.rssb.co.uk/NP/SRP/Pages/default.aspx and for more details about this initiative, contact Shamit Gaiger, head of national programmes, industry strategy, email shamit.gaiger@rssb.co.uk.
The future of the Yellow Book

The status of Yellow Book issue 4

It has been widely acknowledged that a significant part of the guidance on Engineering Safety Management (ESM), more commonly known as the Yellow Book, is out-of-date for the current regulatory regime that applies to the GB mainline railway system.

When need for large-scale revision to YB became evident in 2010, the Industry Standards Coordination Committee (ISCC) set up a sub-group to 'step back' and consider what guidance existed, and what guidance was needed, related to the management of engineering change.

The sub-group reported in January 2012. Its main conclusion was that the current issue of the Yellow Book (known as YB4) should be withdrawn; this was endorsed by ISCC.

The following guidance is being produced to replace YB4:

i ‘Principles’ level guidance largely based on Volume 1 of YB4, which provides a good foundation for understanding ESM.

ii ‘Regulatory’ level guidance, in the form of a process map that allows organisations to navigate their way through the legislation and available guidance. The process map provides links to guidance specific to each regulation - for example, ORR's guidance on the Common Safety Method on risk evaluation and assessment, and the DfT helpnotes on the Railways (Interoperability) Regulations.

iii Detailed guidance at the ‘engineering safety management’ level will be provided in three areas, namely hazard identification, assessing risk, and reducing risk, in the form of three Rail Industry Guidance Notes (GNs). These GNs will reproduce the relevant chapters of YB4 as an annex.

Production of replacement guidance for items i) and ii) will be managed by the ISCC sub-group and will be available on a new page entitled ‘management of engineering change’ on RSSB’s website by the end of June 2012. The Yellow Book website will contain a link to this guidance.

Production of the GNs for item iii) will be managed by a multi-functional standards committee. It is anticipated that the GNs will be available on www.rgsonline.co.uk from early September 2012.

A very important part of the change to the regulatory regime is introduction of the Common Safety Method (CSM) on risk evaluation and assessment. The CSM has been in force since 19 July 2010 for all significant changes to rail vehicles and, in some circumstances, to structural sub-systems. From 01 July 2012 the CSM will be in force for all significant changes to the railway system – technical, operational and organisational.

The CSM defines a common mandatory European risk management process for the rail industry. The ORR has produced guidance on the CSM.

Continuing use of Yellow Book issue 4

Yellow Book issue 4 continues to be available via the links on the Yellow Book website for organisations to use if they wish. However, all organisations should note that the guidance contained within YB4 no longer aligns to the current regulatory regime that applies to the GB mainline railway system.

Users of YB4 need to decide which, if any, parts of it are of continuing use or relevance to their organisation.

Related projects

Two further pieces of work are relevant to the changes described above, and have been taken into account in deciding the way forward:

i RSSB R&D project T955 (Hazard Analysis and Risk Assessment for Rail Projects);

ii Revision of Euronorm EN50126 (Railway Applications - The Specification and Demonstration of Reliability, Availability, Maintainability and Safety (RAMS)).

T955 is aimed at producing a methodology and tools that will use information from the RSSB Safety Risk Model to support the safety assessment of engineering change projects. By automating and standardising repeatable aspects of safety engineering processes, this research is intended to save a large amount of time and effort associated with bespoke risk assessment work on new projects. A report on Phase One of the work is to be published shortly on the RSSB website. Phase Two is now under way. The outputs of Phase Two will be used to update the Guidance Notes on hazard identification, assessing risk, and reducing risk.

The revised version of EN50126 is being drafted. This will replace the current versions of EN50126, EN50128 and EN50129. Parts 1 and 2 of the revised EN50126, which address the generic RAMS process and methods and concepts to support its application, are currently due to be voted on in the first half of 2013.

For further information relating to the Yellow Book and its replacement, please contact Jon Taylor, head of standards policy, on 020 3142 5601 or email jon.taylor@rssb.co.uk.
The Automatic Warning System (AWS) has been in use throughout the British main line railway network since the 1950s, giving an audible warning to alert drivers on the approach to a cautionary signal or warning sign. Over the years, there have been changes in the design and layout of the trainborne equipment. Following the introduction of new testing equipment designed to allow depot staff to check the sensitivity of AWS receivers, it became apparent that the characteristics of the equipment actually installed did not fully match the requirements of the current Railway Group Standard for AWS, GE/RT8035 issue one. The sensitivity of the receivers on some trains was found to be lower than the value specified in the standard.

However, the AWS as a safety system has continued to give satisfactory performance because the magnets mounted on the track generally produce higher levels of magnetic flux than the minimum specified by the standard, enough to ensure that they are reliably detected by the receivers.

It was recognised that this was an undesirable situation. As long as Network Rail provide magnets of similar strength to those already in use, the system will operate safely, but if new designs of magnet were to be introduced with flux levels nearer to the minimum values specified in the standard, trains could fail to detect them reliably.

The issues were considered by the Train Control Technical Sub-Group (TCTSG) under the leadership of the Vehicle / Train Control and Communications System Interface Committee (V/TC&C SIC). Valuable data was provided by two research projects commissioned by RSSB to measure the characteristics of track magnets and vehicle receivers.

T804 Automatic Warning System Infrastructure Characterisation
T808 AWS Testing – the way forward

It was concluded that modifying a large number of trains to ensure that their AWS receivers met the current standard would be a costly exercise. The preferred solution was to amend the Railway Group Standard so that it more closely matched the existing situation.

Issue two of GE/RT8035, specifying higher levels of magnetic flux, was published by RSSB on 3 March 2012. The magnetic fields produced by the magnets, and the corresponding receiver sensitivity, which were previously given only for a single height above rail level, are now specified over a range of different heights, providing more comprehensive information on performance requirements. The revised standard should require no change to equipment already installed on the track or trains, but it means that the higher flux levels that are produced by existing AWS magnets are now mandated by the standard. This will provide greater assurance of compatibility with the receivers installed on trains and ensure that AWS continues to work reliably and safely.

Reducing the industry’s costs – the work of the V/TC&C SIC

The industry needs to reduce its costs – a challenge which is being enthusiastically addressed by the System Interface Committees (SICs).

There are five SICs, consisting of senior representatives from across the industry and supported by RSSB. Their purpose is to help the industry manage system interfaces in the most effective, safe and cost efficient way. The Vehicle / Train Control and Communications SIC is chaired by Clive Burrows, Engineering Director of First Group. With the support of a number of subgroups it oversees projects in the communications and signalling fields, employing research to investigate new technology and improve the use of existing technology.

A business model has been developed for a shared, cross-industry DRACAS (Defect Recording and Corrective Action System). The model shows that implementing such a DRACAS for new systems such as ERTMS and GSM-R will deliver benefits of the order of £500m over 20 years. A cost benefit model has been created for modifying the TPWS track equipment to provide additional protection against SPAD risk for trains with less than 12%g emergency braking. Analysis has indicated that of the 12,500 signals fitted with TPWS, only a few hundred may warrant further consideration. These results will be used by Network Rail in the review of existing signals and in the business case for TPWS during renewals. This work is estimated to have saved the industry around £17m over a 25 year period.

Work on Track Circuit Assisters (TCAs) led to revisions to the Code of Practice on Recommendations for Defective On-Train Equipment (GO/RC3537) and to Module TW5 of the Rule Book (GE/RT8000). The consequent cost savings are estimated at £6.8million over 20 years, through not needing to fit TCA, or being able to reduce its use, or enabling removal altogether.

A Driver Advisory System (DAS) has been implemented successfully on First Hull Trains and demonstrated significant energy savings (up to 25%). Over 100 FSW FST power cars have also been fitted with DAS and the SIC has issued a Standalone DAS Concept of Operation document to assist other Operators planning to introduce a DAS.

Research into operational communications (T964) has indicated that an evolutionary pathway can be identified towards an extensive mobile broadband network within the GB rail corridor. Enabling communications gateway capabilities on-train, rather than building new trackside infrastructure immediately, appears to be the key catalyst to achieve identified benefits.

Analysis of the dependability of GNSS-based technology has produced a major input to the revised Guidance on the Use of Satellite Navigation (GK/GN8578), which was published in September.

Taken together, these results demonstrate the strong focus by V/TC&C SIC, supported by RSSB, on helping the industry bring down costs whilst continuing to deliver an effective and safe service.
RSSB provides a Safety Culture Toolkit that enables rail companies to measure their own safety culture, and determine the actions that they could take to tackle the issues that have been identified. The Toolkit has now been updated to provide an enhanced service and in response to feedback from users.

It is now possible for any survey user to complete an online survey either at work, home or on a computer in a depot. Companies using the Toolkit now have the option to create multiple login accounts - to allow staff to participate electronically in the survey even if they do not have individual email addresses. This is in addition to the existing options of sending links to individual email addresses, and using printed copies of the survey.

For more information about the Safety Culture Toolkit, see [http://safetyculturetoolkit.rssb.co.uk/home.aspx](http://safetyculturetoolkit.rssb.co.uk/home.aspx) or contact Sarah Hesketh, Senior Human Factors Specialist, enquirydesk@rssb.co.uk

### T889 Controlling rail vertical contact stresses

RSSB has managed the delivery of research project T889 investigating the benefit of using the Q/D (maximum static wheel load to wheel tread diameter) ratio as a means of controlling the vertical contact stresses generated within the contact patch between the wheel and the rail.

The outcome of this research was presented and discussed at a dissemination event on 1 March 2012 at RSSB. It was very well attended with representatives from Network Rail, Freight Operators, ROSCOs, Rolling Stock Engineers, Infrastructure Maintainers, Component Suppliers, and Standards Committees.

Railway Group Standard (RGS) GM/TT0088 Permissible Track Forces for Railway Vehicles specifies a Q/D limit of 0.13 kN/mm (Q/D = maximum static wheel load to wheel tread diameter). Based on operating experience, the freight operating companies are seeking a relaxation of this limit because managing it presents significant challenges. It is known that freight wagons do not comply with this limit and that freight operators have to operate under derogations.

It is also known that it is important to control the vertical contact stresses generated by rolling stock to economically and practically manage wheel and rail degradation.

The questions that this research addressed include:

- Do we need Q/D at all?
- If we do need Q/D, where should it be set?
- Is Q/D the best measure?
- Can we safely influence the EU position / protect UK practice?
- What damage mechanisms are controlled by contact stress?
- What is the current distribution of contact stress on the network?
- What would happen if we relaxed or removed the Q/D limit?

The key conclusion made is that Q/D is a good proxy for managing vertical contact stress.

A proposal for standards change (RGS GM/TT0088) was outlined at the workshop. The outlined proposal was broadly supported and it was agreed that a proposal for standards change will be finalised and submitted by Freightliner to RSSB.

The proposal can then be considered by Standards Committees and if it is accepted the process for standards change will commence.

For further information please contact the RSSB Enquiry Desk on 020 3142 5400.