Key to icons indicating which strategic goals for the railway each project addresses:

- Increased capacity
- Reduced carbon
- Lower costs
- Improved customer satisfaction
- Safety
Welcome to the August 2018 R&I quarterly update with examples of research being taken up, new important outputs ready for piloting and adopting, and new projects and initiatives under development. I hope amongst these you will find something that can benefit your organisation and that you would like to take forward.

It is very easy to forget or underestimate the effort adopters, and particularly early adopters, need to put into making any excellent research finding successful and valuable for their business. The actual application of research findings and outputs in the ‘real railway’ is always challenging and too often it can go in the ‘too difficult’ box, particularly when this competes with other priorities, the foremost being the delivery of a safe and excellent daily service.

To overcome these challenges, an increasing proportion of the research and innovation efforts is being focused on supporting take-up. This support takes different forms ranging from working with operators and routes on in-service trials, to ensuring that outputs are more easily accessible, as we have recently done with the all-encompassing resources to improve fatigue management.

It also includes disseminating the outputs and findings in a way that clearly explains how these could be easily used or taken to the next stage, and ensuring that we have the time and skills to provide information once the research is concluded to help you get value from the R&I programmes. Our R&I Account Manager, Robert Staunton, and the specific contacts provided for each of the items covered in this summary, are very happy to hear from you and help you in your implementation journey.

Lastly, I would like to personally invite you to attend the next R&I showcase on 27th September 2018 at the RSSB offices in London, to tap into the knowledge and expertise of our R&I team and make lasting links to call upon in the future to take forward your research needs and future implementation challenges.

Luisa Moisio, R&D Programme Director
luisa.moisio@rssb.co.uk
Research and innovation in action

**Improved door closure arrangements**

Two-thirds of passengers do not perceive the door close alarm as an indication that they should ‘stand back’ and 58% believe that, if obstructed, doors will automatically re-open like lift doors. In the wrong circumstances, contact with a closing train door can trap, strike or knock customers off balance, all of which can have severe consequences.

Following the publication of RSSB research on door closure arrangements in 2017, Virgin Trains West Coast took action implementing modifications to the door auto-close function on their Pendolino fleet. They extended the period the hustle alarm sounds prior to doors starting to close from 3 to 9 seconds, and increased the door close cycle from 4 to 12 seconds. These changes provide safer boarding and alighting arrangements. The modification has been fully implemented on the Class 390 Pendolino fleet and Virgin Trains are planning to modify the Class 221 Voyager fleet.

RSSB research delves into all areas of door closure arrangements (not just auto-close), providing an insight into passenger understanding of and interaction with door closure, and proposes 11 recommendations. For more information on how you can implement mitigations and recommendations proposed by the research, please contact Justin Willet:

justin.willett@rssb.co.uk
Safety Critical Communications Training Programme in use

The Safety Critical Communication Training Programme was launched in November 2017, after research revealed that poor communication was a contributory factor to 21% of rail incidents and a new training approach and materials were developed. Since then, industry has embraced the programme with Network Rail rolling out the training modules to all their frontline staff and training providers. Both Network Rail and Train Operators that have introduced the training have reported that it has been very well received by staff. It has been designed in easy to use modules with a whole industry approach, allowing for use in both refresher and new employee training.

RSSB will continue to support progress with the rollout and monitor the actual impact and benefits of the training. This will include analysis on whether, over the next year, the contribution from communications to rail incidents has changed.

If your business is rolling out this training, please let us know and we can work with you to monitor the results. We welcome all feedback from trainers, briefers, and managers on how the training is being received by the target audience. Please contact Susan Cassidy:
susan.cassidy@rssb.co.uk
One stop shop resource to improve fatigue management

The new Fatigue and Alertness topic area on the RSSB website went live in May this year, pulling together a range of existing and new resources to help RSSB members develop their Fatigue Risk Management Systems. Easy to navigate content, arranged by role or function related to fatigue management, includes sections for planning and rostering, supervision and line management, incident investigation, and senior managers, as well as a section which aims to provide a basic understanding of fatigue for all staff.

This new topic area draws heavily on RSSB research. For example, findings from research on the use of biomathematical models to predict fatigue have been incorporated in the planning and rostering pages, while findings from research that looked into fatigue control options for first night shifts fed into a series of guides and videos helping people manage their own fatigue. These videos have already been used at Network Rail Safety Stand Down Days in early July.

If your organisation has successfully used this new resource, we would love to hear about it. RSSB is also available if you would like more information on how to get the most out of this. Please contact Dan Basacik:

dan.basacik@rssb.co.uk
This is a fantastic move forward and will raise the bar for managing fatigue across the industry. Having access to information to utilise in briefings, presentations and general awareness is invaluable. The ability for individuals to also directly benefit from this information is priceless.

Annette Edgington
Safety, Sustainability and Compliance Manager (Services) at Colas Rail
Research and innovation ready to use

A new tool to optimise braking

The Low Adhesion Braking model (LABRADOR) represents the complex behaviour of passenger train braking systems in low adhesion conditions. The tool allows the study of specific brake control features, such as wheel slide protection strategies, sanding effectiveness, dynamic brake utilisation and traction performance. This is an essential enabler in optimising braking performance of trains, which is key to delivering a safer, more reliable and higher capacity railway.

LABRADOR is now being trialled by seven interested parties including Siemens, Bombardier, the Rail Delivery Group and Hitachi. Their feedback will be integrated into the final solution together with the result of further testing and validation that is currently underway.

Next steps:

We would welcome the opportunity to give you access to the current version and receive your feedback.

If your business would like to trial LABRADOR, please contact Sharon Odetunde:

sharon.odetunde@rssb.co.uk

Example of LABRADOR user interface
The CSIF has significantly helped the rail industry to improve the maturity in which it reports and measures social value. The framework has provided us with one consistent approach to using financial metrics across the industry. Where financial metrics are not available or robust, this provides a consistent way of reporting on qualitative inputs. The CSIF will, alongside other industry-led initiatives, help to develop social value reporting and best practice in rail.

Sarah Borien  
Sustainability Strategy Manager, Network Rail, Project Sponsor

A social value measurement framework for rail

The Common Social Impact Framework (CSIF) for understanding and measuring social value impacts across Great Britain’s rail industry organisations, projects and programmes is now available. It includes a common set of measures for ten categories of social impacts of rail ranging from social inclusion to regeneration. The framework also includes guidance on monetising the values, qualitative approaches and measurements, and reporting.

The CSIF has been developed in Microsoft Excel. It is intended for use by infrastructure operators, contractors and suppliers, train and freight operating companies and community rail partnerships that need to plan, measure and report the creation of social impact benefit and their management of risk of disbenefit.

The CSIF has been trialled on eight rail projects and we are working with Network Rail to create an example application to be published alongside it. We are also making available a short video to explain to end-users how to utilise it.

Next steps:

We would love to hear about how your organisation is looking into applying the CSIF. To have further information and support, please contact Anthony Perret:  
anthony.perret@rssb.co.uk
Applying the route story approach meant that there was more focus on the risk assessment process and it engaged individuals more. This engagement helped these individuals retain their route information better.

Neal Fussey
Professional Head of Operations, Volker Rail

Evidence-based approach to improve route learning

Route knowledge is the information required to predict, identify and interpret route-specific cues to complete an operational railway task safely and effectively. The required information must be available when needed for the task(s) being carried out, whether it is provided by long-term memory (through knowledge and experience) or through documentation or verbal advice.

‘Route story’ is the term given to the new approach to route learning developed and trialled as part of this project. A route story defines route knowledge requirements by drawing together a sequential list of route cues, and detailing what the learner needs to know about each one. This is done for each line on a route and aims to be the minimal set of route cues required for safe operation and performance for task competence in both normal and degraded modes.

This approach has been applied in live operational trials with MTR Crossrail, East Midlands Trains and Northern Rail and case studies completed with VolkerRail and DB Cargo. The trials demonstrated benefits in using a mixture of cab-based and self-study approaches, providing a range of paper-based and interactive learning materials to suit individual learning styles, and monitoring competence development during route learning, so that individuals can be assessed at the optimum time, rather than after a fixed duration.

The companies that have trialled this, the steering group and Traffic and Operation Management Standards Committee have supported the use of the approach to update the Route Knowledge RIS (RIS-3702-TOM).

Next steps:

If your organisation is looking to apply the ‘route story’ approach, we would love to hear about this and are happy to provide more information. Please contact Huw Gibson:

huw.gibson@rssb.co.uk

Examples of on-screen route knowledge video cues.
I found the route story concept very simple to understand and adopt, especially as it provides a logical and structured method to build a route learning package.

Trevor Parkin
Operations Specialist, East Midlands Trains

Controlling trespass and access via the platform ends at railway stations

Trespass is again growing on the railway and nearly three quarters of these events occur at or from stations. Previous RSSB research had produced a good practice guide, *Controlling Trespass and Access from Platform Ends*, which was still relevant but needed updating to ensure it captured current information and terminology. This has now been done and was relaunched in May 2018 through the various Trespass Groups and the annual Industry Health and Safety Meeting. We are now considering how to update the original research report, given that new tools and techniques available might have the potential to bring down the number of trespass events quickly and effectively.

Next steps:
To know more about what we are doing in this topic, contact Justin Willet:
justin.willet@rssb.co.uk

Our past portfolio of Research & Innovation holds a treasure trove of valuable outputs. If you would like to explore how it can help your organisation, contact our R&I Account Manager Robert Staunton:
robert.staunton@rssb.co.uk
Future Ticketing Detection Programme: speeding up throughput

Advances in wireless technologies, image processing and biometrics provide the opportunity to rethink the ticket barrier. Electronic gates that can determine a passenger’s permission to travel without the need for any action on their part, have the potential to create a truly walk-up and walk-on service. The Future Ticket Detection programme explored these technologies and took two alternative approaches to revenue protection through to demonstration stage.

One of them is AirGate created by ByteToken along with Thales. This is the world’s first truly ‘frictionless’ ticketing technology. The innovation is a combination of mobile ticketing (buying and holding a travel ticket on a mobile device), Bluetooth technology and modern fare gates used together to allow passengers who have a
valid ticket to pass through fare gates without any user interaction, completely frictionless. By utilising a 3D camera, and specialist software to increase the accuracy of Bluetooth Low Energy, it is now possible to authenticate a ticket over a wider area and over a longer period of time compared to the centimetre range that near-field communication requires.

Next steps:

To discuss deployment of this technology and to learn about other developments in the area of future ticket detection and gateless gateways, contact Geeta Kailla:

greta.kailla@rssb.co.uk
Research and innovation in progress

Decarbonisation of traction energy

Rail is more carbon efficient than other transport modes, and the industry is committed to maintaining this position. This goal is central to the Rail Technical Strategy, the industry’s long-term plan for creating the railway system of the future.

It has been reinforced in February 2018 by the call by Minister of State for Transport to ‘take all diesel-only trains off the track by 2040’ and ‘provide a vision for how it will decarbonise’.

‘Options for traction energy decarbonisation in rail’ aims to collect information on technologies, current and in development, that can support decarbonising traction. In addition, it will develop an economic decision support tool and route map for implementing the most promising traction options. The decision support tool will give the industry the flexibility to re-assess preferred options as understanding of their technological and economic viability improves.

The project will deliver a technology review in August 2018, economic analysis and decision support tool in December 2018, and the route map in January 2019.

Get Involved:
We encourage subject matter experts and stakeholders with experience in this field to get in touch and provide information and data for the economic decision support tool and the route map.
Contact Richard Walker:
richard.walker@rssb.co.uk
Low cost improvement to container wagon suspension

The rail freight industry operates under significant cost pressures which require wagon suspension to be simple and reliable. Due to this constraint, freight wagon suspension design has not developed at the same rate as passenger suspension. Under the strategic partnership with RSSB, University of Huddersfield are investigating low cost solutions to improving container wagon suspension performance.

The project is looking at two areas for improvement and is split into two distinct workstreams. The first workstream is investigating the possibility of replacing the traditional nested springs (tare and laden) in the primary vertical suspension with a single variable rate spring. For partially loaded container wagons, where the suspension is at the changeover point between the tare and laden spring, this could help improve performance and help reduce the risk of cyclic top derailment. The second workstream will investigate the use of secondary suspension designs to accommodate laterally offset loads. Offset loads, which have relatively recently been shown to have a key role in stability, could be mitigated through a mechanical linkage to equalise vertical wheel loads. This could reduce the risk of flange climb derailment on twisted track.

Get Involved:

If you are interested in this project and would like to be involved please contact Andrew Gleeson:
andrew.gleeson@rssb.co.uk
Get involved

**PERFORM: Enabling Better Performance Research Challenge**

In response to the current industry challenges on rail service performance, we worked with the National Task Force and its subgroups to identify five priority research areas that could make a real difference to the industry’s ability to run more trains on time. Seven projects within the programme are underway and two new project specifications are being prepared for work to start in September 2018. These look into the removal of the reliance on detonators, and improvement of contingency plans and resource management during disruption. The content, specification and scope of these and other projects are being developed and consulted on with a range of industry members, stakeholders and groups to identify synergies, dependencies and insertion points, and to avoid duplication.

**Get Involved:**

To find out more about how research could help to run more trains on time today and improve rail performance, and explore how your organisation can get involved and benefit, contact Hassan Khalil:

hassan.khalil@rssb.co.uk
**R&I showcases and RSSB engagement days**

We run R&I showcases to support the industry in making the most of Research and Innovation programmes, providing a great opportunity to get up to date on current portfolios and latest outputs. The R&I showcases give you the opportunity to tap into the knowledge and expertise of our R&I team and make lasting links to call upon in the future to take forward your research needs and discuss your implementation challenges.

Our next showcase is scheduled to take place at The Helicon in London on 27th September 2018 at 2pm, followed by networking opportunities.

We would also welcome the opportunity to host targeted 2-hour showcase sessions at your offices to make it easier for your staff to drop in.

**Get Involved:**

To attend this event or to host another, please contact our R&I Account Manager, Robert Staunton:

robert.staunton@rssb.co.uk

In addition to the R&I showcases, in November RSSB will be holding our annual regional engagement days for members:

6th November in Glasgow
8th November in Cardiff
20th November in York
21st November in London
Development of a decision-making tool for operations during disruptions

Development of a tool to improve the effectiveness of operational decision-making during disturbed working is progressing. There are several enablers that are critical for the tool to be successfully used and deliver benefits. These include training, on-going support for competence in using the tool and culture and attitudes to decisions undertaken.

The best way to explore these issues is to run an in-service pilot in partnership with an operator and relevant Network Rail route. This is targeted to commence directly following completion and release of the beta version in February 2019. The details of this in-service pilot are being developed, along with what commitment is required from operating partners.

Get Involved:

If you would like to take part in the in-service pilot as an early adopter, please contact Justin Willet:

justin.willet@rssb.co.uk
UKRRIN Annual Conference
13 November 2018
Kings Place, London

UKRRIN Annual Conference
The UK Rail Research and Innovation Network (UKRRIN) will hold its first Annual Conference on 13 November at Kings Place in London.

UKRRIN is a network of centres of excellence that are working closely with the supply chain to revolutionise innovation in rail. The conference will provide opportunities to find out more about the Centres of Excellence in Digital Systems, Infrastructure, Rolling Stock and Testing, and some of the recent activities.

Delegates can meet the partners involved in these Centres and the UKRRIN network as a whole, to understand more about the capabilities of the network and how interested parties can get involved.

To register for this event visit https://www.eventsforce.net/rssb/76/home

For any queries please contact Nailah Fraser-Haynes: ukrrin@rssb.co.uk
SPARK is a knowledge hub with over 20,000 records where you can discover who is doing what in rail related research and innovation. In SPARK you can find the Research and Solutions Catalogues that provide information on research and innovation managed by RSSB on behalf of the GB railway industry. Access SPARK to find out more about the Solutions Catalogue and Research Catalogue.

Suggest research
The research programme is driven by the rail industry’s needs. We receive and review hundreds of ideas each year. New research ideas are always welcome. Drop us an email and we will be in touch to discuss your research needs and ideas further.

Request a knowledge search
Do you want to know if research has been done, or knowledge already exists? Our Knowledge Services include horizon scanning activities, support the R&D programme, and include knowledge searches for RSSB members.

Suggest research
enquirydesk@rssb.co.uk

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