Operations and management research covers seven major research topics, which are:

- Health
- Road-Rail Interface
- Operations
- Public safety
- Workforce development and competence (WD&C)
- Sustainable development (SD)
- Safety policy and risk management (SPRM)

This booklet focuses on the area of RSSB research covering sustainable development:

- Informing you about research that has been done
- Showing you where to find the results of the research
- Encouraging you to find out more including registering to receive the RSSB R&D e-newsletter

The R&D programme has generated substantial knowledge, information and resources – all specifically designed to support the rail industry's day-to-day operations, at senior level and on the front line. This booklet provides only a brief insight into projects—the best way to find out more information about each project is to go to the Research and Development section of the RSSB website—www.rssb.co.uk—where you can find more details including links to the reports and outputs.
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The freight image used on the front cover and on p9 appears courtesy of DB Schenker.

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RSSB facilitates the resolution of difficult cross-industry issues and builds consensus.

RSSB delivers a unique mix of products and services to the industry – supplying knowledge, analysis, a substantial level of technical expertise and powerful information and risk management tools.

RSSB is a not-for-profit company owned by major industry stakeholders, working together to:

- Continuously improve the level of safety in the rail industry
- Drive out unnecessary cost
- Improve business performance

The company is limited by guarantee and is governed by its members, a board and an advisory committee. It is independent of any single railway company and of their commercial interests.
A key part of RSSB’s product range is the research and development (R&D) programme that it manages on behalf of the railway industry. The programme is funded by the Department for Transport (DfT) and aims to assist the industry and its stakeholders in achieving key objectives:

- Improving performance in terms of health and safety, reliability, and punctuality
- Increasing capacity and availability
- Reducing cost
- Integrating all of these to compete effectively with other transport modes (or complement them as appropriate) and deliver a sustainable future for the railway

The RSSB-managed rail industry research programme focuses on industry wide and strategic research that no individual company or sector of the industry can address on its own. The programme is also instrumental in supporting the development of a future vision that can best be delivered. In addition, RSSB manages the rail industry strategic research programme which has been specifically developed to support industry and its stakeholders in the delivery of ‘step changes’ in industry strategy in 10, 20 and 30 years time – as outlined in the Rail Technical Strategy.

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It also includes some projects from the Operations topic and dedicated strategic research in support of the Rail Technical Strategy which contribute to the aims of the sustainable development topic research plan.

The R&D programme has generated substantial knowledge, information and resources – all specifically designed to support the rail industry’s day-to-day operations, at senior level and on the front line.

This booklet provides only a brief insight into projects—the best way to find out more information about each project is to go to the Research and Development section of the RSSB website—www.rssb.co.uk—where you can find more details including links to the reports and outputs.
Research on sustainable development is undertaken through the industry Sustainable Rail Programme (SRP). The SRP’s purpose is to tackle sustainable development on behalf of the industry at a cross-industry system level, focusing on those areas which require significant cross-industry coordination or involve significant government and policy input.

The programme’s early work focused on agreeing the key strategic cross-industry issues and reviewing cross-modal performance. Literature reviews were developed to build shared understanding of each issue and the related policy and legislative environment; and a route map for sustainable development was developed. These fed into the industry’s first sustainability review, The Case for Rail 2007.

The Rail Industry Sustainable Development Principles

- Customer-driven
- Putting rail in reach of people
- Providing an end to end journey
- Being an employer of choice
- Reducing our environmental impact
- Carbon smart
- Energy wise
- Supporting the economy
- Optimising the railway
- Being transparent

The Case for Rail reviewed the key sustainability issues for the industry, and the industry’s performance against them at that time. It went on to give a series of commitments on sustainability and outline a way forward for the industry.

Central to this has been the development of the Rail Industry Sustainable Development Principles (the SD Principles)
which reflect an assimilation of the knowledge developed to date of both the challenges and opportunities of sustainable development for the rail industry. They cover economic, environmental and social issues and provide the key platform for the future work of the SRP, helping to embed sustainability throughout the industry.

The SRP is governed by two cross-industry groups, the Sustainable Development Steering Group at executive level and the Rail Sustainable Development Group at senior management level. The programme also has working groups focused on carbon reduction and noise policy.

The industry has identified five roles where research by RSSB has a part to play in support of the SRP.

- **Support industry strategy development**
  Integrating SD into industry strategy and planning

- **Support implementation**
  Identifying solutions and actions plans on key priorities

- **Measure performance**
  Understand rail’s current position, monitor its performance and plan a way forward

- **Influence policy and legislation**
  Understanding and responding to UK and EU legislation and policy, including identifying barriers to progress

- **Build shared understanding among industry and stakeholders**
  Encouraging awareness of, engagement with and action on SD across the industry
The current focus for the SRP is on:

- Embedding the SD Principles at a systematic and strategic level across government and industry decision making
- Developing success measures for the industry to be able to monitor progress against the SD Principles
- Contributing to government policy and industry planning including the High Level Output Specification (HLOS), and Joint Performance Improvement Plan (JPIP)
- Developing a range of tools to support organisational decisions on sustainability
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*This project was published under the Control, Command and Signalling topic for the Vehicle/Train Control and Communications Systems Interface Committee.*
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*This project is being progressed under the Operations topic for the Operations Focus Group.

**These projects are being progressed for the Technical Strategy Advisory Group.
# T438 The rail industry - a way forward on sustainable development

<table>
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<tr>
<th>Description</th>
<th>This research pulls together current thinking on sustainable development for rail.</th>
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<tbody>
<tr>
<td><strong>Abstract</strong></td>
<td>This research pulls together current thinking on sustainable development for the railway in Great Britain; most importantly, it proposes a three-category classification system describing how sustainability issues can best be addressed. The first category consists of those initiatives that can be undertaken by one business on a business case basis, and that require little or limited coordination with other parts of the industry. The second consists of those initiatives that have a business case, but where the business case requires coordination between different parts of the industry. The third category covers those initiatives that are bought at high cost with no direct benefit to the railway industry but that meet wider policy objectives. The report sets out, in draft form, current and potential actions on sustainable development in the Great Britain rail industry aligned to this three-category concept.</td>
</tr>
<tr>
<td>Published</td>
<td>August 2006</td>
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<tr>
<td><strong>Current Position</strong></td>
<td>Through the work of this project, the Rail Sustainable Development Group (RSDG) was created, involving representatives from government and industry. The project marked the start of the Sustainable Rail Programme (SRP). This research defined a route map the industry could follow to develop a Sustainable Development Strategy. The route map formed the basis of the SRP for the first two and a half years and provided a solid foundation of knowledge for further work in sustainability.</td>
</tr>
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</table>
Developing metrics and benchmarking for sustainable development in the rail industry

**Description**  
This work has developed a range of sustainability metrics (economic, social and environmental) that measure the performance of GB rail, and benchmark it against other modes of transport / other European rail operators.

**Abstract**  
This work has developed metrics for sustainable development and has benchmarked the railways performance against road and air travel as well as other European rail operators. The metrics enable the measurement and comparison of different facets of sustainable development; and facilitate the modelling of improvement options and their sustainable development benefits, impacts and costs. The benchmarking identifies the relative strengths and weaknesses of rail. It enables the industry to capitalise on areas where it is better than other transport modes and focuses attention on the areas that need greatest improvement. Both areas of work are considered to be essential in understanding how a framework of incentives and disincentives could be modified or developed to encourage more sustainable behaviours. Both will be vital ingredients in the creation of a sustainable development strategy for rail.

**Published**  
June 2006

**Current Position**  
This project contributed to the industry’s understanding of sustainability issues and its sustainability performance. The project findings specifically informed the development of The Case for Rail 2007 and the Department for Transport’s long term strategic framework for GB rail. It has also provided a baseline against which performance can be measured in the future.
**T675  Review of research relating to sustainable development for the railway**

<table>
<thead>
<tr>
<th>Description</th>
<th>This work identifies existing research on sustainable development relating to the rail industry; identifies key research outputs, and reviews the contribution made by each; and identifies gaps and priorities for further work.</th>
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<tr>
<td>Abstract</td>
<td>Many studies into aspects of sustainable development in the rail industry and related sectors have already been completed. In order to capitalise on these, and to avoid duplication and wasted effort, a review has been carried out of all existing research on sustainable development relating to the rail industry. The review includes an assessment of the usefulness of key research outputs and an analysis of gaps. The results are collated into a summary, which is available to stakeholders, and which forms an important input to the development of a sustainable development strategy for rail. The review covers work commissioned or carried out by rail organisations in GB such as Department for Transport, Office of Rail Regulation, Health and Safety Executive, the former Strategic Rail Authority, rail companies, and RSSB itself. It also covers work carried out by key European, national, and international bodies.</td>
</tr>
<tr>
<td>Published</td>
<td>June 2007</td>
</tr>
<tr>
<td>Current Position</td>
<td>The outputs have informed the Sustainable Rail Programme of the current understanding of sustainability related to rail as well as relevant research gaps.</td>
</tr>
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</table>
This project has delivered the foresight research described in the Sustainable Rail Programme work plan to broaden thinking about the future and provide a detailed toolkit to guide and test future strategies.

This foresight research was commissioned to inform long-term thinking and provide tools and techniques to assist the rail industry to determine and test potential strategies to meet the sustainable development challenges it now faces. The research was undertaken through a series of interviews and workshops, involving the Rail Sustainable Development Group (RSDG), Sustainable Development Steering Group (SDSG) members and other relevant stakeholders to ensure the involvement of all stakeholders who might influence the strategy for sustainable development in rail.

The research explored the key social, technological, economic, environmental, political and organisational drivers-of-change impacting upon the rail industry. Analysis of these drivers-of-change provided the foundation for stakeholders to develop four possible ‘scenarios of the future’ in which the rail industry may operate. In turn, these future contexts provided the basis for stakeholder discussion on how the industry will need or want to develop over the next 30 years to ensure it is sustainable in the long-term.

The output of this work provides a valuable input to the rail industry long-term thinking. The scenarios themselves will allow the rail industry to test initiatives and plans as they develop to ensure they support the agenda of sustainable development in the railway. A detailed toolkit has also been produced which will ensure the industry gains maximum benefit from this research. Providing step by step guidance and resources for facilitating a scenarios workshop, this toolkit can be used effectively without training which will enable the cost effective implementation of the benefits of this research.
The strategic actions identified through this research have been fed into the industry’s and government’s long-term thinking and planning. Figure: The research developed four scenarios to help organisations plan and manage better under conditions of uncertainty and complexity. They work on the presumption that there is not one single future but multiple possible futures.
This research aimed to develop and assess an integrated engineering and operational approach to improve railway traffic regulation to reduce energy usage and increase network capacity without reducing the service.

The research developed and analysed the generic functionality of a driver advisory system (DAS). In addition to engineering considerations and analysis, the work was underpinned by risk assessment to ensure safety would not be compromised, and human factors assessment to ensure that information would be provided in a user-friendly way. This analysis considered the factors that would need to be included to produce a robust and detailed business case that estimates the costs of implementation and the potential for reduced energy consumption and potential traffic performance improvements. The work supports the Department for Transport’s Rail Technical Strategy and has been carried out on behalf of the Vehicle/Train Control & Communications System Interface Committee.

Stage 1 of the research involved information gathering on existing systems, a review of human factors principles, train driving task analysis, a hazard and operability study and operations workshops, train performance analysis and driver interface options analysis. Stage 2 activities have provided a more detailed evaluation of the options and benefits of a proposed system using simulation software, a review of the national timetable for operational factors such as allowances and hidden slack, and assessment of alternative system architectures building upon previous research.

The benefits from implementation of a DAS include reductions in energy consumption by avoiding unnecessary braking and running at reduced speed whilst maintaining on-time arrival. A rough estimate of the financial benefit that this would achieve could be in the region of £20 million over the lifetime of its application across the main line network in Great Britain.
### T724 Driver advisory information for energy management and regulation  
*cont.*

**Abstract**  
Operational benefits would include reduced train delays and better utilisation of track capacity by running through junctions and station approaches at higher speeds whilst also reducing maintenance costs as a result of reduced brake wear.

Follow-on research has been proposed to take this work further. This will include a short-term engineering project focusing on train to shore communications when operating DAS, and a longer-term strategic project that will pick up on issues such as energy efficient timetabling and traffic management.

**Published**  
February 2010

**Current Position**  
This project has led to a longer term, more strategic project that considers traffic management, traffic disruption, provision of information (for operational decision making and customers) and energy efficient timetabling and complements **T839 Eco-driving: understanding the approaches, benefits and risks**.
Overview of environmental noise, diffuse pollution and biodiversity management in the Great Britain (GB) rail industry

**Description**
This research summarises the current situation in the management of environmental noise, diffuse pollution and biodiversity.

**Abstract**
This research summarises the current situation in the management of three key environmental topics in the rail industry, that are not addressed in other RSSB work and sets out the potential issues which could be addressed in the future. The three topics are environmental noise, diffuse pollution and biodiversity. The output of this work is intended to inform the industry in the development of a sustainability strategy and inform Department for Transport (DfT) in the development of the long term strategy for rail. For each issue the report sets out the current legal framework, current industry management and contractual position and impending legal developments. In terms of noise the key issue identified is the implementation of the Environmental Noise Directive and the rail industry’s role in the process of mapping and action planning. In relation to diffuse pollution the main issue is the implementation of the Water Framework Directive and the clarification of responsibility for pollution between Train Operators and Network Rail (NR). Coverage of biodiversity issues relates entirely to NR’s estate and the report sets out their management of protected sites and species, and action which could be taken by DfT to support this.

**Published**
June 2007

**Current Position**
This project provided an overview of the current rail industry position on three environmental issues; noise, diffuse pollution and biodiversity. It made suggestions on areas which both the industry and DfT may wish to address to improve performance or respond to changes in legislation. These findings have informed the development of The Case for Rail 2007 and DfT’s development of its long term strategic framework for GB rail, published in July 2007.
T748 Implications of noise-related EU Legislation

Description

This work comprised a review of existing and forthcoming EU legislation that impacts the rail industry in relation to the noise that it produces. It describes its implementation in Great Britain, describes the implications for the rail industry, and recommends ways in which its requirements might be met.

Abstract

In recent years the European Commission has developed a body of legislation that addresses the impact of environmental noise on the population. The aim of this is to ensure that the population is not exposed to excessive environmental noise, and to reduce the potential for damage to hearing in occupational environments.

The specific legislation comprises:

- EC/AEIF Technical Specifications for Interoperability (TSIs) either dedicated to noise, or containing noise elements.

This report describes the requirements of this legislation, how it is implemented in Great Britain, and the implications for the GB railway industry, and also makes recommendations for options to address the requirements of the legislation.

Published

December 2008

Current Position

The report has been presented at Vehicle/Vehicle Systems Interface Committee and the Rail Sustainable Development Group. Further work will be undertaken as a separate project which will reference this work.
Description
This research documents the potential for energy saving across the nine stations on the Bittern Line in East Anglia and the replacement of the existing station at Accrington with a new ‘Eco’ building.

Abstract
Two case studies have been produced that look at the feasibility of carbon neutral stations along the Bittern Line in East Anglia and also the principal activities undertaken to date in the development of the Accrington EcoStation project. Both case studies provide the rail industry and others with practical experience of ways to improve existing stations or embark upon similar projects to be more sustainable in terms of design, energy efficiency and benefits to the community. The Bittern Line comprises nine small stations between Norwich and Sheringham in Norfolk. The case study explores the feasibility of achieving a carbon neutral line and the viability of reducing the carbon emissions of small stations. It also includes information on a range of energy saving construction methods and materials, and renewable energy options appropriate for small stations in Great Britain. The Accrington EcoStation project focuses on the use of renewable construction materials and sustainable building techniques consistent with the ‘reduce, reuse, recycle’ approach as well as the processes that had to take place to enable the actual work to be undertaken at the station. This includes the steps taken to obtain planning permission and agreement of the specification and covers how, and from where, funds (both domestic and European) can be secured to take forward such an initiative. The report also looks at local sourcing of materials, the use of renewable power, and the encouragement of ‘local ownership’ through the inclusion of community space within the building. This research is sponsored by the Rail Sustainable Development Group.

Published
March 2010

Current Position
The publication of the Accrington report coincided with the building work at the station which is nearly complete and the outputs from the Bittern study are being examined by Network Rail.
The purpose of this joint research with ATOC and Passenger Focus was to carry out quantitative research to get a set baseline data for the pilot stations in the National Station Travel Plan initiative, against which to measure progress. This baseline data analysis was undertaken in autumn 2008 at the 31 stations participating in the pilot programme. An additional aim of the research was to develop a research toolkit for use by stakeholders who are considering developing an STP of their own.

A station travel plan (STP) is defined by the Department for Transport (DfT) as ‘A strategy for managing the travel generated by your organisation, with the aim of reducing its environmental impact [typically involving] support for walking, cycling, public transport and car sharing.’ In 2007, the DfT Railways White Paper asked the rail industry to work with all relevant stakeholder groups to pilot STPs. The idea was to investigate and provide advice on whether the travel plan approach could be beneficial to rail passengers. The overall aim of the STP initiative is for the pilots to develop plans to encourage rail passengers to use more sustainable forms of transport when travelling to and from their stations. This includes improving access to public transport, and providing facilities to encourage walking and cycling. An STP can bring together all the stakeholders with an interest in rail stations (rail industry, local authorities, passenger groups, bus and taxi operators, cyclists, and others) to develop and agree common objectives and a coordinated approach to delivering improvements in terms of getting to and from the station. The overall benefits of the National Station Travel Plan initiative are ultimately to:

- Create modal shift from car travel to more sustainable modes of travel to and from the stations.
- Increase the numbers of passengers using the stations.
- Reduce CO₂ emissions created by passenger travel to and from station.
- Improve customer satisfaction with end to end journeys.
Abstract

ATOC agreed to lead the pilot programme, and convened a National Steering Group for Station Travel Plans. RSSB became involved in the project at the ‘research and planning’ stage and undertook joint research with ATOC and Passenger Focus.

This research was in two parts:

Baseline data analysis - undertaking quantitative research to develop a baseline of all the pilot stations. This data is for use by the individual STPs pilot stations when developing their plans. It will also be used for the monitoring and evaluation of the success of the whole initiative over time.

Research toolkit – part of the research included the development of a research toolkit for those outside the STP pilot programme who may want to develop an STP. This research toolkit aims to provide Local Authorities, Train Operating Companies, Network Rail and others with the information and resources required to conduct the research required to develop a Station Travel Plan. It includes best practice and practical examples of passenger surveys, station audits and other key issues.

Published

July 2009

Current Position

Both the data analysis report and the research toolkit can be found on the RSSB website www.rssb.co.uk or ATOC’s Station Travel Plan website www.stationstravelplans.com

Station Travel Plans:
Research Toolkit
| **Description** | This project has produced two topic notes on transport integration and its potential barriers, and travel behaviour and behavioural change – looking at why, when, where and how individuals travel. |
| **Abstract** | This project has developed a robust compendium of recent literature/research relating to integrated transport, travel behaviour and behavioural change in the context of sustainable development. It has identified a number of clear recommendations that could be pursued, and gaps in literature/research that could be completed in order to gain further understanding in both areas. The topic notes include a scientific and research literature review looking at policy and legislation in each area, an evidence base to give greater understanding of the topics and practical examples within the transport sector. Opportunities have been identified for the rail industry to improve on current barriers and therefore the sustainability of rail. The findings from this project will enable government, regulators, operators and other stakeholders to gain further insight into each topic therefore strengthening future business cases for improvements to the rail system. This work is sponsored by the Rail Sustainable Development Group. |
| **Published** | April 2010 |
| **Current Position** | This project provided industry with a literature review of current research and data on integrated transport, and travel behaviour and behavioural change. |
T851 Development of a process to identify the carbon impacts of infrastructure projects

Description
This project developed a practical framework that enables the whole life carbon impact of major infrastructure projects to be managed and/or influenced.

Abstract
Rail travel already has a good reputation for carbon efficiency when compared to other modes of transport. To develop and improve both the reputation and practice of carbon efficiency, on behalf of Network Rail, RSSB joined a partnership to look at how carbon can be managed in major infrastructure projects. Other partners included the Highways Agency, Atkins, and Balfour Beatty.

This project was part of the Engineers of the 21st Century (EC21) programme run by Forum For The Future. EC21 was set up to bring engineering based organisations together to work on projects that address key challenges for sustainability.

This project has developed a framework designed to help identify, manage, and reduce the whole life carbon impact of major infrastructure projects. The framework aligns with the project management processes most commonly used in road and rail infrastructure projects. The framework looks at which carbon sources should be measured, how carbon can be managed across contractual and supply chain interfaces, and who is accountable for each source. The framework considers how whole-life carbon impact can be affected, by considering the pre-design, design, and construction activities, as well as the carbon emitted during operation, maintenance, and decommissioning. This work has already produced a framework that enables the GB rail industry to establish how to develop carbon reduction strategies. This framework will outline how to determine the most effective application of management time and other resources to the reduction of carbon emissions. It should also show how to embed these activities into accepted project management processes. A two-page summary of the project is available from the Forum For The Future website: [http://www.forumforthefuture.org/files/2-pager-carbon-FINAL.pdf](http://www.forumforthefuture.org/files/2-pager-carbon-FINAL.pdf). The full report can be downloaded using this link: [http://www.forumforthefuture.org/files/EC21-Carbon-Framework-FINAL.pdf](http://www.forumforthefuture.org/files/EC21-Carbon-Framework-FINAL.pdf)
T851 Development of a process to identify the carbon impacts of infrastructure projects cont.

The full report can be downloaded using this link: http://www.forumforthefuture.org/files/EC21-Carbon-Framework-FINAL.pdf

Published: July 2010

<table>
<thead>
<tr>
<th>Description</th>
<th>This research is a study of the extent to which organisations in the rail industry have embedded sustainable development in their procurement policies, operations, and activities; and the benefits derived.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td>This research establishes a baseline in understanding how sustainable development (SD), (based on the rail industry sustainable development principles) is currently managed in the rail industry procurement processes. It develops an understanding of what constitutes good practice in sustainable procurement in the context of the rail industry and how these practices can be promoted and implemented efficiently to benefit the industry and its customers. The report highlights the opportunities for improvement which can be adopted across the industry and throughout the supply chain to increase the extent to which SD is addressed by procurement. It also describes where the industry can aim to be if it takes advantage of current opportunities and further develops the role of procurement in implementing SD. Furthermore, this research identifies possible tangible benefits that may accrue from sustainable development practices and the barriers to implementation that currently exist. This research has been endorsed by the Rail Sustainable Development Group on behalf of the rail industry.</td>
</tr>
<tr>
<td>Published</td>
<td>August 2010</td>
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<tr>
<td>Current Position</td>
<td>This project suggested that a number of further steps will need to be taken in order to embed the sustainable development (SD) principles into railway procurement activities. The next steps are currently being considered by industry and further research to engage senior level personnel may be required. Additional research is also being conducted under T767 Embedding sustainable development principles into organisations, which will develop a framework to enable individual organisations and the industry as a whole to benchmark the progression of fully embedding the Rail Industry SD Principles.</td>
</tr>
</tbody>
</table>
Sustainable Development projects in progress

T766  Work to strengthen data sets and develop new KPIs to address gaps in sustainable development metric data

Description
This project follows on from previous work to develop new social, economic, and environmental key performance indicators and metrics, and to identify gaps in sustainable development metrics data.

Abstract
To have a full understanding of the environmental sustainability of the railways, it is important to have a clear understanding of the relevant social, environmental and economic impacts of the GB rail industry. The metrics can be categorised as social, environmental and economic and split into those available for use now, those available in the short-term, and those available in the long-term.

Using an extensive list of current and potential metrics, identified in research project T674, a shorter more concentrated list to be monitored by the Sustainable Rail Programme was developed through a process of stakeholder engagement with the Rail Sustainable Development Group and technical advisors.

This project looks to develop the metrics identified in T674 which were categorised as medium- and long-term. The metrics and KPIs developed from this project will be used in conjunction with those identified in T674, and used to benchmark the rail industry’s performance in terms of the social, economic and environmental issues it faces. The research will provide the understanding and methods required to measure and record the data so it can be used throughout the industry to optimise its sustainable performance.

Published
In progress

Current Position
Due for publication October 2010
## T767 Embedding sustainable development principles in organisations

### Description
This project includes a review of good practices for embedding sustainable development (SD) into the rail industry, agreement of a bespoke industry framework, and criteria to help organisations assess their progress against the industry’s SD principles.

### Abstract
The research is being undertaken to help rail industry organisations gauge the maturity of their approach to embedding the rail industry SD principles at an operational and management level; and to provide a framework for measuring progress. Developing this understanding will enable organisations to identify areas for improvement and highlight areas of good practice. The project objectives are to: have a clear understanding of best practice in embedding SD; develop an agreed SD assessment framework for individual organisations that is fit-for-purpose; define an approach for assessing the embedding of the rail industry SD principles; present a useable and accessible methodology for organisations to assess the maturity of their approach to the rail industry SD principles; and to identify the business benefits of progressing through the framework for individual organisations. A set of recommendations for future work packages will also be produced as a result of the first work package. This research is sponsored by the Rail Sustainable Development Group.

### Published
In progress

### Current Position
Due for publication April 2011
## T812 Sustainable development decision making framework

### Description

This research will produce a framework for sustainable development decision making to enable the rail industry to evaluate the sustainability impact of trade-offs between business issues.

### Abstract

This research seeks to support the inclusion and suitable prioritisation of sustainable development (SD) principles in industry decision-making. This will identify gaps in current practice and develop tools to support industry decisions where appropriate. The project will align with current good practice and policy, in particular through the New Approach to Transport Appraisal. It will also be useful in understanding how a framework of incentives and disincentives could be developed or modified to encourage more sustainable behaviour between undertakings within the industry and across different industries. This project should be seen as part of the wider Sustainable Rail Programme which seeks to embed the SD principles into decision-making, government policy, industry planning, and organisational culture, with the aim of meeting the industry’s goal that: ‘by 2014, sustainability will be core to the UK rail industry’s business activity and decision making’. This research is sponsored by the Rail Sustainable Development Group.


### Published

In progress

### Current Position

Due for publication December 2011
### Description
A high level qualification of the benefits and dis-benefits of eco-driving.

### Abstract
In response to both economic and environmental pressures (and potentially also specific franchise commitments), train operating companies are keen to identify and exploit the opportunities presented by the adoption of energy efficient driving techniques (eco-driving). ATOC and RSSB co-hosted an industry seminar on the subject in December 2009 and one of the ‘next steps’ agreed at this was that RSSB should produce a Good Practice Guide on eco-driving, drawing on existing TOC experience. The aim of this research project is to undertake initial analysis to determine both the high level safety risk implications of eco-driving and also the core energy/cost savings that could potentially be achieved. This research needs to take place prior to establishing ‘good practice’. As such this research project will:

- Undertake a high level Hazard Analysis and Operability Study (HAZOP) to identify and quantify safety risks associated with eco-driving.

- Validate the energy savings claimed by a sample of those TOCs already employing eco-driving (noting that benefits from energy saving may be partially offset by increased costs elsewhere) and identifying the extent to which such savings are transferable to other TOCs and types of operation.

- Produce case studies of existing eco-driving applications to highlight lessons learned (both positive and negative).

### Published
In progress

### Current Position
Due for publication December 2010
Sustainable development research – Projects in progress
This project seeks to provide an understanding of carbon emissions associated with the railway. It takes a ‘whole-life’ view from design, to construction, operation, maintenance through to decommissioning.

The Technical Strategy Advisory Group (TSAG) has proposed this research project to provide an understanding of carbon emissions associated with the life-cycle of the railway, from construction through to decommissioning. The output of this work will be a report showing the dominant sources of carbon emissions. The methodology is grounded in the Greenhouse Gas Protocol (A Corporate Accounting Reporting Standard: Revised Edition (2004)). It is designed for repeatability and is comprised of the following work streams:

- Scoping assessment (defining boundaries, exclusions)
- Data investigation (review of data availability, recording sources)
- Methodology development (identification of dominant sources, sensitivity analysis)
- Emissions assessment (whole life (gross/net), external influences, potential changes, target setting)
- Reporting (report and presentation)

This work will help to inform debate at TSAG and in therefore shape future work including the feasibility of carbon centric standards. Other groups interested in this project are the Carbon Reduction Working Group, and the Rail Sustainable Development Group and findings will be disseminated to both. This work is in support of the delivery of an environmentally, economically and socially sustainable railway, ensuring that rail can meet the needs of society, without compromising the quality of life for future generations.

Published  In progress

Current Position  Due for publication October 2010
## T915 Mega-City Suburban

<table>
<thead>
<tr>
<th><strong>Description</strong></th>
<th>Quantified potential benefits of a more segregated railway</th>
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<tbody>
<tr>
<td><strong>Abstract</strong></td>
<td>Over the next 30 years the rail network will need to cope with double the number of passenger journeys. Some sections of the network, notably those entering the major cities are already at their maximum capacity during peak times and will thus be unable to satisfy the increase in demand without major change. A study is required to develop the concept of segregation and consider the impact over a 30 year time horizon of segregating parts of the existing network providing suburban services.</td>
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<td></td>
<td>A radical approach which is likely to involve innovative thinking, new technologies and techniques, different standards to those currently employed on a system separated from the present one is likely to deliver the greatest benefits in terms of cost (whole system whole life), capacity, carbon and customer benefit.</td>
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<tr>
<td></td>
<td>The potential benefits of such a system are to be quantified. The project will consider both the opportunities and constraints for migration to establish the feasibility of introducing segregation over a 30 year time frame. Understanding how degrees of segregation affect costs and benefits. Examples are the degree to which the acceptance of other traffic, say freight at night, reduces the opportunity to differentiate standards and save cost. Identification of changes to the current approach that offer the greatest potential benefits, including conditions that might prevent their application. For example the benefits (and disbenefits) of reduced crashworthiness and the circumstances in which they can be achieved. In this way it will be possible to identify the threshold level of change at which the greatest benefit is delivered.</td>
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<tr>
<td><strong>Published</strong></td>
<td>In progress</td>
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<tr>
<td><strong>Current Position</strong></td>
<td>Due for publication October 2010</td>
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</tbody>
</table>
**Description**
This work will develop tools to help the industry better understand the impact of weather on the network and guide actions to maintain performance through an affordable and cost-effective weatherproofing programme over a 20-year period.

**Abstract**
Extreme weather events in the last few years have shown that we have insufficient understanding of weather effects on our infrastructure. The rail industry needs to know how it will perform in the current and future climate to achieve: a highly reliable railway; increased capacity; value for money; and a ‘predict and prevent’ ethos. This research will support these aims by providing information on the likely effects of the climate on asset performance and safety, covering both infrastructure and rolling stock. It will enable a prediction of likely asset and system behaviour for the next 50 years and facilitate planning for an affordable and cost-effective weatherproofing programme over a 20-year period. This will make use of the very latest UK climate projections (formerly known as UKCIP08) published in 2009 by the UK Climate Impacts Programme. See [www.ukcip.org.uk](http://www.ukcip.org.uk). This research is being carried out on behalf of the Technical Strategy Advisory Group.

**Published**
In progress

**Current Position**
Due for publication May 2011
Where can I find research?

All the research outputs that have been published since RSSB began its programme can be found at ‘Research Topics and Projects’:

http://www.rssb.co.uk/RESEARCH/Pages/default.aspx

We suggest you filter your search by selecting the Sustainable Development topic area from the pick-list, then scroll down to the bottom of the page for the most recent projects.

If you know the reference number for the project – eg TXXX – you can use the ‘search projects’ facility on the left of the page.

The previous pages in this booklet contain listings of the published and current Sustainable Development projects – correct at the time of publication.

We hope this helps you find the information that is most relevant to you.

If you can’t find what you’re looking for, please contact us at enquirydesk@rssb.co.uk
Each project has a research brief that provides a concise summary.

The full report can be downloaded to drill down to more detail.
More Information

The RSSB R&D e-newsletter is an email bulletin that keeps the industry updated on the latest research projects to be started or published.

To view the most recent edition and to sign up for your own copy, visit:

http://www.rssb.co.uk/RESEARCH/Pages/RANDDE-NEWSLETTER.aspx

If you have enquiries about research – contact the RSSB Enquiries Desk – enquirydesk@rssb.co.uk, tel 020 3142 5400

More about the Sustainable Rail Programme (SRP)

To find out more about the SRP, go to the Sustainable Development section of the RSSB website – http://www.rssb.co.uk/NP/SRP/Pages/default.aspx or type ‘Sustainable Rail Programme’ into a search engine.
Rail Technical Strategy
Some of the projects referenced in this guide are in support of the industry’s implementation of the Rail Technical Strategy. These projects are managed by RSSB for the Technical Strategy Advisory Group (TSAG).

TSAG has sponsored a specific website – www.futurerailway.org which explains more about its role and the nature of the strategic research being undertaken.

Operations and management research covers seven major research topics, which are:

• Health
• Road-Rail Interface
• Operations
• Public safety
• Workforce development and competence (WD&C)
• Sustainable development (SD)

This booklet focuses on the area of RSSB research covering sustainable development:

• Informing you about research that has been done
• Showing you where to find the results of the research
• Encouraging you to find out more including registering to receive the RSSB R&D e-newsletter

The R&D programme has generated substantial knowledge, information and resources – all specifically designed to support the rail industry’s day-to-day operations, at senior level and on the front line.

This booklet provides only a brief insight into projects—the best way to find out more information about each project is to go to the Research and Development section of the RSSB website—www.rssb.co.uk—where you can find more details including links to the reports and outputs.