

LIGHT RAIL

Safety and Standards Board



Annual Report

2022/2023



Annual Report 2022/2023

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Section 1 – Chief Executive's Review

Foreward

The Light Rail Safety and Standards Board (LRSSB) was formed by the UK light rail industry and UK Tram in 2019 under the guidance of the Department for Transport (DfT) and the Office of Rail and Road (ORR). This was following the Rail Accident Investigation Branch (RAIB) report into the Croydon tram accident at Sandilands on 9th November 2016.

LRSSB is managed by the LRSSB Board, which consists of:

- A Chief Executive Officer (CEO)
- A Non-Executive Chair
- Four Non-Executive Directors (consisting of representation from both operators and owners)
- The Managing Director of UK Tram
- An ORR observer.

Within the year, the Board constitution and membership remained unchanged.

Following confirmation of a further three years' funding from the DfT, LRSSB was able to conduct a more permanent organisational restructure of its senior management team. The senior management team of LRSSB now consists of a CEO, Administration Manager, Head of Engineering and Innovation, Head of Safety and Assurance, and Head of Safety Risk Management.

Diagrams and descriptions of the organisational structures can be found in the LRSSB Business Plan.

It remains our intention to recruit further posts into the organisation, in operations, engineering and business support, within the next financial year. LRSSB will also continue to attempt to offer opportunities to graduates to assist with our upcoming projects but also to promote a career in, and help them to learn about, light rail. Supplementary internal support from UK Tram colleagues has also been provided during the year. Additionally, LRSSB has been successful in partnering with a number of external agencies to leverage our capacity to produce documentation and information.

As a team and an organisation, we remain relatively small; however, we have grown from our early formative years into our adolescence. We continue to deliver highly significant milestones in terms of output. Our TAIR upgrade project is clear evidence of this, as well as the increasing provision of guidance and knowledge that the sector is asking from us. This report summarises the work undertaken by LRSSB from May 2022 until April 2023 as detailed in the LRSSB three-year Strategic Business Plan.



Overview

LRSSB has now completed its fourth full trading year, with a Memorandum of Understanding now in place with the DfT with a three-year funding model. This funding is welcome and along with the sector's continued support will mean that LRSSB can now better plan and produce in a more sustainable, cost-effective way; however, in these times of reduced patronage, LRSSB does not take for granted this commitment and will continue to attempt to deliver the best added benefit it can to the sector. It remains a key objective for LRSSB to attain a guaranteed, sustainable funding mechanism so that the excellent progress made to date continues and momentum is not lost.

The main focus of our three-year Strategic Plan is to deliver our core objective, 'Prevent Incidents, Reduce Harm', which is delivered via seven strategic aims. Those aims are to:

- Provide a safer industry for all
- Promote harmonisation across the sector
- Strive for innovation through research and development
- Become a Centre of Excellence
- Deliver a standard approach to guidance
- Collaborate with other industry bodies
- Remain relevant to all stakeholders.

The Strategic Plan included a series of deliverables which underpinned these strategic aims while at the same time addressing the recommendations arising from the ORR review and subsequent Findings Report of February 2022.

For the first time in its short history, LRSSB has been referenced within report recommendations made by the RAIB. The investigation was into an accident at Audenshaw on the Manchester Metrolink network. LRSSB acknowledges the recommendation and is in regular dialogue with RAIB and ORR on the progress being made to implement the recommendation.

Following the ORR's review, and the Findings Report in February 2022, LRSSB attended the ORR Health and Safety Regulation Committee in December 2022 to report on progress against the recommendations made. A full report was given, and an acknowledgement was received that LRSSB had discharged its requirement to provide an update on the progress made to date. ORR further added that continuing to have a safety and standards body that meets the specific needs of the light rail and tramway sector was vital. LRSSB is to develop a blueprint for the future status and funding model of the body beyond the current Memorandum of Understanding with the DfT.

Continued future progress will be monitored by the ORR's team through the routine engagement channels held with them.

The recommendations, along with a precis of the LRSSB responses, are detailed on the next page.

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Recommendation 1: UK Tram operators, owners, and infrastructure managers should continue to support the role of a safety and standards body for the light rail sector. This body will need to have and continue to build specialism and understanding of the sector and be able to meet the specific requirements of the whole light rail sector.

LRSSB

- Delivering crucial, well-targeted communications to boost sector interaction
- Improved proactive consultation mechanisms assisting sector feedback and LRSSB outputs
- Becoming a 'critical friend' of the sector
- Sector working group delivering the Tram Accident & Incident Reporting tool upgrade (TAIR)
- Working to provide 'forward-thinking' risk modelling analysis, with mitigation assessments
- Working alongside ORR to promote utilisation of RM3

Recommendation 2: LRSSB should review and update its terms of reference to clearly define its role and purpose. The review should include considering how it ensures and demonstrates its independence from UKTram and the relevance of LRSSB's current status. LRSSB's review should consider if and how the current status of LRSSB impacts its ability to implement this report's recommendations fully.

LRSSB

- LRSSB and UK Tram review of terms of reference
- Governance Manual produced covering:
 - Historical Background
 - Organisational Structure
 - Roles and Responsibilities
 - Finance, Funding and Budget Cycles
 - Accountability and Reporting

Recommendation 3: ORR recommends that LRSSB considers – in consultation with its members, DfT and ORR – the current model of voluntary membership and adoption of LRSSB outputs. In particular, LRSSB should consider how its successes to date, under that model, can be continued as LRSSB evolves. LRSSB should report back on its conclusions and any proposals for change:

LRSSB

- LRSSB has conducted a review of the original 'Options' model
- High level of engagement and utilisation of guidance produced
- Government funding to continue based on delivery against Business Plan and MoU agreed with DfT
- ORR to continue to undertake independent audits to ensure efficacy
- Effective links between ORR, DfT and LRSSB remain essential
- LRSSB to examine future 'Options', key principles and status beyond current funding round
- Process to involve sector consultation to gauge views
- Report back for discussion with ORR and DfT by end 2023

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Recommendation 4: *ORR recommends that LRSSB develops a stakeholder engagement strategy with a view to strengthening its collaboration with a broader range of stakeholders including relevant trade unions, RSSB, highway authorities and vehicle/tram manufacturers.*

LRSSB

- Power/influence matrix created to map key relationship requirements
- Targeted stakeholder engagement communications plan produced along with contact schedule
- Engagement tracking document produced, ensuring 'plan, do, check, act' approach

Recommendation 5: *ORR recommends that LRSSB – in consultation with DfT and ORR – develops a long-term strategy and plan of work. This should include the topic of health, be transparent to its members, and include the funding arrangements that will need to be secured in order to deliver that plan. It should clearly define the governance arrangements to enable delivery of the plan, including how progress against the plan is to be monitored and reported.*

LRSSB

- Planning – LRSSB three-year Business Plan outlines key activities and deliverables
- Internal reporting – LRSSB management team reviews
- Board reporting – Board reviews activity each quarter (ORR a Board participant)
- Stakeholder tracker – Reviewed and updated monthly
- Annual reporting – LRSSB Annual Report provides narrative against deliverables
- Sector support – Strong guidance and initiatives improving sector's safety maturity (RM3)
- Future status – Subject of 'Working Group' review

Recommendation 6: *ORR should take into account the findings of this review as it considers whether there is a continuing need for any MoUs or agreements in relation to light railways and tramways. This should be done in liaison with LRSSB.*

LRSSB

- ORR to draft a Memorandum of Understanding between the two organisations for review by LRSSB

LRSSB has now published its 2023/24 update to its 2022 three-year Strategic Plan. Detailed below are the activities, achievements and benefits that it has delivered for the light rail sector in the first year of that plan.

The update also summarises the workstreams, areas of focus, standards and guidance developed, and how safety information collated from members, stakeholders and the industry is analysed, monitored and utilised to further improve the safety of the sector going forward.

2022/23 Performance Summary Review

Section	Activity	Deliverable	Performance
Organisation and Structure	Recruitment	Head of Risk Management	In post
	Recruitment	Lead Engineer	In post
	Recruitment	Operational Co-Ordinator	Currently outsourced
	Recruitment	Graduate	In post
Sustainability, Funding and Cost Management	Provide Value for Money	Via improved stakeholder engagement ensure that we are providing the sector with good value for money	Opportunities identified for subsequent years
	Third-Party Revenue	Identify and develop third-party (non-member) revenue opportunities	Achieved
	Cost Management	Deliver all activities within budget	Supplier selection process in place
	Cost Management	Develop supplier framework to ensure competitive tendering	Achieved
	Cost Management	Deliver more activities in-house	Achieved
Stakeholder Engagement	Engagement	Maintain or develop channels identified in Stakeholder Engagement Plan	Achieved
	Influence	Enhance awareness of LRSSB role	Stakeholder field visits now in place / ongoing
	Capture Feedback	Ensure feedback is formally captured and retained – inform demand for new initiatives or enhancements	Stakeholder Plan
Integrated Risk Management Framework Support Activity (S) Enhancement Activity (E)	TAIR (S)	Ongoing engagement and support	Ongoing
	TAIR (E)	Collate and upload existing network historic data	Upload complete
	TAIR (E)	Platform update	Achieved
	TAIR (E)	Provide user training post-delivery of platform update	All core users trained
	TAIR (E)	Improve interfaces between TAIR and user base systems	Supported on a user-by-user basis as required
	Sector Risk Model (S)	Engagement and support	Ongoing
	Sector Risk Model (E)	Review and re-analysis of operator models	One operator outstanding
	Sector Risk Model (E)	Production of sector risk profile	Completed
	Bowtie Risk Assessments (S)	Engagement and support	Provided
	Bowtie Risk Assessments (S)	Establishment of LRSSB-led bowtie working group	Group established and attended
	Bowtie Risk Assessments (E)	Integration of the full sector risk model data into the bowtie server database	Completed
	Risk Management Maturity Model (S)	Engagement and support	Ongoing
	Risk Management Maturity Model (S)	Establishment of LRSSB-led RM3 working group	Group established and attended
	Bowtie Risk Assessments (E)	Apply RM3 maturity levels against Bowtie assessments	All assessments completed
	Risk Management Maturity Model (S)	Provide user training following completion of all assessments	Initial training provided Follow-up training to be provided in 2023/24 following feedback and subsequent modifications to tool
	Risk Management Maturity Model (S)	Support the ORR in developing e-learning platform (Module 1)	E-learning module issued to industry

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Section	Activity	Deliverable	Performance
Publication of New Standards and Guidance	Prioritisation	Ongoing review of planned publications and reprioritisation as deemed necessary	Ongoing
	Production	Publish minimum of 12 new documents	13 documents published
	Review	Review all existing documents in line with cyclical review requirement	All current documents have undergone an internal review and will be republished pending approval by the Guidance and Standards Committee
	Customer Engagement	Quantify level of adoption (into SMS/QMS) for each document produced by customers	To be captured via Stakeholder Engagement Plan
	Influence	Formation of UK Mirror Groups to ensure appropriate input into development of standards	Sector updates given on CEN/BSI to functional groups
	Influence	Develop framework of expertise to provide representation at BSI working groups.	Following assessment, due to the random and uncertain nature by which documentation is drafted, the ability to plan as and when working groups will be needed has proved impracticable to date, however, LRSSB will continue to monitor and liaise with BSI accordingly.
Leading a Proactive Approach to Safety	Research and Development	Development of relationships with partner organisations and improved representation	Ongoing
	Research and Development	Development (subject to feasibility) of existing R&D-led pipeline initiatives <ul style="list-style-type: none"> • Obstacle Detection • Pedestrian Behaviours • Pedestrian Crossings • Anti-Drag Door Safety • Termini Sand Drags • Rail Defects 	R&D ongoing seeking to develop opportunities in six key subject areas
Health and Wellbeing	Policy Production	The production of a Health and Wellbeing Policy	Policy produced
	Events	LRSSB to host industry events	Achieved
	Online Hub	Production and roll-out of an online hub	Under review – to be scoped as part of the wider website/hub development
Measuring the Impact of LRSSB	Stakeholder Engagement / Data Collection and Analysis	Develop understanding of success/impact against the seven strategic aims	Ongoing

I am delighted at the performance of the team over the past year, and the summary table demonstrates a high level of achievement which will bring huge benefit to our members and the wider sector as a whole. Detailed commentary on activities and achievements is contained within later sections of this Annual Report.

Section 2 – Significant Achievements 2022/23

Key areas of activities and achievements are summarised below, with more detailed information provided throughout this report.

LRSSB

LRSSB continues to grow from the initial embryonic stage through childhood into its adolescence. LRSSB is now in the second year of this three-year Strategic Plan. The focus for year two of the plan can be found in the 2023 update to that plan, which contains details, milestones and ambitions for the future .

The year has seen LRSSB increase its establishment, particularly in the area of safety risk management and data analytics. We believe that the production of intelligent data, presented in a good understandable format, will be key to helping the sector better understand its risks, as well as unlocking potential knowledge-sharing opportunities.

Tram Accident and Incident Reporting Database Tool (TAIR)

Following the commissioning of a survey with a relevant cross section of the user group, it had been concluded that an improved, more versatile and intuitive version of TAIR was needed. During 2022/23 the project to deliver the new TAIR platform was successfully carried out.

After significant investment, the launch of the updated TAIR platform took place in March 2023. The introduction of this new platform, aligned with feedback from the sector, has delivered enhanced usability and dashboards. The new platform provides the following benefits:

- Improved integration with existing databases
- Enhanced user interface and navigation
- Improved reporting output
- Integrated sector dashboards
- More detailed individual network dashboards
- Enabled ready for future integration of regulatory reports – e.g., RIDDOR.

The launch event of the upgraded TAIR platform was attended by senior executives from all UK light rail networks and owners, in addition to members of the ORR, and featured a keynote address by Deputy Chief Inspector of Railways Richard Hines.

Extensive work has been undertaken to populate TAIR with multiple years of individual networks' historical data, thus building a foundation for the networks to continue the work themselves. The work undertaken by LRSSB, in conjunction with individual operators, allows more accurate assessment of event frequency to determine levels of risk.

The successful hiring of a dedicated data analyst in early 2023 will now enable an expanded focus on quality of inputs, records and reports within the TAIR database.

Further feedback on the functionality and minor adjustments of the upgraded TAIR platform was reviewed by the software developers in conjunction with the TAIR Implementation Group (TIG). The TIG agreed to release the TAIR platform to the wider sector for test and evaluation purposes. In 2023/24, the updated TAIR platform will be embedded into business as usual for the sector and its networks.

Industry Risk Model

The 2022/23 year has seen a review of both the individual network and national sector safety risk models. Along with trends of accidents and incidents being experienced by the individual networks, and better knowledge of perceived risk, the update to the models considered a range of changes, including:

- Impacts of Covid-19
- Recent and imminent network extensions
- New control measures addressing overspeed and inattention
- Reviewed crossing risk assessments
- Updated procedures addressing vulnerable persons
- Refreshed driver training and recruitment methods.

The above topics have also seen the networks implement a variety of LRSSB guidance, published over recent years, and incorporate tools such as the LRSSB-funded hazard perception software.

This was made possible by the extensive work to populate TAIR with individual networks' historical data, including a review process using direct TAIR data analysis exports for the first time. This introduced efficiencies in the update process as well as improved confidence in the held historical data, resulting in an increased level of data-driven-modelling decisions by the networks.

These LRSSB led initiatives have realised improvements in the sectors risk profile achieving considerable reductions in the total collective, controllable and fatal risks that passengers and staff are exposed to.

Model review workshops also benefited from the use of the developed global generic bowtie risk assessments to identify new potential hazardous event precursors and control measures.

The full model outputs can be seen in Section 5 of this report.

Risk Management Maturity Model (RM3) E-Learning Platform

The ORR RM3 training syllabus, which LRSSB contributed to the development of, was launched to industry on 29th June 2022. The first of the interactive e-learning modules focuses on RM3 and how it works with an organisation's Safety Management System, with the second module aimed at supporting and aiding professionals in their understanding of how to use RM3, and in identifying and obtaining necessary evidence to help them assess the maturity level of their organisation against the 26-point RM3 criteria.

Throughout the modules, videos have been produced to provide examples of how RM3 is being used within both heavy and light rail industries and of how to undertake RM3 assessments efficiently and correctly. ORR has created the e-learning module in collaboration with industry professionals across the railway, including Network Rail, the Rail Safety and Standards Board (RSSB), LRSSB, East Midlands Railway, who represented train operating companies, and the Institution of Occupational Safety and Health. As part of the launch, LRSSB collaborated with ORR media relations to ensure that news of the release of the new e-learning platform was effectively communicated to the light rail industry.

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Barbour Index

As part of LRSSB's ethos of 'adding value' and providing the sector with up-to-date regulatory information and tools, it has procured sector access to the Barbour Index online database. The database provides access to a multitude of reference information and tools, plus over 800 authoritative publishers including HSE, EA, BSI and ACOPs.

With guidance and good practice materials, specialist publishers and trade associations aligned to legislation within the following areas:

- Workplace health and safety
- Environment and energy
- Estates and facilities management
- Fire and security.

National Safety Plan

The development of a National Safety Plan, which has been agreed by the sector, is aligned to aspects of, or underpins key objectives contained within LRSSB's Business Plan. This in turn provides a focus for the delivery of specific and measurable safety outcomes.

The purpose of the National Safety Plan is to guide the collective effort of the sector in managing key actions or mitigations of prominent, specific safety risks and hazards, as well as communicating those actions, risks and hazards to the wider sector as a whole.

Through delivery of the National Safety Plan and ongoing collaboration with our customers, as well as the application of their knowledge and expertise, LRSSB will be able to establish an enhanced proactive approach to existing and future risk identification and management for the common benefit.

It is recognised that safety intelligence is an essential part of risk identification, and as such LRSSB has developed a range of data-gathering and analytical tools that have been consolidated into a centralised risk management framework.



Section 3 – Activities in 2022/23

In line with its key purpose, LRSSB has continued to evolve and develop. The main focus of LRSSB in 2022/23 has been:

- **Safer light rail sector** - By utilising the outputs from the Industry Risk Model, LRSSB has continued to manage and maintain the implemented model to better inform, both locally and nationally, where risks are emerging. LRSSB believes that by taking this information from the model and conducting bowtie risk assessment exercises, the sector can significantly reduce the threat of real and perceived risk, and in moving to a leading rather than a lagging system, we have never been better placed to prevent accidents happening.
- **Sector accident and incident reporting** - Consultation, collaboration and significant investment and development into the standardised safety reporting dashboard (driven by the Risk Model and TAIR database) to be applicable to all tramways to provide national oversight and understanding of current risk profiles and changes within the profile over time.
- **Industry accident and incident report data collation and analysis** - Re-review of existing individual networks' historical data. The review process included use of direct TAIR data analysis exports for the first time.
- **Research and development** - LRSSB has commissioned research relevant to its members and for the benefit of member organisations in the industry. LRSSB continued to horizon-scan to better inform itself of relevant international research programmes to ensure the benefit of any lessons learned. LRSSB has also been able to partner with learning organisations such as universities, research facilities and best practice centres.
- **Standards and guidance** - LRSSB is the custodian for light rail standards and guidance for the UK. It has a three-year plan detailing the evolution of Tramways Principles and Guidance – LRG1.0 (TPG) and how it will become the reference document for the sector. The document is now in final draft and will be published in Q2 2023.
- **People and competency management** - LRSSB has worked closely with ORR to develop other sector-specific competencies, such as the RM3 e-learning platform.

LRSSB has also innovated in the staff competency area with the previously produced Universal SCADA simulator for training and ongoing competency assessments for control room staff, which has now been fully utilised by the sector. In addition, the Hazard Perception tool is also fully operational, and LRSSB, in conjunction with its members, is looking to expand the scope of this tool to include network-specific hazards.

- **Stakeholder interfaces** - LRSSB now has an ongoing working relationship with government bodies/departments including DfT, ORR and RAIB. LRSSB now has in place a Stakeholder Engagement Plan that details how it maintains and grows its relationships both within its own sector and also more widely to involve customers, the public and sector employees.

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- **Wider global industry** - LRSSB has actively engaged with networks and organisations from within the global industry to assist in the development, review and production of documentation that will benefit the UK sector. Prospective international project sponsors of schemes have also contacted LRSSB to discuss both the ideology and the benefits of having an independent safety body. LRSSB continues to foster these relationships for learning and potential income.
- **Informing industry decisions and sharing best practice** - Reviewing requests from UK Tram functional groups and disseminating information to industry sector stakeholders. LRSSB has now been added as a standard recurring agenda item on all UK Tram functional groups to give formal updates on its activities.
- **Codification and development of standards and guidance** - LRSSB has now formalised its categorisation based on various research and the ongoing requirements of the sector.
- **Relationship with similar light rail counterparts and colleagues around the world, including benchmarking** - Through direct involvement with the likes of industry bodies such as UITP and Association of German Transport Companies (VDV) and presenting LRSSB workstreams to international audiences.

During the period, LRSSB provided a demonstration of TAIR and the Bowtie XP database to Transport Infrastructure Ireland in addition to an overview of its risk management framework and associated software platforms and tools, highlighting the benefits that membership of LRSSB brings.

LRSSB has also been approached by a delegation from South Korea, as well as by Auckland Light Rail Project, to discuss TAIR and the risk management framework.

- **Light rail safety innovation** - LRSSB continues to fund and develop research into innovations and is currently involved in or leading on several projects in this area. Full details of these can be found later in this report.

It has also implemented a formal process for the application of funding relating to innovation, research and development. This has seen two successful projects requested by the sector which LRSSB has invested in.

- **Collaboration with other industry safety bodies** - LRSSB has held a number of workshops with RSSB to better understand what areas of potential 'cross-over' collaborative opportunities there may be for the two bodies. To this end, a project looking at a tram/train wheel-rail interface has been agreed on with the Institute of Railway Research, Huddersfield. LRSSB will continue to investigate collaboration with other industry safety bodies.

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TAIR Development

The substantial piece of work to integrate risk model analytics into the TAIR database to allow for a direct export of data into risk models was concluded, and notwithstanding the work involving the TAIR update project, the 'business as usual' activities continued throughout the year.

The TAIR database now has in excess of 65,000 entries.

Industry Risk Model Development

In response to requested feedback from the network users, this review has seen a roll-out of an updated model template with enhanced functionality and results dashboards. As the model continues to be developed, it remains the objective to provide the sector with a user-friendly tool.

During 2022/23 LRSSB has worked with a number of new personnel within the sector to introduce them to and familiarise them with the safety risk model through their own network's update, and it also provided an online sector-wide introductory session. Following this recent model update, and TAIR now maturing, LRSSB shall set a support strategy for the update of networks' safety risk models alongside an agreed periodicity and approach to the publication of a national sector safety risk profile. To aid this process, LRSSB has produced a learning module which is embedded into the TAIR/model software.

RM3 Development

As RM3 forms a key element of LRSSB's wider risk management framework, and to further cascade the adoption of RM3 across the sector, it worked closely with the ORR and other rail industry stakeholders during the 2022/23 period on the development of the ORR's new e-learning platform. This allows users to gain a full end-to-end understanding of how RM3 works and how to apply it to an organisation.

Further modifications to the RM3 tool and analytics have been undertaken with the integration of Power-BI dashboards. A trial audit has been undertaken by South Yorkshire Combined Authority for evaluation purposes, supported by the software providers who have assisted in the ongoing development of an initial standardised audit report template. The trial audit draft dashboards were presented to the ORR RM3 Governance Board during the period and received positive feedback. Further evaluation will now be undertaken by working group 1 of the RM3 Governance Board.

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Introduction of Bowtie XP

LRSSB completed all training to the sector on the new Bowtie XP software platform during the period by adapting its content to be delivered virtually. Additional training sessions were also delivered during 2021 to incorporate new members of staff within the industry.

LRSSB in partnership with Edinburgh Trams has produced the top ten industry global generic bowtie risk assessments, then, in conjunction with Atkins and software providers, integrated the sector risk model data into the bowtie server database. This enables a degree of automated bowtie risk assessment development which assists further production.

To further assist the sector, LRSSB is establishing a Bowtie Assessment working group through the Heads of Safety group, where application and development of global bowties for the sector will be undertaken. The aim of the working group is to produce global bowtie assessments capturing all best practice drawn from across the sector. Duty holders from the owner's group will be able to assess their areas of interface and responsibility associated with controls identified or which require additional review.

This in turn will allow the sharing and cascading of best practice and benchmarking for the control of risks across the sector.

New Standards, Guidance and Good Practice Document Production

LRSSB is the custodian for light rail standards and guidance for the UK. This is to include, as a minimum, standards for operations, engineering, highways interface, management, environment quality, and health and safety. Documentation is not limited to local guidance; it is also fully inclusive of all urban standards relating to CEN Mandate 486 and all applicable CEN heavy rail standards.

The magnitude of this body of work cannot be underestimated. As well as domestic requirements to standardise the industry, there is a global push on light rail and metro, as well as the pending requirements to include, tram/train, very light rail, both of which will need their own set of standards, or be made to fit current ones. This was further enhanced with the formal announcement by BSI for all future rail standards to at the very least be considered, as to whether urban rail needs to be included both in revisions and new work items.

The initial objective for 2022/23 was to produce 12 new documents for publication; this target was exceeded, with a final total of 13. The topics were carefully selected from a variety of sources, which identified the following as priority documents.

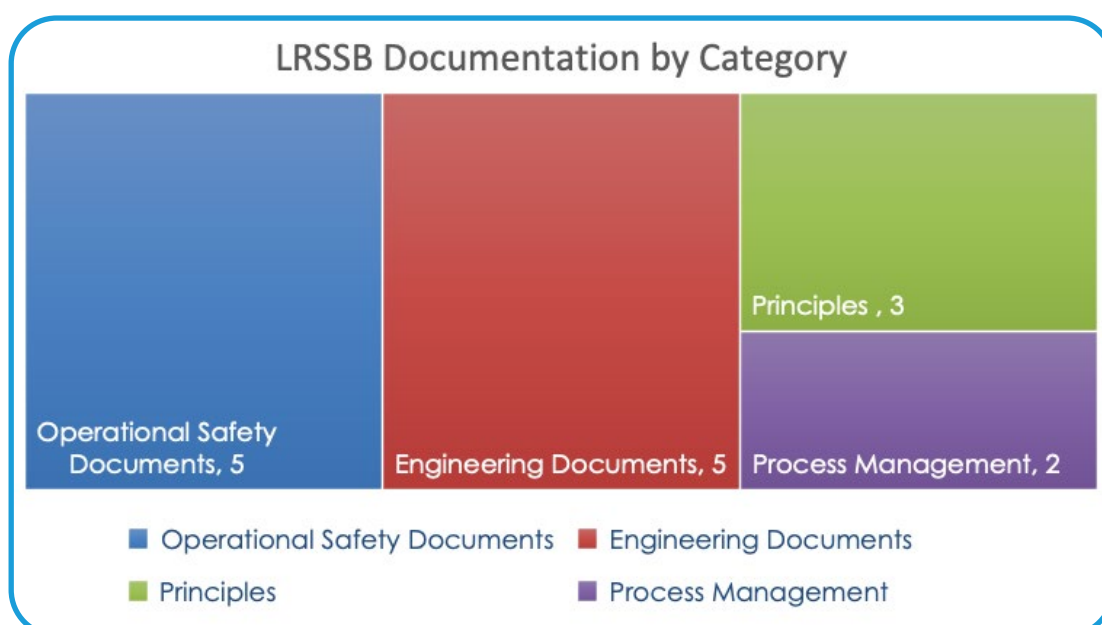
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Table 1 – Guidance and documentation published in 2022/23

DOC REF	DOCUMENT TITLE
LRSSB/LRG 2.0	Underrun Protection appendix
LRSSB/LRG 12.0	Statutory Reporting of Incidents
LRSSB/LRG 20.0	Fire Rescue and Evacuation Best Practice Guidance
LRSSB/LRG 23.0	Construction, Design Management Guidance
LRSSB/LRG 27.0	CIRAS Guidance
LRSSB/LRG 28.0	Accessibility
LRSSB/LRG 29.0	Operation Control Centre – Human Factors
LRSSB/LRG 30.0	Depot Control Centre
LRSSB/LRG 31.0	Depot Supervision
LRSSB/LRG 32.0	Testing and Commissioning
LRSSB/LRG 33.0	Drug and Alcohol – Random, For Cause, Post Incident
LRSSB/LRG 34.0	The Control of Contracted Works on or Near a Light Rail System
LRSSB/LRG 37.0	Weather and Climate Resilience Guidance
LRSSB/LRG 38.0	Noise and Vibration
LRSSB/LRG 40.0	Overhead Line Systems Training and Competency Guidance

Table 2 – Guidance and documentation by type produced by LRSSB in 2022/23



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LRSSB firmly believes that over the coming years, its work in this area will represent a huge shift towards standardisation and in doing so will increase safety and optimise both operation and engineering practices for the greater good of the industry and its passengers and stakeholders. This is evident with the production of over 40 documents now available on the LRSSB reference library, which will be further enhanced during the year 2023/24.

Tramways Principle and Guidance Working Group

The group has remained active and has recently completed a full annual review of the current TPG document. The main driving factor for this review was the accelerated production of a guidance document to supplement TPG. All new and current guidance has been cross-referenced against the content of TPG and made consistent, and where appropriate TPG has been streamlined to reflect the additional guidance. The revised version of TPG will be available along with all its offspring guidance on the reference library.

Document Selection and Review

TPG RAG Index

While the original RAG status document, which originally comprised some 150 categories and was utilised to prioritise the selection of documents, continues to be one source for production, it has been superseded by the formation of the **Guidance and Standards Committee**.

Light Rail Standards Committee

In line with the LRSSB's '(GA) 01.3 Light Rail Standards Documentation Development and Approval Process', LRSSB has formed the Light Rail Guidance and Standards Committee to remain accountable for the process by which light rail industry guidance and standards documents are initiated, developed, approved and published. It has its own terms of reference and governance, and each individual representative on the committee is aware of its responsibilities as a representative of the sector.

The selection of documentation had to represent an array of different criteria and was driven by a number of factors and sources. Three essential avenues for recommendations were UK Tram Light Rail Operations Group, Light Rail Engineering Group and the LRSSB Heads of Safety Group, which through best practice sharing had highlighted a number of documents that they felt would be of great benefit. Additionally, the risk model was utilised to identify areas of focus which it was felt would benefit from new or updated guidance documents. Irrespective of the source of the recommendation or request for the production of a standard, each one must now be submitted to the Light Rail Standards Committee for formal review and vote.

Other external sources that can affect the production of documentation are:

- RAIB reports and recommendations
- ORR actions/observations
- Changes in legislation
- Revised EN/ISO.

Guidance Source



Document Production

LRSSB continues to engage with stakeholders to ascertain and understand the need for additional documentation whether in the form of guidance, good practice, technical reports, etc. LRSSB now has at its disposal a wealth of light rail expertise and experience, which can be applied to any topic selected.

LRSSB also encourages feedback from a range of bodies and organisations, which might include but not be limited to:

- UK Tram functional groups
- ORR
- DfT
- Network Rail
- Supply trade members
- Consultants
- RSSB.

By actively engaging with these bodies, LRSSB believes it will continue to produce much-needed relevant documentation for the sector by the sector.

To date, LRSSB has been utilising its own internal resource as well as UK Tram employees to both attend working groups and review documentation as and when required. Attendance at working group meetings has been further supported by Network Rail, and discussions have been had with a view to this continuing. LRSSB has the option of calling on individual consultants, a number of which it is already working with, to offer their expertise to relevant standards development. It has always been a challenge to get consistent support from the UK light rail operators given their own daily commitments, and to date LRSSB has acted as a conduit to feed comments back to CEN on behalf of the UK industry. The best approach, and therefore LRSSB's desire, is to set up mirror groups with members from owners, operators and maintainers to review and comment on documentation as it continues to be developed through to publication.

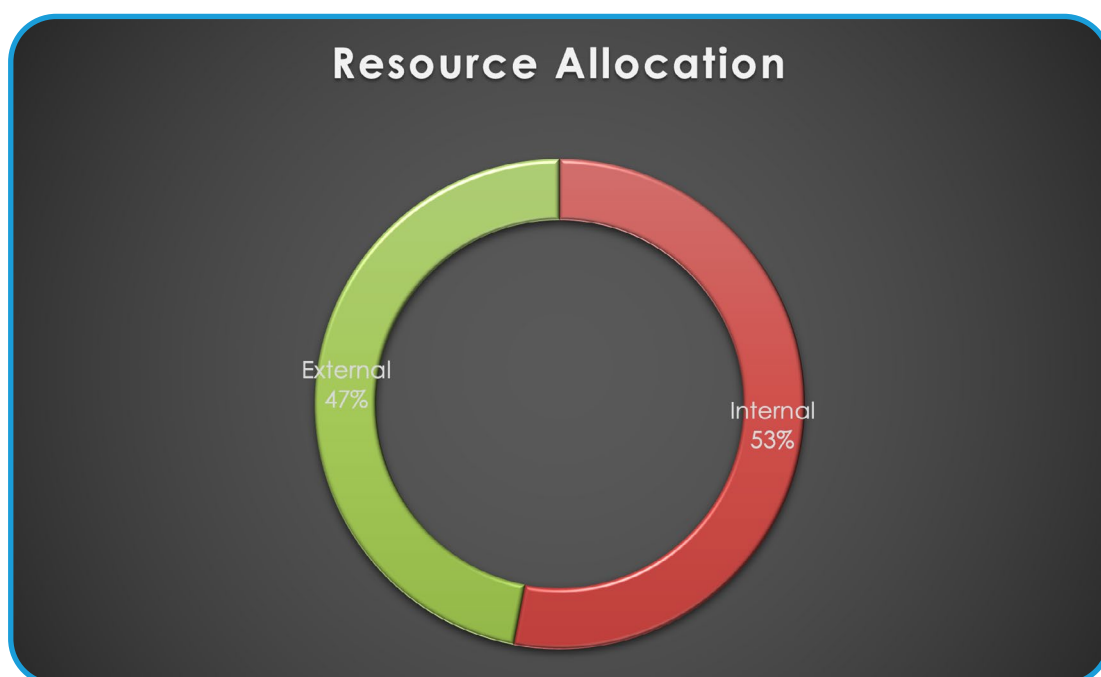
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The general shift towards more virtual meetings has meant that attendance at the numerous working group meetings is made easier; however, there remains an obvious drawback in the lack of in-person meetings. LRSSB continues to use its internal resource to attend meetings and review documents, but additional sector representation has seen little increase to date. This comes as no surprise given the current pressures on operators and owners and the timescales often involved in the production of EN/ISO documents. However, LRSSB will always look to represent the UK sector's interests.

LRSSB has procured a number of standards through its partnership with BSI, which has aided it with current and future objectives.

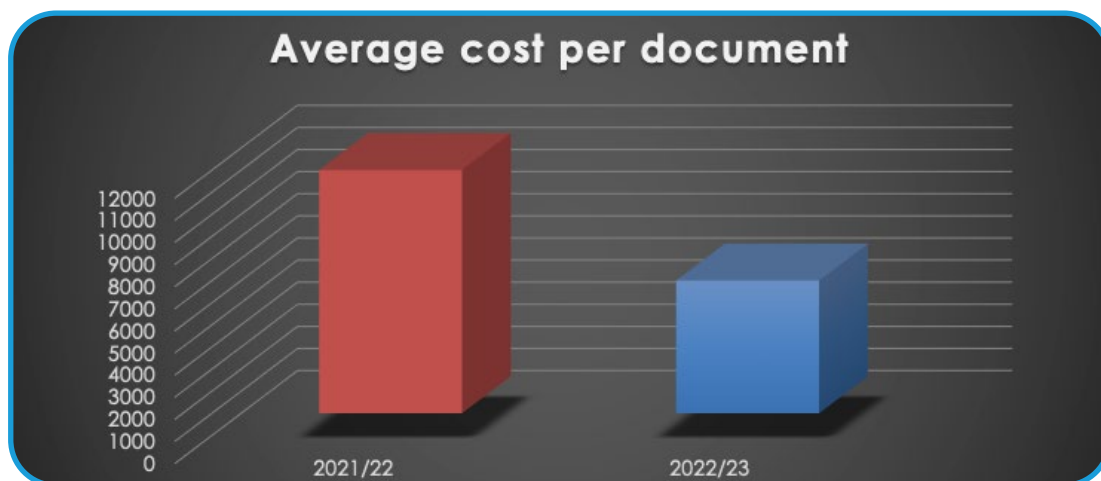
This collaborative approach has enabled LRSSB to make progress far beyond its size and better obtain value for money, as well as involving and engaging the sector and its expertise. The year has seen a slight shift towards an increase in the utilisation of internal resource for the production of documentation, in the main due to an increase in personnel and the nature of the subject matter being produced.



This shift in allocation (as shown above) has led to a reduction in the overall cost per document, with additional value for money provided by the continued expansion of the LRSSB's network of contacts.

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Stakeholder Engagement

To ensure high levels of communication to its audiences, LRSSB has increased its social media presence via Twitter and LinkedIn. Support and take-up of these channels are seen as essential alongside other communications activity. Newsletters and e-shots are now regularly published with updates on published guidance, workstreams and upcoming issues.

As an addition to LRSSB's media offering, and in line with the sector's wishes, LRSSB has produced a series of safety videos. These have highlighted areas for increased awareness for passengers, the public and employees.



LRSSB has within its Strategic Business Plan a stakeholder engagement strategy with an associated tracker where the communication channels identified are updated in relation to the progress made and the initiatives being considered.

Working Relationships – ORR, RSSB, BSI and Others

ORR - LRSSB holds regular meetings with representatives of the ORR to discuss any emerging issues, ongoing research developments and production of guidance. ORR also sits as an observer on the LRSSB Board. This occurs at all levels of LRSSB, with quarterly updates given directly to the ORR team both on operational and engineering-safety-related workstreams and issues.

RSSB - LRSSB and RSSB are actively involved in a collaborative process with the intent of identifying common ways in which both organisations can learn and benefit from each other. In addition, LRSSB actively engages with RSSB's committees and standards working groups to ensure that the interests and comments of the light rail sector are heard.

BSI - LRSSB has been a distributor for BSI documents since the summer of 2021, and LRSSB has provided a number of documents to its member organisations on request.

CEN - LRSSB currently attends a number of working groups relevant to producing urban rail standards. These meetings have been held online for the past two years, but participants are being encouraged to attend in person, which will involve travel across Europe.

The Institute of Railway Research / the UK Rail Research Innovation Network - LRSSB has established a working relationship with the Institute of Railway Research at Huddersfield University. The Institute of Railway Research is an active member of the UK Rail Research Innovation Network, which will allow LRSSB to strengthen ties with this group, who have many relevant active workstreams.

UK Tram / LRSSB functional groups - LRSSB is an active participant in the Heads of Safety Group, Light Rail Engineering Group, Light Rail Operations Group and Heritage Group meetings and provides updates on all its activities. This has been very well received by members and strengthens ties with all aspects of the member organisations and supply trade. LRSSB has also looked at how it can assist the heritage tramway sector in better understanding its risk profile.

Establishment of Overseas Relationships

A number of overseas cities and authorities have had contact with LRSSB throughout the year. Australia, New Zealand, South Korea and Israel have all shown interest in the work it carries out, particularly in relation to accident reporting and monitoring. The Dublin Luas system, along with Transport Infrastructure Ireland, maintains a close engagement with LRSSB and has seen the benefit that the TAIR database and the associated modelling work can offer.

Commercialisation

LRSSB has held meetings with, and given advice to, Transport for Wales to assist with the 'line of sight' element of the Core Valley Lines transformation project in Cardiff and surrounding areas.

The development of the Risk Model and TAIR continues to receive significant interest from systems and governments overseas. LRSSB will look to actively promote these excellent tools, particularly once the upgrade to TAIR is complete.

Section 4 – Initiatives

Innovation, Research and Development

Over the year, LRSSB commissioned independent research in several major areas, as detailed below.

Obstacle Detection Trials

After previous trials carried out with the Bosch system last year in Sheffield, LRSSB is now supporting Blackpool in their own trials with the Compass system. LRSSB was in attendance for real-time trials of the system, which have been continuing to date. LRSSB intends to publish findings on at least these two systems with a view to informing the sector on the benefits of each system.

Pedestrian Behaviour Survey

After analysis of the Blackpool and Manchester trial results, it has been decided to expand the initial scope of this project to incorporate all UK networks. The expanded scope will also look to utilise video footage of pedestrian movements and behaviours around tramways. It is not believed that a study of this type has been conducted before, and it will prove very useful in understanding if current mitigations are adhered to and what more could reasonably be done to reduce pedestrian incidents.



Pedestrian Crossing Innovation

LRSSB is currently supporting Transport for London on the potential trial installation of the Vamos system, which is presented as a low-cost derivative of the Flex system. LRSSB highlighted this as an ideal opportunity for researching the effectiveness of the system, with the perceived output being one of knowledge sharing for the sector. LRSSB has submitted a series of potential areas where LRSSB can support the project and add value. It has been agreed that any output and learning from the project will be shared with the wider sector.

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Anti-Drag Door Safety Device

A project brief has been drafted and submitted capturing a general scope and numerous assumptions about what the project will deliver. This project is currently realising collaboration with other transport sectors through which it will see a pooling of resources and sharing of best practice on both human factors and emerging technologies for the sector.

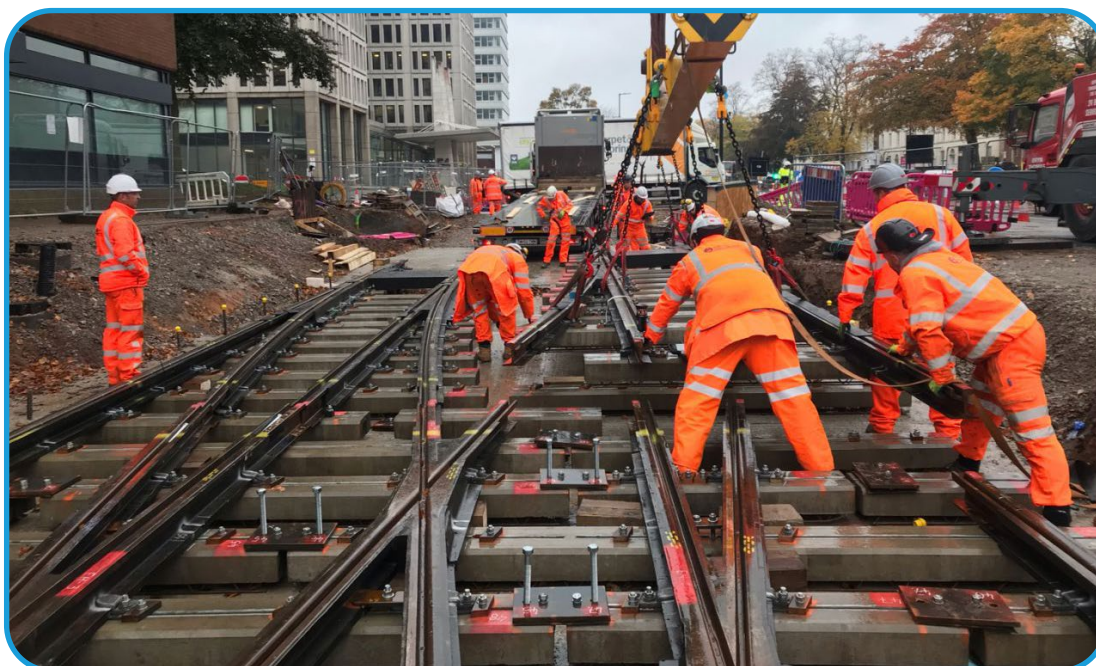
Termini Sand Drags

LRSSB has been asked by member organisations to investigate the possibility of utilising sand traps/drag as a viable alternative to buffer stops on light rail networks. LRSSB has commissioned the Institute of Railway Research, which is carrying out the research required to produce a technical analysis and report detailing the findings. This will be available to the sector later this year.

Rail Defects

LRSSB has part-funded the research and development investigations into existing rail defects on the Manchester network after a request was formally made through the Light Rail Engineering Group forum. There is limited information available about these in terms of published research, and so this report will be an invaluable resource for informing LRSSB members and others in what could easily become a sector-wide issue.

These initiatives are all currently live, and LRSSB anticipates that further additions will be made as it increases its scope of horizon scanning and continues to collaborate with both internal and external stakeholders to understand the challenges and possible solutions across operational and engineering safety.



Section 5 – Industry Risk Profile

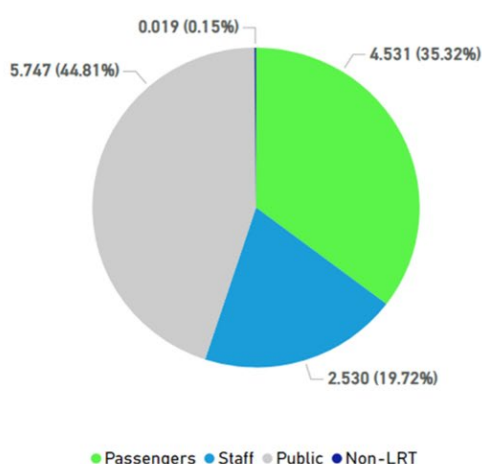
National Sector Risk Profile

The individual networks' assessed safety risk profiles have been combined to provide the overview for the total sector and compared to the combined profiles held in 2021. The 2022/23 update has seen estimated total collective risk for the sector reduced by over 5% and total fatal risk reduced by over 3%. This change is a result of reductions in 42 of the 60 hazardous events within the risk model framework, demonstrating both improved understanding of the risks faced and the efforts of the sector to reduce safety risk to as low as reasonably practicable.

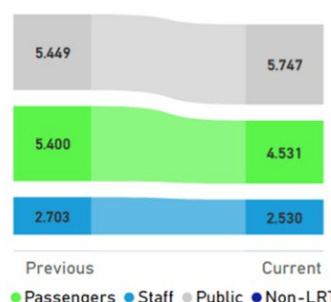
The sector has achieved considerable reductions in the total collective, controllable and fatal risks that passengers and staff are exposed to.

There has, however, been an increase in total collective, controllable and fatal risk estimated for members of the public exposed to the operations of the light rail networks. The extensions occurring on a number of the networks have noticeably contributed to the increase in public risk and can be further explored in the analysis of hazardous events.

Current Sector Breakdown: Total Collective Safety Risk (FAIs Per Year)



Sector Population Breakdown Comparison to Previous Profile: Total Collective Safety Risk (FAIs Per Year)



Year	Passengers	Staff	Public	Non-LRT	Total
Current	4.53	2.53	5.75	0.019	12.83
Previous	5.40	2.70	5.45	0.015	13.57
Change	-16.09%	-6.41%	5.47%	24.52%	-5.46%

• Total Collective Safety Risk (TCR)

The aggregate risk associated with exposure to hazardous event(s) for one or more populations

• Fatalities and Aggregated Injuries (FAI)

An overall measure of safety harm, taking account of injury and fatalities 1 FAI = 1 fatality = 10 specified injuries = 200 RIDDOR-reportable/recordable minor injuries or class 2 shock/traumas.

• Hazardous Event

An event that has the potential to lead directly to death or injury.

• Precursor

A system / sub-system / component failure or characteristic inherent of design, human error or operational condition which could, individually or in combination with other precursors, result in the occurrence of hazardous event.

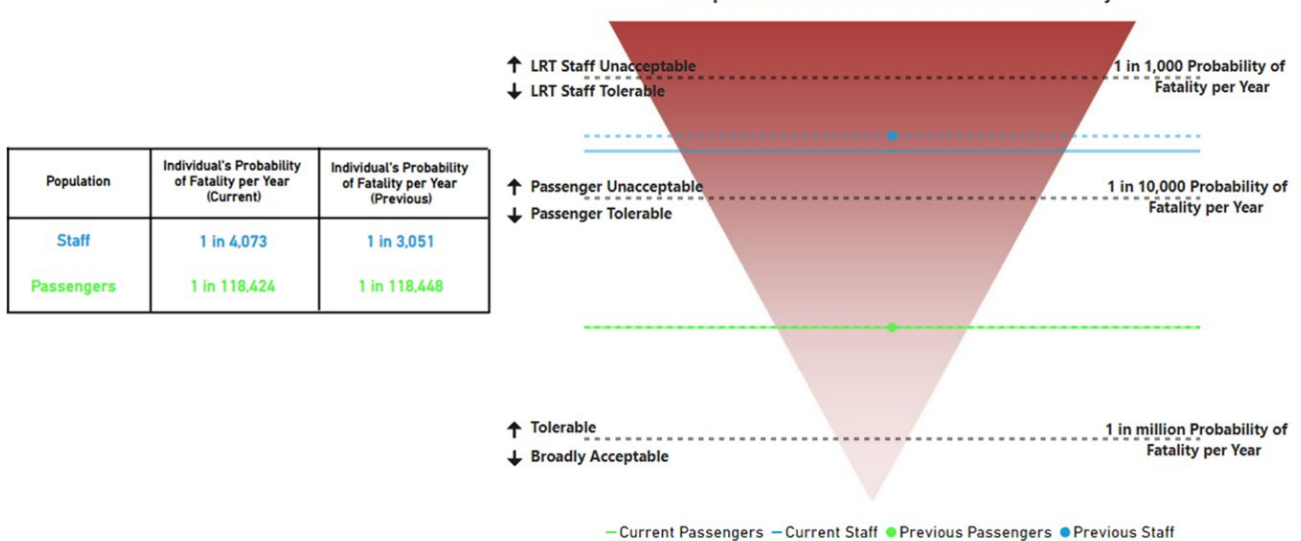
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The achieved reduction in total fatal risk for passengers has substantially offset an increase in the calculated fatal risk for an individual passenger. With networks declaring reduced numbers of passenger journeys per year, as the sector recovers from the impact of Covid-19, passenger risk is in effect being distributed across a smaller population of individuals. LRSSB will keep this method of data normalisation under review as changes in public transport use are further understood.

Meanwhile, the estimated fatal risk for an individual member of staff has seen a marked reduction. This is in part due to the increasing workforce size of the overall sector, although it is predominantly attributable to the reduction of estimated staff fatal risk in 22 of the 60 hazardous events within the risk model framework.

Comparison of Sector Individual Risk of Fatality



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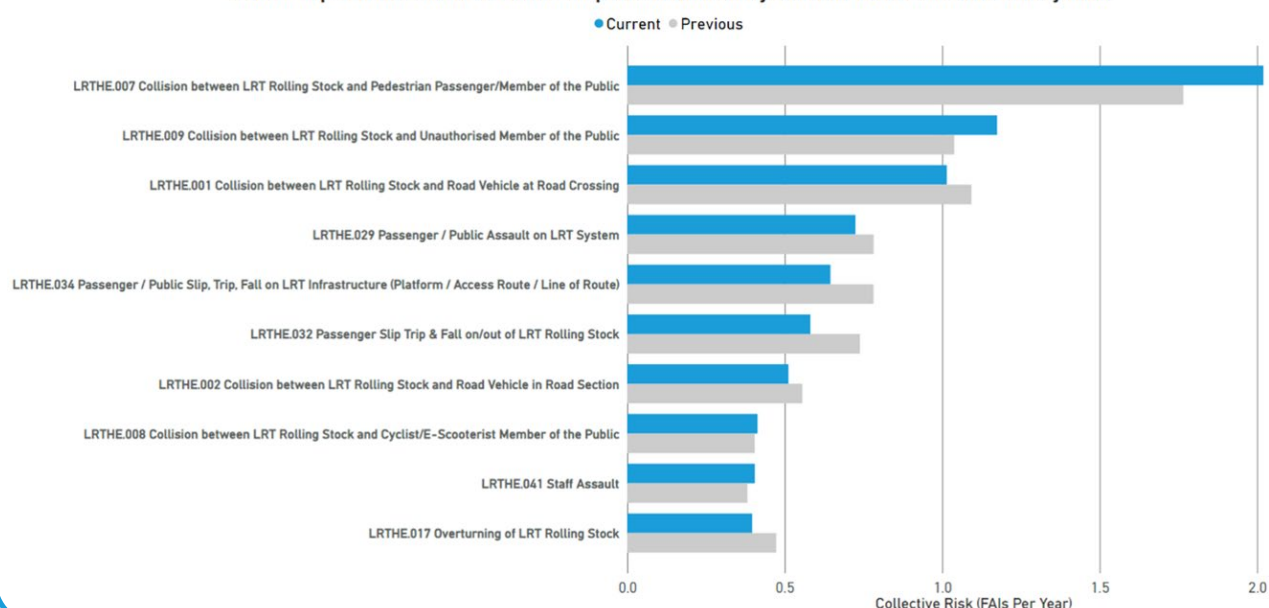
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Sector's top ten hazardous events and precursors

The charts below provide the sector's top ten hazardous events and precursors with a comparison to 2021. In line with the increase of risk estimated for the public, a number of related hazardous events in the top ten have seen an increase, including Collision between light rail Rolling Stock and Pedestrian Passenger/Member of the Public, which continues to be the sector's top-ranking hazardous event. Encouragingly, the overall sector risk associated with collisions with road vehicles has reduced, with variety of network commentary referring to enhanced driver training and the identification and targeting of high-risk locations for interventions in recent years, noting also the benefit of successful collaborations with local road authorities.

The hazardous events contained in the sector's top ten ranked by total collective risk have changed this year. Staff Assault remains a concern now, entering the sector's top ten. Passenger Incident while Boarding/Alighting LRT Rolling Stock has now moved out of the top ten, with network commentary again referring to enhanced driver training but also engineering measures for the rolling stock, such as sensitive door-edge detection. The hazardous event of Overturning has again seen estimated risk reduced, moving from ninth to tenth ranking, a trend which is expected to continue as networks finalise control measures introduced since Sandilands and start to draw on data insights from monitoring systems.

Sector Top Ten Hazardous Events Comparison Ranked by Current Total Collective Safety Risk



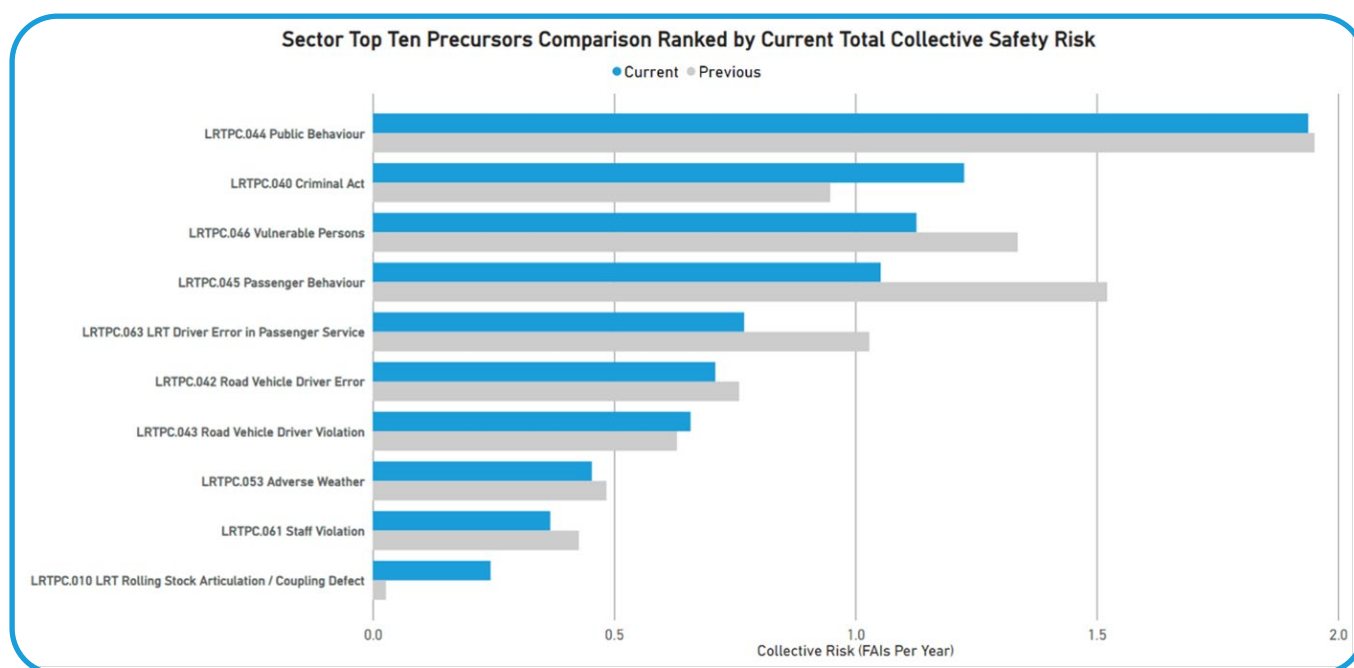
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The impact of both the measures introduced since Sandilands and the wider enhanced driver training can also be seen in the changes in risks attributed to precursors since 2021. Estimated risk as a result of both LRT Driver Error in and Not in Passenger Service has reduced, with LRT Driver Error Not in Passenger Service moving from 10th to 19th. LRT Rolling Stock Articulation/Coupling Defect has entered the top ten this year in response to a recent series of high-severity accidents involving persons being present in the gap between coupled trams¹. It is expected that attributed risk will subsequently be reduced again, with relevant risk assessments and introduction of control measures for legacy fleet already underway.

Public Behaviour as a precursor remains the top-ranked precursor for the sector. Although some networks estimated a reduction in safety risk resulting from criminal acts, an increase has been seen at sector level due to dominant estimated increases by the larger networks. Further analysis will provide greater insight; however, with Criminal Act appearing in all individual networks' top ten and this precursor contributing risk to 48 of the 60 hazardous events within the risk model framework, it continues to be a significant contributing precursor for all networks. Vulnerable Person remains in third ranking but positively has seen a reduction in attributed risk from all the individual network updates.

¹ - It should be noted that only one tram system utilises coupled trams other than in recovery mode.

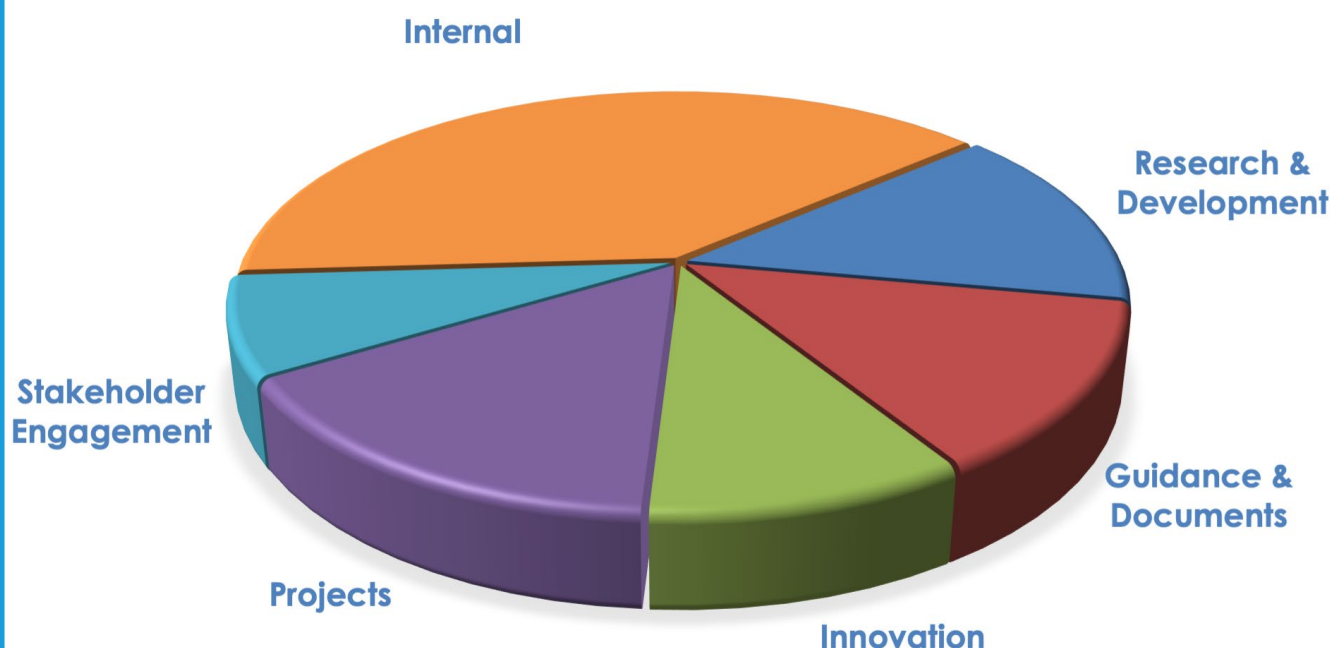


As indicated in LRSSB's Integrated Risk Management Framework, the results of these model updates shall inform both individual networks and the national safety management planning and initiatives. Additional analysis shall also be undertaken to promote further understanding of the safety risks facing the sector.

Section 6 – Funding and Finance

The figure below indicates how LRSSB has apportioned the allocated funding provided into the areas and disciplines identified as requiring the most urgent attention.

LRSSB PRINCIPLE EXPENDITURE

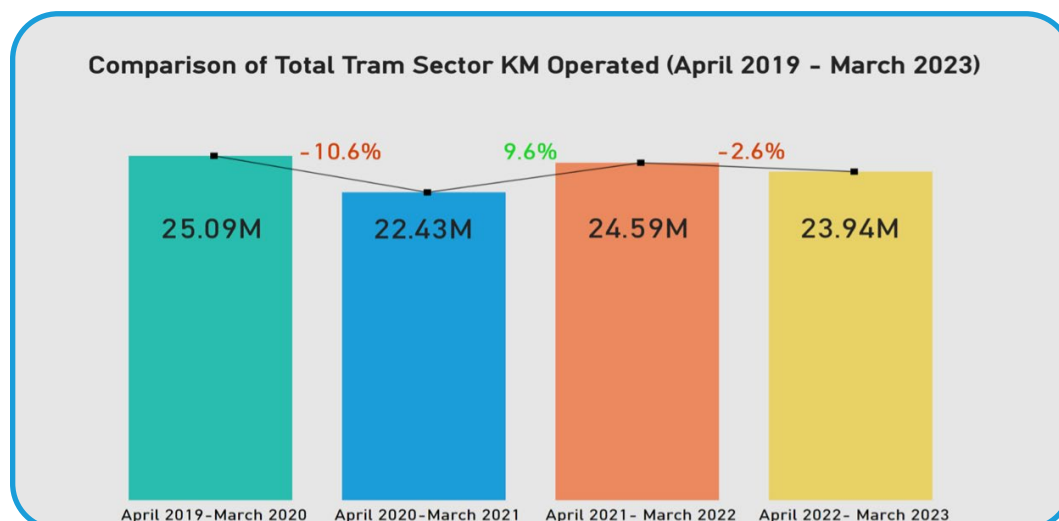


LRSSB has produced a budget forecast for 2023/24 in line with the Business Plan objectives for the year 2 period. It is believed that there is sufficient funding being provided to deliver the budgeted aspirations contained within the Business Plan. LRSSB now has a three-year programme of work, in line with its MoU with the DfT.

In addition, LRSSB will continue to look to secure funding for investment in specific areas, such as innovation and research, that will help support and assist in the delivery of LRSSB's overall risk management strategy.

Section 7 – Summation

As detailed within the report, it can be seen that LRSSB has continued to make significant progress throughout 2022/23, even with the continuing post-pandemic effects being felt across public transport. Passenger operating kilometres remain below pre-Covid levels, as can be seen in the chart below, and LRSSB remains committed to supporting our sector in all aspects of operating and maintaining safe, efficient and reliable services.



As an organisation, LRSSB is still evolving, and we are not yet as influential within the sector as we would like but this is increasing. The implementation of our newly developed Stakeholder Engagement Plan will further enable us to raise our profile, provide understanding and demonstrate to our customers the benefits to them in adopting our various offers.

LRSSB will take the conclusions from our stakeholder feedback to create and formulate a future blueprint proposal document for consideration by the ORR, DfT and other stakeholders.

The recognition of the good work achieved to date is evident and was welcomed within the ORR Findings Report. The progress report to the ORR Health and Safety Regulation Committee in December 2022 was well received and got positive feedback.

Our organisation is now well placed to provide support, guidance, education and detailed information to assist each network in addressing its own or collective challenges. We also expect that the sector will be benefiting from our integrated risk framework strategy by March 2024.

LRSSB has now become an integral part of the light rail sector in the UK and has forged partnerships and agreements with a number of revered and established organisations, and while benefiting LRSSB and our sector, this is also testimony to how those organisations see us.

We will also look to learn from such organisations and work collaboratively for the betterment of the light rail sector.

Light rail plays an important role in the wider integrated transport solutions. UK cities are continuing to explore the light rail option to help in decarbonisation strategies. LRSSB understands and appreciates the benefits of gaining knowledge from a cross-sector approach to safety and standards. With the continued support of stakeholders and members, LRSSB can deliver real benefit for the light rail sector, today and in the future.



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