LRSSB

Light Rail Safety and Standards Board

Annual Report

2020/2021


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LRSSB
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Annual Report 2020/2021

Contents

Section 1 – Chief Executive's Review

Forward

The Light Rail Safety and Standards Board (LRSSB) was formed by the UK light rail industry and UKTram 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 the 9th November 2016.

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

- Chief Executive Officer (CEO)
- Non-executive Chair
- Four Non-executive Directors (consisting of representation from both Operators and Owners),
- Managing Director of UKTram and
- An ORR Observer.

During the reporting year LRSSB appointed a new, Chair Sue Byrne in May 2020, and a new CEO, Carl Williams in October 2020.

The current management structure of LRSSB consists of a CEO, Administration Manager and Safety and Assurance Manager, with the intention to recruit further posts, in safety, engineering, project management and data analysis within the next financial year. LRSSB has also been supported by UKTram colleagues during the year.

The key purposes of LRSSB are to:

- Codify and develop standards and guidance to provide both support and guidance to its members.
- Support the design, delivery and ongoing operation / maintenance of light rail systems in the UK and abroad.
- Manage and assist in the collation and analysis of industry safety and risk data, and to provide a platform to help lower the level of risk in the member networks by sharing best practise and benchmarking data.
- Ensure data and learning points are gathered from worldwide industry partner organisations to ensure best practise advice is shared whenever possible.
- Ensure that ORR/RAIB future recommendations are acted upon industry wide.

Overview

This report summarises the work undertaken by LRRSB from May 2020 until April 2021 in relation to the aspirations and objectives detailed in the LRSSB Business Plan of that year. The last year has been one of the most challenging years in the history of the current generation of UK tramways, in which we have worked through a global pandemic.

Although there seems to be light at the end of the tunnel with some semblance of normality returning within the near to immediate future, the ongoing effects and impacts of the pandemic continue to adversely impact lives, jobs and the day-to-day activities of society on the whole. The events experienced throughout 2020 and into 2021 will remain forever in our memories, and our thoughts at LRSSB go out to all the bereaved who have lost families, friends and colleagues.

In March 2020, the Covid-19 pandemic forced the introduction of a series of governmental restrictions ranging from national lockdowns to restrictive work and travel arrangements. These restrictions remained either fully or partially in force for the entirety of the 2020/21 business planning year.

Light rail networks run through the very core of our towns and cities, and they have provided an essential means of travel to key workers during the pandemic. The light rail sector has responded to the challenges asked of it and has managed the demands of social distancing to continue to provide safe, reliable and dependable public transport. Figure 1 below illutrates that even when taking into account the effects of the pandemic, light rail networks across the UK delivered close to 89% of the previous year's service levels.

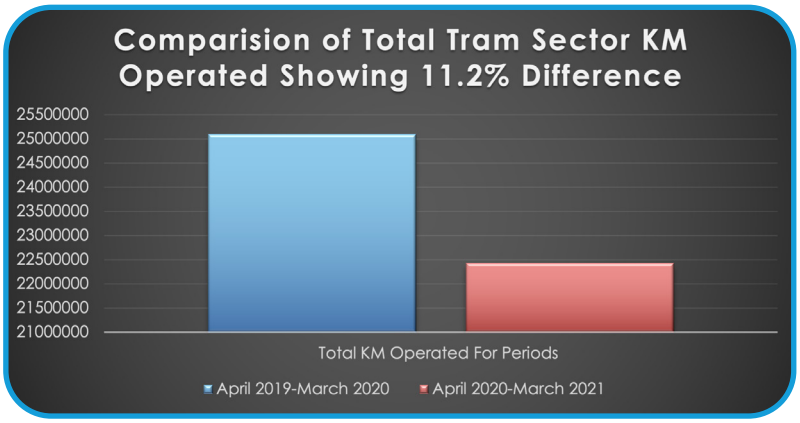

Figure 1 Comparison of Total Kms Operated

Whilst the LRSSB remained functional during this period, workload priorities and emphasis were adapted to answer the questions posed by the effects of the pandemic on the sector as well as the organisation. Throughout the year, LRSSB has both produced and assisted in the production of documentation associated with the control and management of Covid-19 in liaison with UKTram and other sectors including the DfT and Public Health England. This assistance remains ongoing.

On a personal level, during these initial months in my role as Chief Executive I have been impressed with the support LRSSB has continued to provide to the sector. Notwithstanding the effects of Covid-19 on the ability of LRSSB to conduct its normal activities, and in addition to specific documentation related to the pandemic, LRSSB was able to complete large parts of the commitments made within the 2020/21 Business Plan.

Furthermore, LRSSB has proactively advanced projects ahead of original timeframes envisaged (see Section 7), and has introduced new additional concepts through research and development into practical use.

The Tram Accident and Incident Reporting (TAIR) database tool and the Industry Risk Model have continued to be developed to a point where the national risk profile is sufficiently mature to identify precursors and emerging risks at a local and national level. LRSSB has invested in the new Bowtie XP intelligent software that will then utilise this data to produce risk assessments and mitigations to assist in preventing future accidents. It is believed that the generation of the risk assessments by this method will bring real added benefit to the sector. LRSSB also facilitated the provision of a number of training modules to the sector during the course of the year. It was impossible to deliver these sessions in the face to face workshops format that would normally have been held. The sessions were re-engineered so that they could be delivered virtually with small interactive groups and appears to have been successful with very positive feedback from the candidates.

Training in 2020/2021 was provided for:

- Bowtie Risk Assessments;
- TAIR Database; and
- ORR RM3 – 2019 criteria.

LRSSB continues to support research and development projects in a number of important areas in particular, in relation to driver attentiveness and speed control. This work will culminate in the publication of guidance documentation in early 2021.

During 2020/21 LRSSB has also continued to build a core repository of knowledge, guidance notes and "good practice" documentation, and has initiated a new methodology for the development, production, approval and monitoring of material provided. It is intended that this library will be hosted on the new LRSSB website and it is anticipated it will become a trusted source of information giving real benefit not only to the sector and existing owners and operators, but also to prospective developers of new schemes.

During 2020/2021 the new LRSSB website has been under development with a working group now established to continue its development and ongoing review. This work includes the alignment of website guidance indexes, with indexes in Tramway Principles Guidance (TPG) to assist and ease of use and reference.

In tandem with the new LRSSB website, LRSSB has continued to significantly increase its social media presence via Twitter and LinkedIn. These channels are seen as essential to support other communications activity. Newsletters are now regularly published with updates on published guidance and upcoming issues.

LRSSB has now submitted accounts to Companies House for the first full trading year; however, future funding for LRSSB remains unclear. Encouragingly, LRSSB has had the funding for 2021/2022 confirmed from the DfT, in line with expectations and has also received industry subscriptions. Whilst the monies received allow LRSSB to plan the arenas and workloads it wishes to undertake in 2021/22, the uncertainty surrounding funding beyond that makes long-term planning impossible and impacts the LRSSB'sr ability to grow the team and boldly increase the programmes of work undertaken. It remains a key objective for 2021 for LRSSB to attain a guaranteed, sustainable funding mechanism so that the excellent progress made to date continues and momentum is not lost.

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LRSSB is currently producing a Business Plan not only for 2021/22 but for future years, and the need for funding certainty is crucial in building an industry body that is sufficiently robust in its resources, knowledge and technology to ensure that the light rail sector knows what its safety risks are and is as informed and prepared as it can be.

Detailed below are the activities, achievements, results and benefits that LRSSB has delivered for the light rail sector in the second year of operation. Furthermore, it summarises to date the work streams, 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.

Section 2 – Significant Achievements 2020/2021

LRSSB continued to make significant progress throughout 2020 and with the research and development programme, in particular, was able to bring real benefits to the sector, these being recognised at the 2020 Global Light Rail Awards, where, with Ian Rowe Associates, LRSSB was awarded "Significant Safety Initiative" for its funding and work into speed management.

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

LRSSB

LRSSB cemented its position within the consciousness of the sector and stakeholders alike. The journey from the Shadow LRSSB through inauguration and inception into the fabric of the industry was achieved during a very difficult year for all. LRSSB's plans in the main have been brought to fruition and future plans formulated.

Industry Risk Model

LRSSB, in conjunction with Atkins and UKTram, has now built an Industry Risk Model for the light rail industry to provide a clear and measured understanding of individual network risk profiles, ensuring more control of emerging risks/precursors to incidents.

The model has been "flexed" during the year to take into account industry comment, and LRSSB is now embarking on further iteration of both network and sector risk profiles.

Tram Accident and Incident Reporting Database Tool (TAIR)

In conjunction with the risk model, LRSSB has further developed the national UKTram database tool. TAIR has become the LRSSB database, communications network, performance management system and investigation tool. LRSSB continues to work with the ORR on the future utilisation of this platform for the industry.

Bowtie Risk Assessments

LRSSB has worked alongside the provider of the database tool software to deliver training to the industry on Bowtie Risk Assessments. LRSSB has also funded additional development of the database tool so to allow migration of assessments to input into and inform the RM3 tool.

Risk Management Maturity Model (RM3)

LRSSB, along with the ORR, has delivered initial training to the sector on the RM3 assessment tool. LRSSB intend to enter into further collaboration with the provider to produce a more sector-focussed tool in 2021/2022.

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New Standards and Guidance Published

Through the research and development programme LRSSB has investigated, produced and published a number of new guidance notes, reports and good practice guides. This includes documentation to assist in closing out some of the recommendations from the RAIB investigation into the Sandilands accident.

LRSSB has also reviewed and updated previous and current documentation. An index of documentation delivered in the year is detailed in Section 3.

BSI

LRSSB has registered and supplied UK experts in liaison with BSI for CEN/CENELEC/ISO to attend committee meetings, standards and guidance development and to review and provide a voice on behalf of the UK light rail industry.

Section 3 – Activities in 2020/21

LRSSB has been responsible for providing expert support to the light rail industry, driving sustainable improvements in the safety and efficiency of the tramways and light rail systems across the British Isles.

LRSSB

The LRSSB successfully started full operation from the Shadow LRSSB in April 2019 and has continued to evolve and develop in 2020 even with the effects of the Covid-19 pandemic. The main functions of the LRSSB are:

- Industry Risk Analysis and Trends;
- Industry Accident & Incident report data collation and analysis;
- Informing industry decisions and sharing best practice;
- Codification and development of Standards and Guidance;
- Relationship with other light rail counterparts and colleagues around the world, including benchmarking;
- Light Rail Safety Innovation and Research;
- Collaboration with other industry safety bodies;
- Reviewing industry safety, dissemination of information and 'lessons learned'; and
- Oversight of Independent Competent Persons and accreditation.

Response to Sandilands Recommendations

During 2020/21 LRSSB has supported and provided responses on behalf of the membership to close out some of the recommendations from the report. Areas of advancement within the year were:

Recommendations 1 and 2 - now closed out.

Recommendation 1 - *To set up a new joint industry body to enable UK-wide cooperation on safety matters, develop tram standards and good practice, and provide authoritative, impartial advice.*

Recommendation 2 - *To better understand all safety risk associated with tramway operation and then provide updated guidance for the design and operation of tramways (this could be achieved by issuing an updated version of the 'Guidance on tramways' with expanded coverage of operational matters).*

Particular attention will be required to recognise risks from low frequency / high consequence events which may not be apparent from precursor incidents on existing UK tramways. Identifying such events is likely to require input from specialists outside the UK tram community, including specialists with knowledge of main line rail and bus environments. Consideration of main line rail and bus issues is intended to inform evaluation of tramway risks; it does not imply that all heavy rail and bus requirements should be applied to tramways.

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Recommendations 3 and 4 have been the subject of in-depth reasearch and trials funded by LRSSB, both areas culminating in detailed reports. These two reports have then been utilised to produce guidance on speed monitoring / control and driver inattention systems. The guidance notes are expected to be published in 2021 following review by the sector and ORR.

Recommendation 3 - *The intent of this recommendation is to prevent serious accidents due to excessive speed at higher risk locations on tramways. These locations are likely to include all locations where a substantial speed reduction is required for trams approaching at relatively high speed. Implementation of this recommendation may be assisted by work in this area already underway by Croydon tramway organisations.*

Recommendation 4 - *The intent of this recommendation is to reduce the likelihood of serious accidents due to tram drivers becoming inattentive because of fatigue or other effects. Existing tram systems relying on drivers applying forces to driving controls (driver safety devices) do not necessarily detect an inattentive driver. Implementation of this recommendation may be assisted by work in this area already underway by Croydon tramway organisations.*

Recommendations 5 has been closed out by all members in terms of system signage. Additionally, LRSSB has now published guidance, **LRG 4.0 Signing & Marking of Tramways,** in conjunction with the DFT, local authorities and the light rail sector.

Recommendation 5 - *The recommendation is intended to provide tram drivers operating on line-of-sight with signage giving visual information cues comparable to those for bus drivers. This recommendation builds on the RAIB's Urgent Safety Advice issued in November 2016 and recognises that driving a tram on line-of-sight has considerable similarities with driving a bus on a public road.*

Recommendations 6 LRSSB is developing tram sector guidance covering containment, escape and rescue requirements in consultation with stakeholders. This will look to consider enhanced performance requirements for saloon windows and door system integrity within new or modified vehicle design and procurement. This area is very complex with a number of risks and consequential risks associated with it. LRSSB intend to commission Research and Development in its 2021/22 business planning.

Recommendation 6 - *The intent of this recommendation is to reduce the likelihood of people being seriously injured or killed by being ejected through tram doors and windows (i.e. to provide better containment).*

Although it is not expected that ejection can always be prevented in case of overturning, the improvement of containment will deliver improved safety in a range of different scenarios such as collision with road vehicles. Any improvement to containment is dependent on the ability of passengers to easily open doors in an emergency. It is expected that implementation will build on similar research already undertaken by RSSB in respect of railway carriage windows.

Standards and Guidance

The 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. To that end, LRSSB is developing a road map using LRG 1.0 Tramways Principles and Guidance (TPG) as the vehicle by which to deliver the future documentation required by the sector.

TPG – was recently updated as part of its annual review that looked at names, dates and existing content ensuring that the document has taken account of the many new documents that LRSSB has recently published.

As part of the 2021/22 business planning, LRSSB is to conduct a comprehensive revision and restructuring of TPG documentation and will be further updated in line with:

- The latest published Standards, Guidance Notes and Codes of Practice;
- Current best practice;
- Industry recommendations;
- Innovation across the sector; and
- International experience and standards.

As a standards body the LRSSB should not be involved in the assessment or approval of derogations from standards or guidance. Such decisions remain the responsibility of duty holders as provided for in their Safety Management Systems. All derogations, however, should be reported to LRSSB and recorded on a database to inform the future review and ongoing maintenance of the standards / guidance documents. This will in turn allow LRSSB to review best practice across the sector.

In addition to the revision of TPG, Table 1 below lists additional new, revised or re-drafted standards, guidance or documentation produced by LRSSB in 2020/2021.

TAIR (Tram Accident and Incident Reporting Database Tool) Development

The majority of networks now use the TAIR platform as their primary database tool. Work continues with the other networks. Development of TAIR for RIDDOR (The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013) reporting is under consideration. The mapping exercise to link a new primary working index with the secondary risk model events index was also completed in the period.

The review and update of existing historical data against the new events index, in turn allowing systems to have a set range of standardised historical data, is progressing. Once fully complete, the revised data will be uploaded into TAIR and utilised for increased risk profiling accuracy in the upcoming revision of industry risk models.

Some works are still required to develop the alert and communications systems as well as further development of the members library to enable gap analysis to be undertaken. This work will be performed relatively quickly at low cost to LRSSB industry.

Additional further TAIR development:

- Generic risk assessments module;
- COSHH (Control of Substances Hazardous to Health) risk assessments module;
- Published RIDDOR and RAIB reports for learning and action points; and
- Horizon scanning tool – development to ensure safety guidance, reports and incident investigation results from overseas sources, in addition to other industry safety bodies, are captured with learning points disseminated.

Industry Risk Model Development

The period has seen the finalisation and issue of the remaining risk models and accompanying reports to the seven networks, along with training provided to each network's key users of their models and their output information as required.

These training sessions have also encouraged and provided initial guidance on how the networks should incorporate the risk models into their business-as-usual operations and Safety Management Systems (SMS). As the networks have become more familiar with the model, ad hoc query responses and guidance have been provided to further support the models' use.

Requests for model updates have been drawn together from the networks' feedback and assessed. This has included the system request for a further ability to record incidents in TAIR. An overlay list of incident events with mapping to the risk model hazardous events has been undertaken with subsequent re-assessment of historical data and liaison on the mapping functionality in TAIR. Work to develop a data output format from TAIR to the risk model has also taken place, as well as establishing requirements to enable import of historical data analysis into TAIR.

Further work has been undertaken with London Trams to update their risk model to incorporate their recently employed control measures, for which support and guidance was provided, including peer review of the resulting model and accompanying report.

Data collection from our international survey through partnership with the UITP (International Association of Public Transport) was concluded with a Survey Results Summary issued back to participants. This, combined with the industry's start on the Bowtie analysis, will help further refine understanding of high-consequence low-frequency events.

It is possible that additional functionality will be identified as being appropriate for the risk model, which will inevitably require funding for software development. Members have already made suggestions for future consideration in improving the functionality and scope. LRSSB and Atkins are developing a scope of improvement works for 2021 and beyond.

Guidance

New Guidance Developed

Objective	Period	Milestone achieved against initial scope	% Complete	Work undertaken in addition to initial scope	Additional planned work	Comment
LRG 4.0 Signage and Marking of Highways	2020/21	Guidance developed and published to industry.	100%	Additional update undertaken following consultation with DFT immediately prior to publication.	Monitor	Industry and DFT consulted during development of guidance.
LRG 6.0 Fatigue Management Guidance	2020/21	Draft document has been produced.	100%	Formal review undertaken by fatigue specialists Clockwork Research.	Industry consultation. Finalisation and publication of guidance post consultation.	To be completed first quarter 2021
LRG 11.0 Medical Fitness	2020/21	Draft document has been produced following industry and regulator consultation.	100%	Formal review undertaken by occupational health specialist.	Finalisation and publication of guidance.	Extensive industry consultation undertaken to ensure guidance was not over-prescriptive.
LRG 17.0 Driver Inattentiveness Monitoring Systems	2020/21	Draft guidance produced following independent research carried out by Ian Rowe Associates Ltd (IRAL).	100%	Physical trial of SIMOVE system.	Industry consultation. Finalisation and publication of guidance post consultation.	The output of the research and development work undertaken by IRAL has informed the basis for guidance that LRSSB plans to publish in summer 2021.
LRG 18.0 Emergency Escape and Rescue Guidance	2020/21	Draft guidance under development.	40%	Further research into to tram glazing and saloon design associated to new vehicles identified.	Commission research into tram glazing and saloon design.	Budget allocation in 2021/22 Business Plan
LRG 19.0 Cycle Tramway Interface	2020/21	Draft guidance in production.	75%	Visual references required to be inserted into document have been delayed due to inability to visit sites due to Covid-19 restrictions.	Industry consultation.	To be completed first quarter 2021.
Automatic Vehicle Speed Monitoring (ASVM)	2020/21	Draft guidance produced following independent research carried out by IRAL.	100%	Physical trial of SIMOVE system.	Industry consultation. Finalisation and publication of guidance post consultation.	The output of the research and development work undertaken by IRAL has informed the basis for guidance that LRSSB plans to publish in summer 2021.

Guidance

Review of Existing Guidance

Objective	Period	Milestone achieved against initial scope	% Complete	Work undertaken in addition to initial scope	Additional planned work	Comment
LRG 0.1 **Tramway Principles and Guidance (TPG)**	2020/21	Interim review of TPG completed.	100%	Decision made by LRSSB to utilise TPG document as main reference point for all associated tramway guidance.	Annual review and update of TPG under oversight of working group to be undertaken.	Working group established to undertake ongoing review and update of TPG on annual basis.
LRG 2.0 **Non-Motorised User Crossings (NMUC)**	2020/21	Review completed.	100%	Risk assessment template revised.	N/A	N/A
LRG 3.0 **Management of Electro Magnetic Compatibility (EMC) Guidance**	2020/21	Review completed.	100%	N/A	N/A	N/A
LRG 5.0 **Tramway Audible Warning and Acoustic Test Guidance**	2020/21	Review completed.	100%	N/A	N/A	N/A

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RM3 Development

LRSSB has worked closely with ORR to develop an enhanced light rail version update of the risk maturity model framework. This update is known as RM3 and is now published by ORR.

To assist in the familiarisation and application of the RM3 framework, LRSSB has worked collaboratively with the ORR to deliver RM3 briefing sessions to the sector during 2020 and 2021. Taking cognisance of feedback received from the industry following these briefing sessions, the need for a standardised RM3 audit too was identified. In response to this identified need, LRSSB is undertaking research and development associated to auditing software applications for the purpose of integrating the RM3 criteria with standardised industry metrics.

This work will enable us to review the risk maturity of the industry and of individual systems. Equally as important, duty holders from the owners group will be able to assess their relative strengths in terms of governance of their system and the industry overall.

Introduction of Bowtie XP

LRSSB have provided approximately ninety percent of the sector with training on the new Bowtie XP software platform with training delivered during January and March 2021. Further additional training sessions are also scheduled to be undertaken during 2021 to incorporate new members of staff within the industry.

Feedback from the Bowtie XP training sessions has been overwhelmingly positive with attendees, including ORR representative, commenting on the power this new tool delivers in effectively identifying risks and mitigation measures within the scope of each individual operator as well as the industry collectively.

Edinburgh Trams have commenced production of the initial top ten industry global generic risk assessments. In addition, LRSSB are liaising with Atkins and the software providers to integrate the full sector risk model data into the bowtie server database to enable a degree of automated bowtie risk assessment development in order to aid production.

Following feedback from the training sessions LRSSB are arranging to deliver human factors training to the sector to assist in the understanding of factors that may influence events. This will facilitate more accurate risk assessments and further enhance overall risk profiling.

Section 4 – Initiatives

Research and Development

In the year, LRSSB commissioned independent research into two major areas highlighted by the RAIB investigation into the Sandilands accident. Both areas covered have resulted in guidance documentation being produced that is currently out for sector consultation in line with LRSSB process.

One of these projects was Automatic Vehicle Speed Monitoring systems (ASVM). This involved the trial of the SIMOVE ASVM system in conjunction with Manchester Metrolink. Following the conclusion of this research a report has now been finalised – Automatic Vehicle Speed Monitoring (AVSM) System Trials and Research compiled by Ian Rowe Associates Ltd (IRAL). The report was completed during March 2021.

Subsequently the findings of the report LRSSB will be fed into guidance associated with the application of ASVM within the sector. This new guidance will cover the different approaches to AVSM delivering the minimum requirement in order to address the RAIB recommendation as well as incorporating additional benefits and considerations associated with AVSM systems.

The second project in this area delivered in the year was in relation to Driver Inattentiveness.

This work again involved trials and a research report has been produced – Driver Inattention System Trials Issue 2 (IRAL – LRSSB) 28th January 2020.

LRSSB is developing a guidance document for the light rail industry for the selection and implementation of systems designed to detect inattention or incapacitation of the driver and to protect against the results of this by providing a response.

It is intended that, if adopted, these two pieces of research and associated guidance will support members' compliance in regards to Recommendations 3 and 4 of the RAIB report into Sandilands.

Working Relationships – ORR, RSSB, RAIB, BSI and UITP

ORR – LRSSB hold regular meetings with representatives of the ORR to discuss any emerging issues, ongoing research developments and production of guidance.

RSSB – LRSSB has developed relationships with RSSB and BSI to enable enhanced light rail input to safety deliverables and also to be more informed regarding emerging notices and industry trends. Where required LRSSB engages with RSSB standards working groups to ensure that the interests and comments of the light rail sector are heard.

BSI – LRSSB has registered and supplied UK experts in liaison with BSI for CEN/CENELEC/ISO to attend committee meetings, standards and guidance development, review and provide a voice on behalf of the UK Light Rail Industry. Experts have already attended and provided representation both nationally and internationaly, particulary on infrastructure and engineering related issues.

Establishment of Overseas Relationships – Establishing working relationships with overseas bodies will ensure LRSSB stay abreast of developments from other nationality networks as well as potentially becoming a source of income through commercialisation of LRSSB assets such as the Risk Model and TAIR systems.

There has been particular interest from Ireland, LUAS and the Commission for Irish Rail. Data from Ireland would provide valuable additional inputs into the Risk Model and in return would give access to results and comparisons from a far wider profile for LUAS.

Currently LRSSB has established relationships with VDV (Verband Deutscher Verkehrsunternehmen (Association of German Transport Companies), UITP, TII (Transport Infrastructure Ireland), Danish Transport Ministry, APTA (American Public Transportation Association), and STTRMG (Le Service Technique des Remontées Mécaniques et des Transports Guidés) in France. Work is continuing to spread our reach to ensure LRSSB capture as much as possible in terms of safety learning and best practice from overseas. For example, hazardous event data is being captured through a questionnaire which many overseas systems are completing and submitting.

This has also been recognised as a two-way process by ourselves, and our international colleagues, with a growing interest being shown in the work LRSSB is progressing on risk identification and mitigation.

Commercialisation

The development of the risk model and TAIR is receiving significant attention from systems and governments overseas. Currently interest is being shown by Ireland (LUAS and Commission for Irish Rail), Israel, Australia, USA and the UAE with a potential for membership of LRSSB and usage of TAIR and the risk model to be offered at a commercial rate. This will enable more work to be done and potential reductions overall in member subscriptions.

Communications

The LRSSB has developed a core strategy to enhance safety communication across the sector, and, as part of this, a significant project to refresh the organisation's website is being undertaken. The website is seen as a key digital resource which should be central to the LRSSB's communications programme, and the upgrade is being developed in conjunction with a dedicated industry focus group. The outcome will be an intuitive, user-friendly site which is designed to focus on the key issues affecting the light rail sector.

The site will also be the repository for LRSSB's documentation, standards, guidance, good practice codes and reports. As such, work will continue in the months – and indeed years – ahead to continuously expand and enhance the reference materials that are available. Overall the project will ensure the website is better able to support other communications output including social media activity through platforms such as Twitter and LinkedIn and the production of safety bulletins and electronic newsletters.

Section 5 – Industry Risk Profile

National Risk Profile

The individual systems' assessed safety risk profiles have been combined to provide a view at national level and a developed industry risk profile. This has established national rankings of hazardous events and their precursors, along with the proportion of total risk they represent for the sector as a whole, with distinctions made for fatal risk and level of control held by the systems.

Use of this information provides focus for the safety management effort both at local and national sector level, as demonstrated by the collaborative work to establish national-level Bowtie risk assessments for the top ten hazardous events. Using the Health and Safety Executive's guidance, the normalised risk of fatality per year to which an individual is exposed from industry operations was also translated to national level and acts as an initial step of developing safety targets. The presentation and communication of the national profile has subsequently provided feedback to enhance risk model dashboards to aid understanding. The generation of the profile has also provided the opportunity to develop additional analysis to inform individual networks where they sit with regards to national averages. These dashboards will always continue to be refined.

Notwithstanding the events of 2020/21, LRSSB undertook an interim update of The National Safety Risk Profile, incorporating London Trams model update in March 2021. The London Trams review incorporated significant changes made to the system since their baseline application of the risk model in January 2020. Changes included the introduction of Physical Prevention of Over-Speeding (PPOS), and revised precursor weightings of significant incidents, which have occurred, since the baseline. The National Safety Risk Profile has seen a noticeable benefit following these changes updates.

National Total Collective Risk has reduced by an estimated 3% and Total Fatal Risk by 4%. Risk exposure to passengers has seen much of the improvement through these introduced control measures, resulting in a National Total Fatal Risk for Passengers decrease, of an estimated 12%.

As to be expected precursor events LRTPC.063 LRT Driver Error in Passenger Service and LRTPC.062 Staff Incapacitation have seen a reduction in their attributed Total Collective Risk. Other precursors have seen small increases in risk, namely Rolling Stock defect types, as risk is shifted to the wrong-side failure of introduced systems or risk has be redistributed to other hazardous events following London Trams incidents.

The hazardous events which appear in the National Top Ten ranked by Total Collective Risk are unchanged, however hazardous event LRTHE.017 Overturning of LRT Rolling Stock has moved from being ranked 5th to 9th. The Total Collective Risk attributed to LRTHE.017 Overturning of LRT Rolling Stock has reduced by 44% as shown in section (5.2). The Hazardous Event has also dropped to 5th, from 3rd, ranked by Total Fatal Risk. However, LRTHE.017 Overturning of LRT Rolling Stock is still the top ranked hazardous event for Passenger Fatal Risk. Models of the other networks have yet to be fully updated to take into account control measures they have also introduced since the Sandilands accident.

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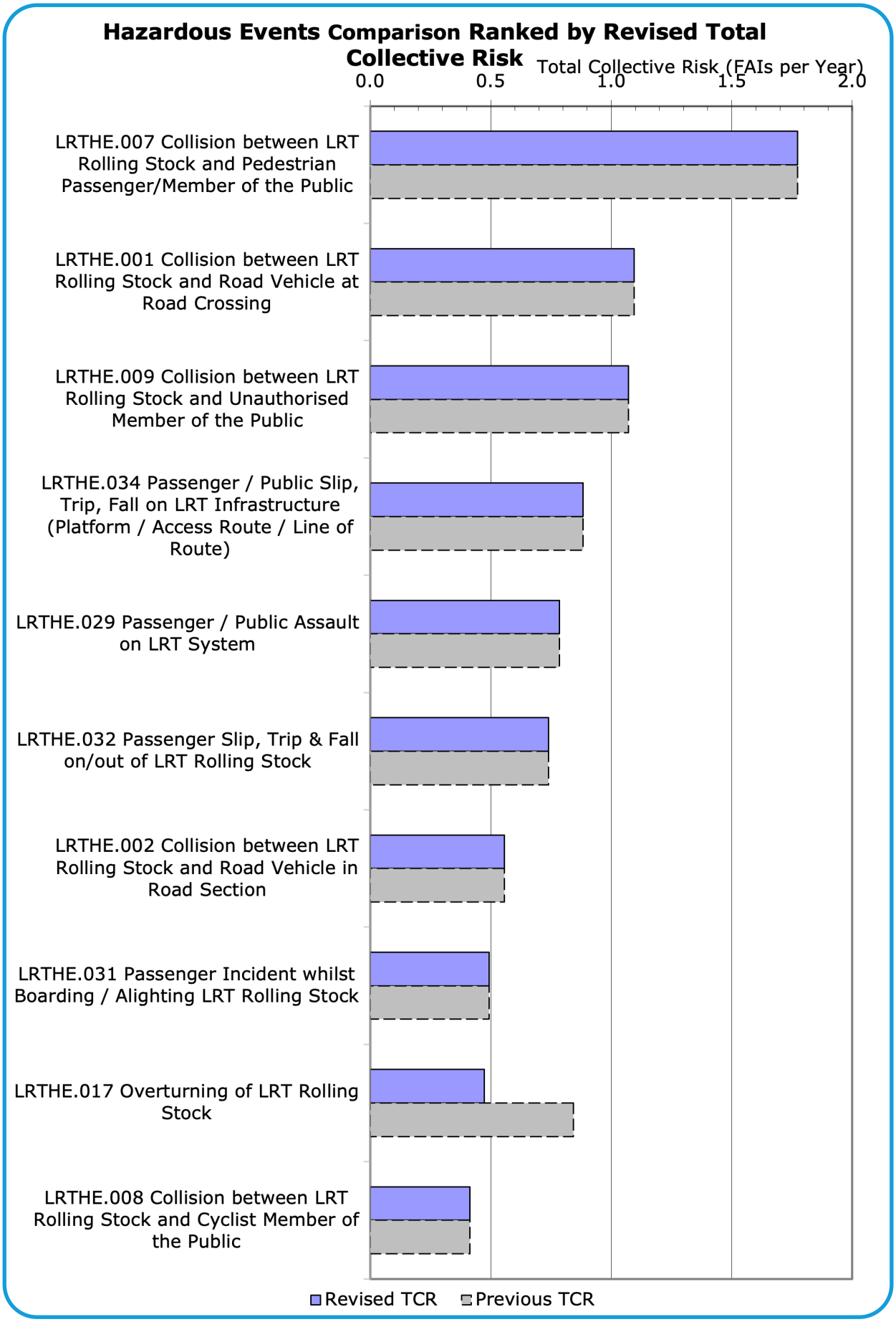
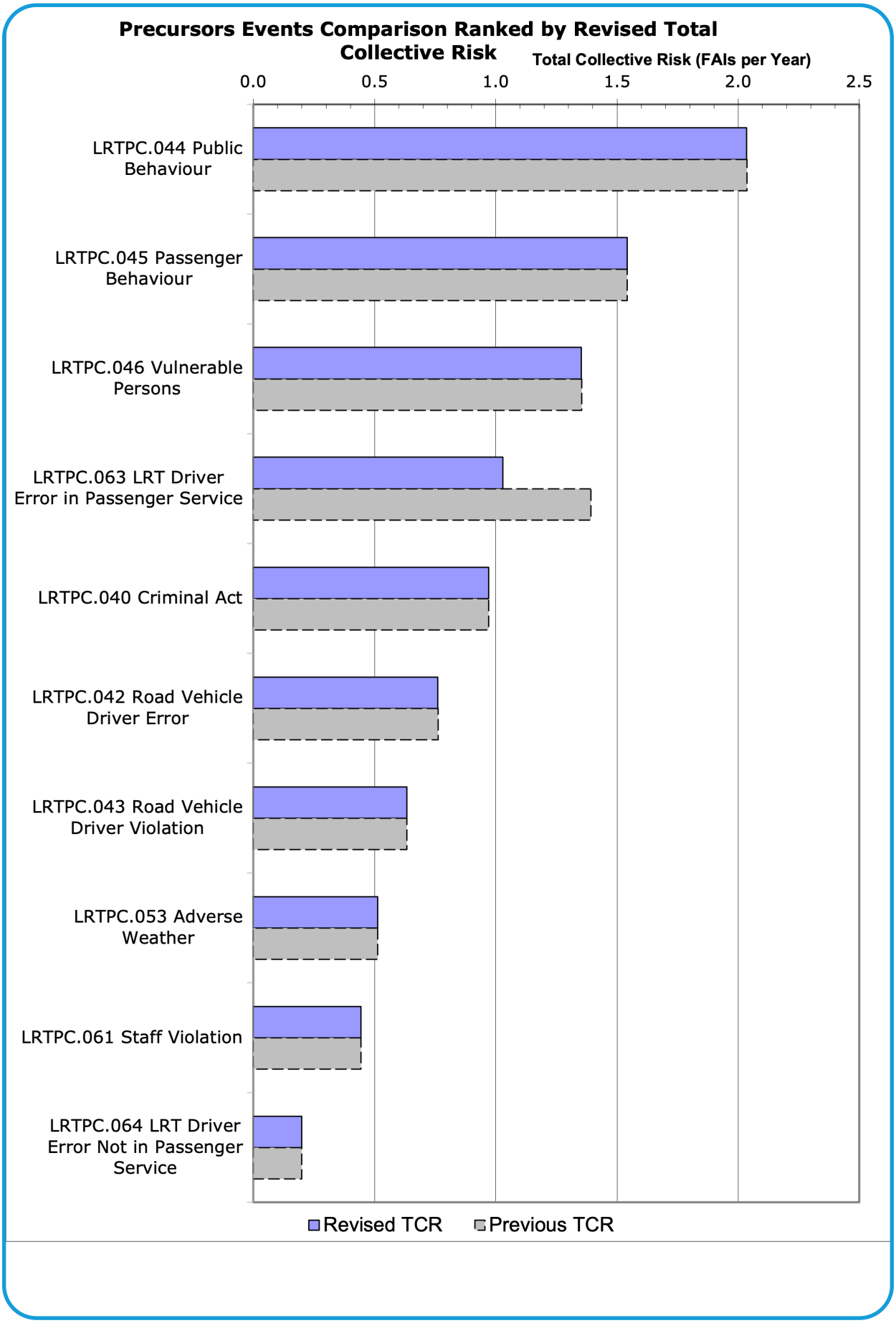
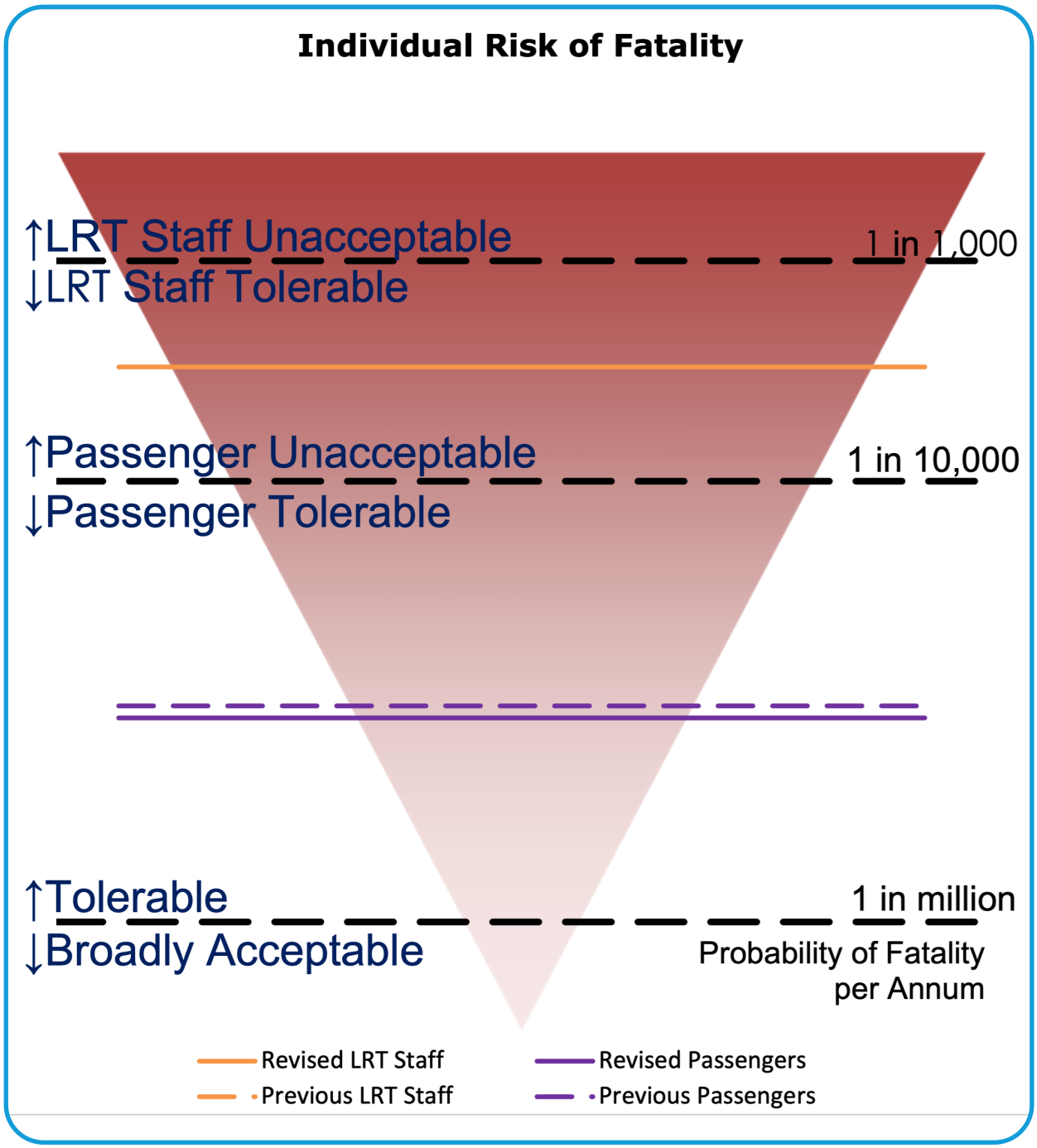
Total Collective Risk – Top Ten Hazardous Events



Total Collective Risk – Top Ten Precursors



Fatal Risk


Individual Risk of Fatality
↑LRT Staff Unacceptable
↓LRT Staff Tolerable
1 in 1,000
↑Passenger Unacceptable
↓Passenger Tolerable
1 in 10,000
↑Tolerable
↓Broadly Acceptable
1 in million
Probability of Fatality per Annum
Revised LRT Staff
Previous LRT Staff
Revised Passengers
Previous Passengers


NET

Section 6 – Funding and Finance

Figure 2 below indicates how LRSSB has apportioned the allocated funding provided into the areas and disciplines identified as requiring the most urgent attention:

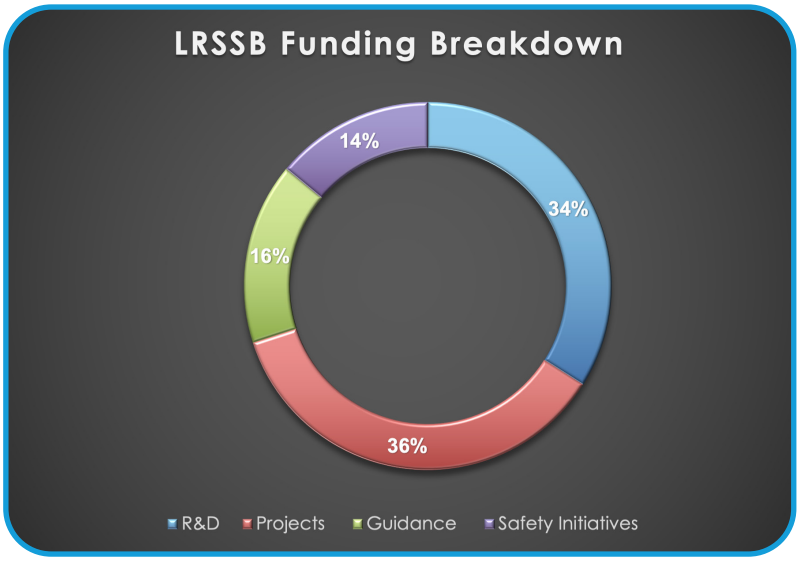


Figure 2 LRSSB Funding Breakdown

LRSSB has produced a budget forecast for 2021/22 in line with the Business Plan objectives for the period. It is believed that there is sufficient funding being provided to deliver the budgeted aspirations contained within the Business Plan. However, future planning is dependent on the securing of guaranteed sustainable funding. LRSSB is developing a three-year programme of work, that will require funding from both the DfT and the sector.

On completion of the programme of forecasted works, a costing will be produced. In addition, the investment of funding in specific areas such as research and development are designated to support and assist in the delivery of LRSSB's overall risk management strategy.

Section 7 – Programme Summay

Objectives						
Recommendations	**Period**	**Milestone achieved against initial scope**	**% Complete**	**Work undertaken in addition to initial scope**	**Additional planned work**	**Comment**
Recommendation 2 Risk Model	2020/21	Network and sector risk models produced. All networks issued with risk models and training. Individual and sector risk profiles produced with rankings of top identified risks.	100%	Development of more intuitive dashboards for network and sector risk models to provide comparative reference of risk profiles.	Full review of network and sector risk models during 2021. Establishing working relationships with overseas bodies to ensure LRSSB stay abreast of developments from other nationality networks as well as potentially becoming a source of income through uptake of non-UK operators.	Budget allocation in 2021/22 Business Plan.
Recommendation 2 TAIR Database	2020/21	Primary accident, incident and near-miss database brought online. Additional modifications to event indexes undertaken at request of sector April 2020.	85%	Reassessment of historical data in conjunction with Atkins, due to incorporation of additional events requested by sector. Modification to TAIR database to incorporate additional events and mapping to original risk model indexes. Additional training on TAIR database provided to networks. Development of data export framework for a number of systems to allow integration with existing in-house databases.	Upload of individual network historical data in standardised format to TAIR following re review if risk models against revised events indexes.	Commercialisation the development of TAIR is receiving significant attention from systems and governments overseas.
Recommendation 3 Automatic Vehicle Speed Monitoring (ASVM)	2020/21	Report compiled following independent research carried out by IRAL. Draft guidance produced.	90%	Initial overview of guidance provided to owners group by LRSSB.	Establishment of sector operator consultation panel. Finalisation and publication of guidance post consultation.	Recommendations 3 and 4 have been considered jointly. During 2020, LRSSB continued to fund independent research by Ian Rowe Associates (IRAL) to examine driver inattentiveness monitoring systems and potential options to provide Automatic Vehicle Speed Monitoring (AVSM).

Objectives

Recommendations	Period	Milestone achieved against initial scope	% Complete	Work undertaken in addition to initial scope	Additional planned work	Comment
Recommendation 4 Driver Inattentiveness Monitoring Systems	2020/21	Report compiled following independent research carried out by IRAL. Draft guidance produced.	90%	Initial overview of guidance provided to owners group by LRSSB.	Establishment of sector operator consultation panel.Finalisation and publication of guidance post consultation.	This work was informed by various bodies of research including, the SIMOVE AVSM (continuous monitoring) trial, over the summer of 2020 and operator's experiences of 'balise' systems.
Recommendation 5 Signage	2020/21	Guidance published to industry.	100%	Further work undertaken to justify and clarify guidance post consultation.	Monitor	Industry and DFT consulted during development of guidance.
Recommendation 6 Passenger Containment	2020/21	LRSSB is developing tram sector guidance covering escape and rescue requirements in conjunction with the emergency services.	40%	N/A	Commission research into tram glazing and saloon design assessing the enhanced performance requirements for window and door system integrity for future design specifications.	Budget allocation in 2021/22 Business Plan.

Research and Development

Objective	Period	Milestone achieved against initial scope	% Complete	Work undertaken in addition to initial scope	Additional planned work	Comment
Bowtie XP	2020/21	Bowtie XP – software for risk assessment has been procured. Approximately half of sector received training on new software during November 2020.	90%	Remaining sector training extended and rescheduled at request of industry to take place during March and April 2021 as a result of Covid-19 restrictions.	Integration of sector risk model ranked hazardous events and precursors into Bowtie Server database. Production of global sector Bowtie risk assessments. Provision of additional human factors training to be provided to sector.	LRSSB is currently undertaking a collective analysis of all risk models to determine the top ten ranking industry risks which will be the first to be assessed by the industry utilising the new software. Budget allocation in 2021/22 Business Plan.
RM3	2020/21	To assist in the familiarisation and application of the RM3 2019 framework LRSSB worked collaboratively with the ORR to deliver RM3 briefing sessions to the sector during 2019 and 2020.	100%	Research into integrated standardised RM3 audit tool. Procurement of Audit XP to interface directly with Bowtie.	Development of full integration of RM3 criteria into standardised audit tool that allows direct link to mitigations within global risk assessments contained within Bowtie XP software.	Following feedback received from the industry following briefing sessions, the need for a standardised RM3 audit too was identified. Budget allocation 2021/22 Business Plan.

Research and Development

Objective	Period	Milestone achieved against initial scope	% Complete	Work undertaken in addition to initial scope	Additional planned work	Comment
Automatic Vehicle Speed Monitoring (ASVM) and Driver Inattentiveness Monitoring Systems	2020/21	Independent research and development commissioned with IRAL. Reports compiled and draft guidance produced.	100%	Physical trial of SIMOVE system.	Conducted audit of guidance adopted by sector.	Engage third party to conduct review of guidance produced. Budget allocation in 2021/22 Business Plan.

Media and Communications

Objective	Period	Milestone achieved against initial scope	% Complete	Work undertaken in addition to initial scope	Additional planned work	Comment
New LRSSB Website	2020/21	New LRSSB website under development	75%	Alignment of website guidance indexes with TPG indexes for ease of reference.	Development of member's guidance portals associated to BSI, LRSSB documentation indexes in addition to other databases and sources of information.	Working group established to undertake ongoing review and development of website.
Enhanced LRSSB Digital Communications	2020/21	Use of social media platforms and digital newsletters	100%	Continued activity and monitoring of LRSSB digital media platforms including Twitter and LinkedIn. In addition, member newsletter launched with target of monthly frequency.	As communications activity increases, we plan to establish regular LRSSB e-shot bulletins to member database along with the use of other digital channels such as podcasts and video.	Increased use to deliver growth in the reach of these communication channels.
Enhanced LRSSB News Output and Profile	2020/21	Establish ongoing proactive and reactive news output both to media outlets and websites	100%	Achieved significant progress and fully aligned to LRSSB publications (e.g. guidance notes) and general activities.	As scale and scope of LRSSB activities expand, news output will continue to grow exponentially.	Monthly communications planning and review meetings established.

Section 8 – Summation

As detailed within the report it can be seen that LRSSB has continued to make advancements throughout 2020 even with the effects of the Covid-19 pandemic.

With continued funding LRSSB will ensure that the light rail sector is well placed to forsee possible future hazards and safety risks. This in turn will benefit all stakeholders, duty holders, customers and the general public.

A light rail network is a barometer by which modern cosmopolitan cities are compared. Tramways and Metro's transform their environment in many ways. By working together with members and stakeholders, LRSSB can deliver its own objectives and assist in providing a safe, sustainable mode of transport. Safety principles are the foundation of LRSSB, and at the core of every successful light rail network.

The UK can become the lead in raising International Standards and Benchmarking, through continued and increased collaboration. It can also become the leading light in safety across all industries and transport modes.

From the initial formation and development of the LRSSB by industry members, stakeholders and statutory bodies, through the second year of operation, it is clearly evident that LRSSB has now become an integral part of the light rail sector in the UK. LRSSB's open-minded, driven and forward-thinking approach to interrogate and invest in initiatives that will drive standrads within the industry is self-evident. With the continued support of stakeholders and members, LRSSB can deliver real benefit for the light rail sector, today and in the future.

LRSSB

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