

WCRR

BIRMINGHAM UK | 2022

13th World Congress on Railway Research: Call for Papers

Reshaping our railways post-pandemic: Research with an impact

6 to 10 June 2022

Birmingham, United Kingdom

Hosted by:



A Better,
Safer
Railway



UNIVERSITY OF
BIRMINGHAM



Foreword from the Organising Committee Co-Chairs

RSSB and University of Birmingham are delighted to announce the **13th World Congress on Railway Research – WCRR 2022, which will be held 6 – 10 June 2022** in Birmingham, UK at the International Convention Centre.

WCRR is the world's largest international congress on railway research providing the best forum for the gathering of researchers, technical experts and industry leaders championing innovation. It provides unparalleled opportunities for networking, knowledge sharing, and discussing the latest and most promising advancements across the global railway community.

The 2022 congress carries the theme of **Reshaping our railways post-pandemic: Research with an impact**. With the Covid-19 pandemic having a huge and long-lasting impact on the rail sector, new knowledge and novel solutions generated by research are of greater importance than ever before, and will be essential in our recovery.

Increasing research quality and speed, putting findings quickly into action and fostering international co-operation to work together on the common challenges faced by the railways will be key to our ability to attract customers back, deliver great value for money and lead on transport sustainability.

Over the past two decades, the WCRR has supported these imperatives by showcasing at every event the very best new knowledge and solutions, celebrating and learning from the successes of one another, and nurturing our talented global workforce.

This is why we invite you and colleagues to please submit abstracts of papers for presentation at the 2022 Congress. We look forward to reading your submissions and seeing you in Birmingham in 2022.



Luisa Moisis
R&D Programme Director
RSSB



Prof. Clive Roberts
Head of School of Engineering
Director,
Birmingham Centre for
Railway Research and
Education (BCRRE)

Overview

Call for Papers

The Organising Committee for the 2022 World Congress on Railway Research (WCRR) are calling for papers to address the theme:

Reshaping our railways post-pandemic: Research with an impact

The 2022 edition of WCRR aims to focus on research that has delivered, or will deliver, real change within the rail industry, with projects that offer benefit to passengers, freight customers, the environment and the economy as a whole. The Congress will highlight the vital role research has to play in finding solutions that make rail more affordable, sustainable and attractive to passengers in a post pandemic world.

WCRR aims to promote the tangible value of railway research and the benefits that international collaboration brings to research activities. Tangible impact and knowledge sharing will be key factors that will inform the selection of papers.

Session Topics and subtopics

WCRR 2022 will be structured around eight session topics that demonstrate how research is delivering benefit against key railway objectives, covering a full range of beneficiaries, from individual users to society as a whole. During the abstract submission process you will be asked to select one sub-topic which your research relates to best. The relevant subtopics can be found on pages 9 and 10.



Low emissions



Reliable and easy to maintain fixed assets



Easy to use for all



Reliable and easy to maintain asset interfaces



Optimised operation of trains



Safety and security



Reliable and easy to maintain moving assets



Rail competitiveness

Overview

Low emissions - Research aimed at minimising carbon, air and noise emissions. Work that supports cheaper and less disruptive electrification, zero carbon diesel replacement, greater energy efficiency and removing emissions at source.

Easy to use for all - Research that supports the delivery of an excellent travel experience to regular and occasional passengers thanks to dependable real-time information, innovative payment methods, and improved solutions for accessibility.

Optimised operation of trains - Research supporting the delivery of train services that are reliable and enable network capacity improvements. Covering real-time traffic management, better train planning and simulation, and shorter headways together with new solutions at nodes.

Reliable and easy to maintain assets (moving, fixed and interfaces) - Research that supports improved reliability and availability of assets through improved design, remote and automatic inspection, and targeted interventions, while reducing whole-life cost. Work that is developing more reliable assets needing less out-of-service time to increase customer confidence and demand. Research that improves the understanding of how humans and machines can best work together.

Safety and security - Research that is focused on improving the physical, digital and biological safety and security of railways. Covering safety assessments, innovative risk modelling, improved mitigations particularly for biosafety risk, insights and management of human factors.

Rail competitiveness - Research addressing social and economic challenges and opportunities, particularly post-COVID challenges, relating to changed demand, novel rail offering, and new forms of revenue generation. This also includes rail integration with other modes in the context of transport on demand.

The UK Rail Technical Strategy provides more information on a number of these priority areas and includes route maps outlining how technical advancement can be made, for more information visit: railtechnicalstrategy.co.uk

Overview

Demonstrating Benefit

The international rail community has the opportunity to use research and innovation to address some of the biggest challenges facing the industry and society as a whole. The impact of the COVID-19 pandemic has been felt by railway communities all over the world and the research community is continuing to work together to support recovery and ensure excellent service in a post-pandemic world.

A key way to ensure research is successfully implemented is to identify how it makes the railway better for its users and the wider society, and to work with



Happy customers

The mode of choice for passengers and freight



A vibrant sector

A railway that attracts investment and talent



Stronger economy and society

An accessible and affordable mode that supports the economy



Better environment

Sustainable operations with a positive environmental impact

Abstracts

Abstract submission process

Abstracts must be submitted using the WCRR 2022 online abstract management website (Firebird), this can be accessed via the WCRR website: wcr2022.co.uk No other means of submission will be accepted.

After writing your Abstract, click on the “Call for Papers” link to access the online conference management system. The submission process has been split into five stages. You will be able to paste your Abstract (text, tables and equations) into the content box provided in the submission form. You will be provided with a word count on the bottom right-hand of the screen.

You will also be asked to provide information about the paper author(s) and affiliations.

Types of Presentation

There will be two types of presentations at WCRR 2022: Oral Presentations and Interactive Presentations.



Oral Presentations

15 minute presentations followed by question and answer session. Best suited to topics that are of interest to a wider audience, covering subjects that will appeal to a broad range of experts.



Interactive Presentations

Interactive session using visual aids (digital posters and videos) featuring 5 minute presentations followed by smaller group discussions. Best suited to specialist technical presentations on a specific research topic. These presentations can be supported with additional demonstration material.

Authors of Abstracts will be asked about their preferred presentation type. The author's preference will not affect the chance of their Abstracts being selected and all selected papers will be treated as equally important in the Congress Proceedings, differing only in the format of the presentation sessions.

Please note that the Congress organisers will make the final decision on the type of presentation to be assigned, which may not be able to accommodate your preference.

Abstracts

Abstract requirements

In the Abstract submission section of the online conference management system, you will be asked to describe the content of your research, please provide details of the following:

1. The link with the related sub-topic
2. Summary of challenge(s) addressed by this research
3. The methodology
4. Results or expected results
5. What is new about the research?
6. Take up so far and/or implementation plan
7. Desired outcome and impact of research for key beneficiaries
8. Potential for international collaboration

Figures and equations

Figure(s) are highly recommended to be included (though not required), to help explain/visualise your ideas (maximum 2 figures). The figures can be graphs, tables, photos, illustrations or anything else that will help the reader understand your research. Equations are not expected or required but may be included if needed.

Abstract text length

The total length of the Abstract is the sum of the number of words of all the paragraphs of items 1 to 8 described above, and this total must be a minimum of 800 words and a maximum of 1200 words (words in the figures, tables, and equations, including captions, labels, and legends will not be counted towards this total), and must be written in English. The text length of EACH of items 1 to 8 should be a minimum of 1 complete sentence, and a maximum of 500 words.

Extent of content originality

Abstracts that have been submitted recently to other congresses will not be accepted. If you are submitting a paper on a subject that you have presented at previous WCRR congresses, then the paper must focus on the new developments since then. Commercial papers (i.e. advertising a product) will not be accepted so please emphasize the research content in your Abstract.

Copyright

At the time of submitting your full paper, you will be asked to also agree to a copyright transfer statement to transfer publication and other rights to the Congress organizers. Details will be available online at a later date.

Abstracts

Implications of submitting an Abstract

By submitting an Abstract, it will be expected that author has the authorisation from their organisation to submit a full paper for presentation at WCRR 2022, if the Abstract is selected in the review process.

If your Abstract is accepted as a paper for presentation, you will be expected to submit a full paper and to attend the Congress to present it, in either an Oral or Interactive session. Presenters of papers must attend the Congress and must present their papers in person.

To do this, the presenters must register for the Congress online. Failure to register for, attend and present the paper in person may result in the paper being excluded from being published in the Congress Proceedings.

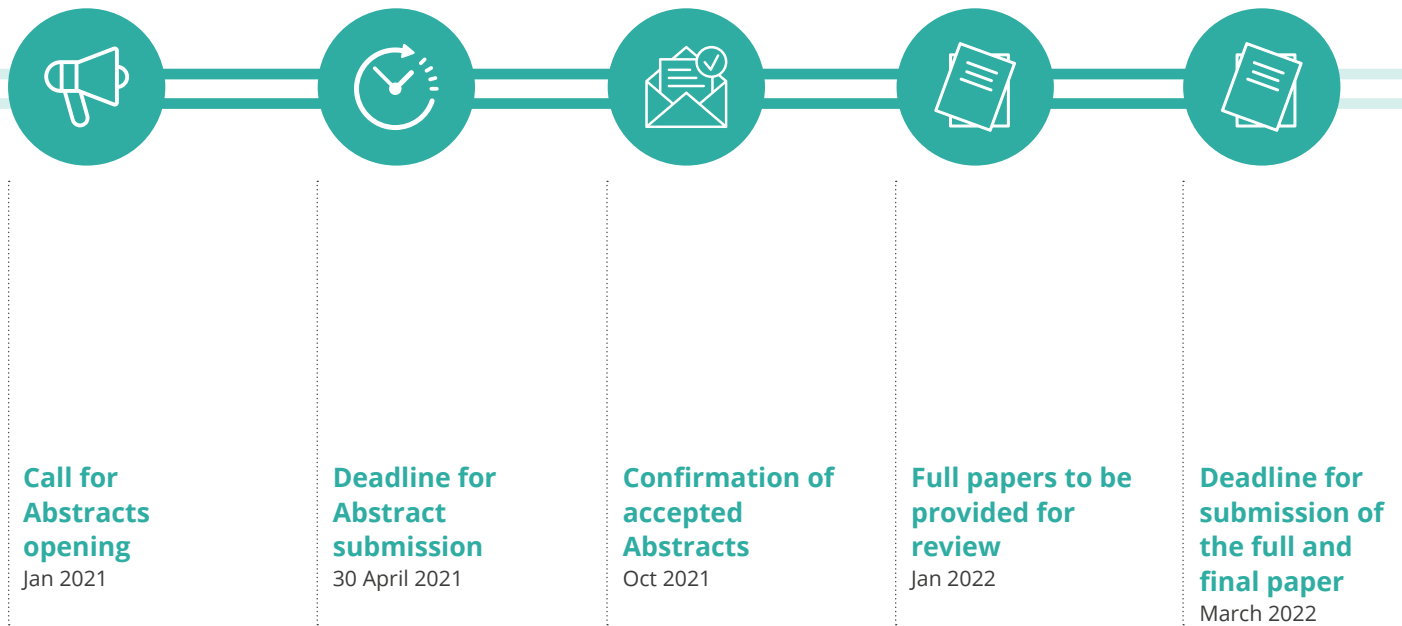
Criteria for Abstract Selection

Abstracts will be assessed using the following criteria which will have weightings attached.

- **Thematic relevance** - Is the abstract relevant to one or more of the Conference themes and topics?
- **Quality of content** - Is the abstract well written, technically sound, with the methodology, results and conclusions clear and easy to understand?
- **Take up and implementation** - Is it clear how the results are practically implementable and useful to improve the railway for its customers and the wider society?
- **Innovation and scientific contribution** - Is this research new/novel or has it been done before by someone else (or by the author)?

Deadline for abstract submission: 30 April 2021

Timeline







Congress Proceedings

All full papers accepted will form part of the Congress Proceedings and be made publicly available on SPARK (www.sparkrail.org).



Contact

If you have any questions regarding the submission of your abstract, please contact abstracts@wccr2022.co.uk or call +44 (0)117 906 4509.

List of Topics and Subtopics

TOPICS	SUBTOPICS
 <p>1.0 Low emissions</p>	<ul style="list-style-type: none"> 1.1 Zero carbon emission trains 1.2 Reduced carbon footprint railways 1.3 Energy storage technology 1.4 Noise/vibration countermeasures 1.5 Measuring and reducing air pollution 1.6 Energy efficient solutions
 <p>2.0 Easy to use for all</p>	<ul style="list-style-type: none"> 2.1 Attracting customers by understanding their needs and behaviours 2.2 Widening accessibility 2.3 Passenger comfort 2.4 Passenger flow modelling 2.5 Passenger information 2.6 Ticketing solutions 2.7 Rail attractiveness in multimodal journey 2.8 Door-to-door intermodal freight/logistics
 <p>3.0 Optimised operation of trains</p>	<ul style="list-style-type: none"> 3.1 Rail time traffic management 3.2 Train planning 3.3 Disruption management, including data and predictive analytics 3.4 Increasing capacity and managing high capacity lines 3.5 Timetabling 3.6 Freight/logistics dry port; transfer technologies in intermodal transport 3.7 Automated/autonomous operation 3.8 Wayside train monitoring and train detection 3.9 Signalling and communication systems 3.10 Freight tracking, monitoring and control
 <p>4.0 Reliable and easy to maintain moving assets</p>	<ul style="list-style-type: none"> 4.1 Rolling stock design for passenger rail 4.2 Rolling stock design for freight rail 4.3 Rolling stock components/subsystems 4.4 Braking performance 4.5 Rolling stock maintenance 4.6 Condition-based maintenance, condition monitoring, inspection and detection, including data and predictive analytics 4.7 Asset management for rolling stock 4.8 Heavy haul; faster, heavier, longer freight trains 4.9 Lightweight vehicles

List of Topics and Subtopics

TOPICS	SUBTOPICS
 <p>5.0 Reliable and easy to maintain fixed assets</p>	<ul style="list-style-type: none"> 5.1 Construction and restoration of new lines 5.2 Structures (bridges, tunnels, stations) 5.3 Materials and track components 5.4 Electric power/catenary facilities 5.5 Condition-based maintenance, condition monitoring, inspection and detection, unmanned aerial vehicle technology in maintenance, including data and predictive analytics 5.6 Rail/track/infrastructure maintenance 5.7 Civil engineering 5.8 Asset management for infrastructure
 <p>6.0 Reliable and easy to maintain asset interfaces</p>	<ul style="list-style-type: none"> 6.1 Rail/wheel (vehicle-track) interaction 6.2 Rolling stock/pantograph-catenary interaction 6.3 Electromagnetic compatibility 6.4 Test, homologation, and cross-acceptance 6.5 Global certification for innovative product development
 <p>7.0 Safety and security</p>	<ul style="list-style-type: none"> 7.1 Safety assessment/evaluation 7.2 Security, including cyber security 7.3 Level crossings 7.4 Train operation safety, driver and crew, human factors 7.5 Disasters and countermeasures/recovery 7.6 Derailment/capsizing 7.7 Infrastructure resilience in extreme events 7.8 Bio safety and security
 <p>8.0 Rail competitiveness</p>	<ul style="list-style-type: none"> 8.1 Rail cost base 8.2 Infrastructure financing, ownership, and public/private investment 8.3 Improving demand forecasting 8.4 Low-cost operation, highly competitive railways 8.5 Human resources, work force development and training 8.6 Railway social value 8.7 Open market: business trends, new players and models, new opportunities

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