



**CALL FOR PAPERS**

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**2022.02.08**

**CALGARY  
2022**



**CONGRÈS MONDIAL DE LA VIABILITÉ HIVERNALE ET DE LA RÉSILIENCE ROUTIÈRE  
8-11 FÉVRIER 2022**

**WORLD WINTER SERVICE AND ROAD RESILIENCE CONGRESS  
FEBRUARY 8-11, 2022**

**CONGRESO MUNDIAL DE VIALIDAD INVERNAL Y RESILIENCIA DE LA CARRETERA  
8-11 FEBRERO 2022**

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[www.piarc-calgary2022.org](http://www.piarc-calgary2022.org)

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**Canada**

# XVth World Winter Service and Road Resilience Congress Calgary 2022

## *“Adapting to a Changing World”*

PIARC (World Road Association) is calling for individual contributions on selected topics for the XVth PIARC World Winter Service and Road Resilience Congress, which will be held in Calgary (Canada), 8-11 February, 2022.

The *World Winter Service and Road Resilience Congress* is a world-class event that builds on decades of PIARC experience. It brings together road experts and practitioners from across the globe. This will be the 16th edition of the International Winter Road Congress, which PIARC has organised every four years since 1969.

The 2022 Congress will be structured around two Themes: Winter Service and Resilience.

**The official languages of the Congress are English, French and Spanish.**

### **SUBMISSION OF ABSTRACTS AND FULL PAPERS**

Contributions are invited only on the topics described below. Authors are invited to submit an abstract, before **30 November 2020**, using the online facility from the Congress website at:

<https://abstracts-calgary2022.piarc.org/>

The abstract must be written and submitted in English, French and/or Spanish, with a maximum of 400 words (English is highly recommended for evaluation and dissemination purposes).

All papers must be original work available to be released for publication. Material that has been previously published will not be accepted. Any reference of a political, commercial or advertising nature must be excluded from the papers. The indication of a brand name should be excluded in the title and in the abstract.

The papers should present case studies, research results and/or practical experience related to the topics of this call.

The abstracts will be reviewed anonymously by PIARC Technical Committees and decisions will be notified to the authors before 15th March 2021. Authors of accepted abstracts will be invited to submit a full paper before **15 July 2021**. The full papers can be submitted in English, French and/or Spanish (it is recommended to submit in as many languages as possible in order to maximize dissemination).

These will be reviewed by PIARC Technical Committees and decisions regarding publication and requests for amendments will be notified to the authors before **15 October 2021**.

The papers will be evaluated on the originality of the content, the technical interest and the applicability and transferability of the results.

All accepted proposals will be presented during poster sessions and will be included in the Congress proceedings. Outstanding contributions will be selected for oral presentation during the technical sessions of the Congress.

Publication of the accepted papers is subject to the registration of at least one of the co-authors to the Congress.

### **PIARC PRIZES 2022**

Prizes will be awarded to the best papers among individual contributions as a result of the call for papers.

More information will be released on the Congress website later.

### **KEY DATES**

Call for papers	From July 2020
Deadline for authors to submit abstracts	30 November 2020
Notice of acceptance of abstracts	15 March 2021
Deadline for authors to submit full text of papers	15 July 2021
Notice of review of papers	1 October 2021
<b><i>XVth World Winter Service and Road Resilience Congress - Calgary 2022</i></b>	<b><i>8-11 February 2022</i></b>

# XVIth World Winter Service and Road Resilience Congress Calgary 2022

*“Adapting to a Changing World”*

## CALL FOR PAPERS

The 2022 Congress will be structured around two Themes: Winter Service and Resilience.

Authors are invited to submit an abstract, before **30 November 2020**, using the on-line facility from the Congress website at:

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Contributions are invited only on the topics described below. Papers that fall outside this scope will not be considered.

## WINTER SERVICE THEME

### Topic 1: Extreme winter situations in cold climate areas

During extreme winter events, standard response plans may no longer be valid. These events can have significant consequences for society. In many countries there are roads in areas with extreme conditions such as mountain passes requiring convoys, roads in open areas exposed to snow drift and roads vulnerable to avalanches. But extreme weather conditions can also happen anywhere; examples include heavy snowfall, freezing rain, extreme cold, fast changing weather conditions, fast increasing temperature and melting snow which can cause landslides or flooding.

How can road agencies cope with these challenges and plan to act accordingly emergency situations regarding:

- Organization
- Management
- Equipment
- Contracts
- Information
- Transportation of dangerous goods

### Topic 2: Effect of climate change on winter service

Winter service is dominated by climate and local weather events. How will climate change affect winter conditions and how will it affect winter services? How can winter service organizations respond considering a benefit/cost analysis? What are appropriate planning periods and opportunities for technology development, new or updated strategies, and quality control of performance necessary to respond to climate change? Papers might include:

- Methodological approach to climate change and how to simulate its evolution
- Taking into account the increased variability in weather events; their occurrence and strength
- Impact of climate change on “winter road climatology”
- Operations’ solutions to meet climate change
- Changes required in organization, workforce, equipment and materials (to meet the needs from more extreme event)

### Topic 3: Road weather information

MDSS (maintenance decision support system), ITS and use of mobile data are the new tools to assist in delivering winter service operations and providing information to the public. Presentations will be made on innovations, technology and information related to decision-making such as:

- Policies and management of road weather data
- Integration of road weather information with predicted traffic, planned maintenance, anticipated incidents etc.
- Using assembled weather forecasts (confidence interval, probabilities) to better manage the risk and the cost of a decision
- Using road weather information to improve road condition forecasts
- Using road weather information to enhance infrastructure resilience
- Using road weather information to model and forecast surface transportation and weather events
- Using road weather and surface condition data collection, including big data approach (mobile data, etc.)

### Topic 4: New technologies and methods in winter service

Winter service evolves over the years with ongoing development and research. This topic covers all subjects concerning innovation in techniques and technologies in winter service.

#### *Techniques*

- Application of de-icers and anti-icers
- Improvement in the use of abrasives
- Snow and ice clearance procedures and methodologies
- Sustainable and adaptive maintenance procedures
- Protection against snowdrifts and avalanches

Excludes:

- Urban areas
- Extreme weather situations

#### *Technologies*

- New snow and ice clearing equipment
- Automation of snow and ice control
- New or alternative chemicals or materials
- Route selection and optimisation
- Specifications and standardisation of equipment and materials
- Measurement of residual winter chemicals
- Sustainable products or equipment

Excludes:

- Weather forecasting and road weather information service (RWIS)
- Data collection
- Communication with road users
- Connected and autonomous vehicles (CAV)

## Topic 5: Winter maintenance management

Administration of winter service activities involves the planning and organization of many functions of road agencies and requires significant resources. Winter service is part of the operational strategy of Road Administrations. The policies and tools these administrations use in its management are the subject of this topic.

- Strategic planning and organization policies
- Definition and measurement of Levels of Service
- Regulations relating to the use of roads (example: use of winter tires)
- Cost/benefit analysis
- Sustainability considerations in winter service planning
- Professional training
- Outsourcing / Contracting winter service
- Interaction with road users/customers
- Performance management

## Topic 6: Road user communications and connected and autonomous vehicles during winter

This topic will look at what winter information the general public want and need to know, and the best platforms to use to ensure the information can be delivered clearly and efficiently using both manual input and information being received and sent from connected vehicles. Also, what are the effects winter conditions will have on connected and autonomous vehicles; and the effect connected and autonomous vehicles on winter service?

- What information does the travelling public need to know?
- What are the best and safest platforms to use to get the information in the public domain?
- How can information from the public be used to assist winter decisions and operations?
- How can connected vehicles assist with live information from the roads?
- How is it best to send information and current conditions to connected vehicles?
- What impact do snow and ice have on the safe use of autonomous vehicles?

## Topic 7: Winter service in urban areas

Maintenance of the urban network can vary from major highways to dead-end roads where space is very limited. Most people live in cities and many do not use personal transportation. Multimodal transport is common in most cities, snow and ice in winter has an impact on different types of transport and their connections. Due to the intense use of urban areas the environment of these areas is exposed to winter service operations. Papers might include:

- Optimization and minimization of the routes for winter service vehicles
- Treatment methods, materials and vehicles for winter service on different types of bicycle facilities, sidewalks and pedestrian areas or cluttered areas
- Accessibility for those with reduced mobility (e.g. tactile paving) during winter events
- Equipment and layout of urban areas, what to do with the snow, store, remove or thaw?
- Accounting for winter weather during the planning/scoping phase of roads
- Solutions to ploughing different surfaces without disadvantaging any transport mode
- How to manage different responsibilities and regulations
- How to define a standard and best practice in cities also for multimodal transport (public transport, pedestrian, bicycle, bus, car)
- Methods and technologies for environmentally friendly winter service
- Snow falling from roofs/bridges etc.

## RESILIENCE THEME

Road networks and road transport systems are exposed to various threats that affect their operations and structural integrity. This includes climate change, natural or man-made disasters, extreme weather events, pandemics, together with challenges resulting from aging infrastructure, increased or heavier traffic, use of non-standard equipment on roads, etc. Road authorities and other organisations need to design and implement policies, strategies, holistic methodologies / frameworks and actions to increase the resilience of the road transport system. Resilience is the ability to prepare, respond, recover and adapt from such threats. Such strategies and policies need to enhance resilience of road systems during the design, construction, maintenance and operations of roads.

### Topic 8: Best practices for increasing resilience in road networks

This call seeks to identify best practices that increase the resilience of the road transportation system to all threats/ hazards, including:

- climate change and extreme weather
- aging infrastructure
- natural disasters
- man-made disasters
- and cyber-physical threats

We encourage submissions that address the assessment of resilience, implementation of actions to increase resilience, as well as identification of the economic, social and environmental aspects of resilience management, and the cost-effectiveness of proven adaptation strategies.

This also includes the development of climate change adaptation frameworks for road infrastructure and identification of methodologies for risk management and data requirements (e.g. innovative practices in terms of acquiring, processing and sharing forecasting data and risk analysis, as well as the development of platforms integrating geographic information systems -GIS- and asset management systems). Vulnerability assessments, prioritising risks, developing and selecting adaptation responses and strategies, and decision making may consider new and innovative methodological approaches, in particular criticality assessment, and adaptation pathways.

Best practices should focus on resilience, with special attention to actions that help to prepare, respond, recover and adapt to future threats/hazards.

### Topic 9: Disaster and Risk Management

Countries that experience disastrous situations acquire unique management knowledge and develop tailored countermeasure technologies based on their experiences. As societies diversify, disaster damage changes as society changes. Therefore, the type of technology necessary to manage disastrous situations needs to continually adapt as the needs of road users and of the society change. Current trend in the management of disastrous event pay more attention to the quality of the management. Various available data/information can be easily collected and provided between road administrators and road users. The interaction with the public and other organization is also a key word for producing better results. This compares to the traditional disaster management approach of prioritizing making infrastructure safe. New or updated managing approach and techniques therefore welcome for the discussion.

Papers shall deal with the following topics:

- Application of advanced information and communication technology
- Application of user or third-party based data/information such as big data
- Communication with road users using social network technology
- Technology for reducing disruption time in disastrous event such as emergency measures or emergency procurement system
- Disaster, risk, and resilient management approach considering social impact and financial resilience
- Promotion of coordination and cooperation with road related organizations on disaster management
- Case studies of good practice of the management of disastrous event

## Topic 10: Improving resilience of Road Network Operations through ITS and new technologies

When disruptions happen the ability of road operators to deliver information properly to road users may be compromised and the efficiency of road operations may be jeopardized. Hazards occurring along the network (like winter extreme situations or high impact events for example) can be a challenge for many Road Operators in terms of ensuring the viability of the road, and therefore the mobility of people and goods along the network itself.

New technologies offer new possibilities to engage with road users and avoid disruptions, such as:

- Connectivity (i.e. V2X) secures a faster transmission of data than ever before, allowing road operators to fast track road operations;
- Big data and advanced analytics (i.e. machine learning and AI) allow road operators to perform better especially in times of crisis and emergencies, ensuring better information in a sensible short period together with better decision-making processes;
- New methods of data collection (i.e. probe data) complement the panel of information in order to provide customized services to users.

This theme includes all papers that provide experiences of how data collection, use of new technologies and analysis represent for road operators valuable assets in order to provide not only basic information but also real value to road users, improving the efficiency of road network operations.

## Topic 11: Resilient pavements

We encourage submissions that address:

- Resilience of pavements and roadside infrastructure, in urban and rural areas
- Experiences with adaption of resilient pavement designs and materials, e.g. to non-standard tires such as new generation wide based single tires,
- Use of technology for post-disaster investigation and monitoring resilience
- Use of advanced pavement management approaches to mitigate/incorporate natural or man-made disasters may also be considered
- Materials with the potential for self-healing
- Pavement surfaces that retain their characteristics irrespective of climatic variations, etc.

The papers can be based on theoretical modelling, laboratory research, in-situ performance evaluation or case studies.

## Topic 12: Bridge resilience considering natural hazards

With regard to road bridges, concerns associated with climate change are the extreme variation of air temperatures, extreme wind due to hurricanes and typhoons, sea level rise, frequency and intensity of rainfall and associated flooding, and so on. In addition, seismic events have caused severe damage to road bridges in seismic areas that have resulted in closing of road networks.

For this topic, papers are invited which describe the following aspects:

- Bridge recovery after the occurrence of natural hazards
- Mitigation to accommodate effects due to natural hazards for road bridges
- Measures for increasing resilience to climate change
- Effects of climate change on bridge design and maintenance
- Mitigation to accommodate climate change effects
- Climate change resilient bridges
- Road Bridges damage-resilience in seismic areas
- Seismic retrofit techniques to enhance resilience of road bridges

## Topic 13: Resilience of Earth Structures to natural hazards

It is essential to study the effect of natural hazards on existing earth structures and the measures used for their remediation. Specific measures are sought in design and construction of earth structures to prevent the effect of natural hazards on their performance over their design life.

Natural hazards include, but are not limited to:

- Heavy rainfall events and flooding
- Wind erosion
- The action of snow and frost penetration
- Rock falls
- Soil moisture deficit
- Earthquakes, and
- Any other effect of global climate change

Papers are invited from any geographical location and involving any techniques that have been utilised in the past to improve earth structure performance irrespective of the complexity of the method employed.

Papers may eventually be included in a PIARC report about the resilience of earth structures.

## Topic 14: Resilience: measures to keep a road tunnel safely available for traffic under varying circumstances

Compared to the open road, tunnels are relatively vulnerable when it comes to availability for traffic, because of the many required safety measures to enable safe passage. Moreover, a traffic incident or fire in a tunnel often requires more time and effort to normalize the situation than on the open road. So, in the context of road tunnels, resilience could be described as the ability to keep the tunnel safely available for traffic, during various abnormal situations, like traffic incidents, technical malfunctions, extreme weather conditions, other natural and man-made hazards, or maintenance and refurbishments.

Papers on this topic should describe cases in which measures were planned and implemented to improve road tunnel resilience in general or for a specific road tunnel, focussed on events or circumstances that are particularly relevant for your situation or experience.

The analysis, design, implementation, monitoring and effectiveness of the measures in question would be interesting for the reader - “do’s and don’ts”, recommendations, etc.

## Topic 15: Resilience of Roads and Roads transport

PIARC’s Strategic Plan recognizes resilience as one of the global issues that it should address. Papers that will be submitted to this topic should relate to PIARC’s Strategic Plan. They can address in particular:

- Resilience of road administration
- Resilience and urban mobility related to road infrastructure and intermodality
- Resilience and mobility in rural areas
- Resilience of road freight transport
- Resilience, safety and sustainability of roads
- Asset management and resilience
- Security aspects of road resilience

All papers are welcome as long as they deal with roads and road transport. Papers that focus on Climate change and resilience of road networks, Disaster management, Road network operations, Pavements, Bridges, Earthworks, Tunnels should be submitted to the corresponding topic (topics 8 to 14).

### CONTACT INFORMATION

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