

BULLETIN

N° 1

CALGARY
2022



XVI WORLD WINTER SERVICE AND ROAD RESILIENCE CONGRESS

ADAPTING TO A CHANGING WORLD

Calgary, Alberta, Canada | February 8-11 | English





Photo: Stephen Avenue Walk by Andrew Bain

© Her Majesty the Queen in Right of Canada,
as represented by the Minister of Transport, 2020.

*Cette publication est aussi disponible en français sous le titre
XVI^e Congrès mondial de la Viabilité hivernale et de la Résilience routière.*

*Esta publicación también está disponible en español bajo el título
XVI Congreso Mundial de Viabilidad Invernal y Resiliencia de las Carreteras*

TP No. TP 15446E

Cat. No. T22-244/1-2020E-PDF | ISBN 978-0-660-35414-9

Cover photo: Canada Credit: Transport Canada

TABLE OF CONTENTS

WELCOME MESSAGES	4
WHAT IS PIARC?	6
WHY YOU SHOULD ATTEND THE CONGRESS	6
CITY OF CALGARY AND THE CALGARY TELUS CONVENTION CENTRE	7
CONGRESS THEME, PROGRAM AND EXHIBITION	8
CALL FOR PAPERS	10
LANGUAGES	19
IMPORTANT DATES	19
ENTRY INTO CANADA	19
CONTACTS	20



Photo: Stampede dancing on Stephen Avenue Walk by Travel Alberta/Colin Way

WELCOME MESSAGES



MINISTER OF TRANSPORT
The Honourable Marc Garneau

Canadians know winter. From the passes through the Rocky Mountains to the coastal Atlantic provinces and all points in between, including the tundra in our territorial north, Canadians have had to adapt to winter and the challenges the season brings.

As a longstanding member of the World Road Association, now known as PIARC, Canada is proud to be the host nation for the 2022 *World Winter Service and Road Resilience Congress*, which will be held in Calgary.

The safe and efficient transportation of people and goods is vital to Canadians. With millions of Canadians on the roads every day, road safety is a big priority for us at Transport Canada. Across our diverse geography, and with our diverse meteorology, our road infrastructure must take winter and seasonal changes into account – especially as the climate changes.

Our road networks must be resilient, and able to withstand a variety of hazards. Our economy feels the impact if our transportation network is compromised. We need to keep people and goods moving, so that our economy keeps moving.

We look forward to the *World Winter Service and Road Resilience Congress*, and the presentations, discussions, and sharing of knowledge and solutions that it will bring to Calgary in 2022.

The Honourable Marc Garneau
Minister of Transport



PRESIDENT OF PIARC

Claude Van Rooten

On behalf of PIARC (World Road Association), I am pleased to invite you to take part in the *XVI World Winter Service and Road Resilience Congress* which will be held in Calgary, Canada, on 8–11 February 2022, under the theme “*Adapting to a Changing World*”. In the last few last months, the world

and the road community have had to face one of the greatest changes of our lives with the COVID-19 pandemic, and we have had to adapt. For this reason, the theme of the Congress will link us perfectly with all current and future challenges.

The *World Winter Service and Road Resilience Congress* is a world-class event that builds on decades of PIARC experience, which 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, and winter topics will be a major pillar of the Congress. It will also be more than that. In order to reflect the megatrends that impact the road sector, we have decided, together with our Canadian hosts, to broaden the themes to include resilience. Ensuring the resilience of roads and of transport services is indeed a priority for our members, who are confronted with deteriorating

infrastructure, budget constraints, adverse climate events, and rapidly evolving user expectations. I want to underline that road resilience will be addressed in the broadest sense, without seasonal constraints.

The *World Winter Service and Road Resilience Congress* in 2022 will be relevant to all our countries, regardless of their climate, and I invite world experts, road managers and administrators, from the public sector as well as from the private sector, to join us in Calgary.

On behalf of PIARC, I express my most sincere gratitude to the Government of Canada and to the City of Calgary for their commitment to the organization of this Congress and for their efforts to ensure that it will be a great success. I invite you to mark this event in your agenda and look forward to meeting you in Calgary February 8–11, 2022!

Claude Van Rooten
President PIARC



MAYOR OF CALGARY

Naheed K. Nenshi

I am very excited to welcome all delegates and participants to Calgary for the 2022 *World Winter Service and Road Resilience Congress*.

This is a unique opportunity to share learnings and discuss transportation subjects related to roads in winter with experts from around the globe. PIARC (World Road Association) has brought this year’s event to Calgary, and I cannot wait for you to see what we have been up to.

In 2019, Calgary was once again named the best city in which to live in the entire western hemisphere. This, despite the fact we have a long and often harsh winter. The ability to get around safely in weather of

all types is just one of the reasons we have been fortunate to receive this commendation.

As you join us in Calgary from February 8–11, 2022, there are so many great things for you to see and do. From our beautiful parks, vibrant neighbourhoods, diverse shopping and dining destinations, outdoor activities, and stunning view – there is a lot to take in. I know you will love it as much as I do.

See you all in Calgary in 2022.

Sincerely,

Naheed K. Nenshi
Mayor of Calgary



WHAT IS PIARC?

PIARC, formerly known as the World Road Association, was established in 1909 as a non-profit organization. PIARC's vision is to be the world leader in the exchange of knowledge on roads and road transport policy and practices within the context of integrated, sustainable transport. The organization's four key missions are to:

- Be a leading international forum for analysis and discussion of the full spectrum of transport issues related to roads and related transport.
- Identify, develop, and disseminate best practice and give better access to international information.
- Consider fully within its activities the needs of developing countries and countries in transition.
- Design, produce, and promote efficient tools for decision making on matters related to roads and related transport.

WHY YOU SHOULD ATTEND THE CONGRESS

Every four years a Congress dedicated to road maintenance in winter is hosted by PIARC. Historically, this Congress represents a unique opportunity to discuss in depth all subjects related to roads in winter: traffic management, pavement conditions, de-icing agents, equipment, information to users, and more.

The XVI Congress begins a new and exciting chapter for PIARC. In an effort to highlight issues of paramount importance to its members, the additional pillar of resilience will be explored during the Congress.

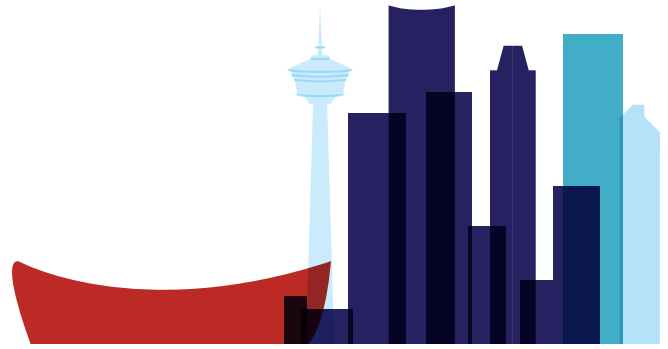
You should attend this Congress because decision-makers, technical experts, administrators, academics, equipment operators, manufacturers and engineers will share their knowledge and best practices in winter service and road resilience, thereby increasing the world-wide expertise in these areas.

CITY OF CALGARY AND THE CALGARY TELUS CONVENTION CENTRE

Set dramatically between prairies and peaks, Calgary is a modern metropolis known for its western hospitality, sport culture, lively festivals, classic and quirky arts scene, and innovative chef-driven culinary experiences. Surrounded by incomparable natural beauty, Calgary is a place where you can explore the magic of the Canadian Rockies or the mystery of Dinosaur Provincial Park by day and be back in time for dinner.

Calgary is also full of a vibrant energy. Sport and cultural events are at the heart of this energy, but it's also the public art and architecture, the young population, the growing and confident culinary and cultural scenes that combine to give Calgary a unique cosmopolitan feel.

The **Calgary TELUS Convention Centre** is more than a place to meet; it is a place where collaboration and meaningful relationships begin. Located in the heart of the city among choice hotels, restaurants, theatres and shops, the Calgary TELUS Convention Centre is the community hub where people come to network, share ideas and explore opportunities. They work with a number of partners and networks to foster business development, knowledge exchange and connect visitors to Calgary's intellectual capital. Hosting local, national and international conventions, congresses, meetings and events, they are an integral part of the city centre.



GETTING TO CALGARY

Getting to Calgary by air is easy from most major international airports. As one of the world's most modern and welcoming airports, and one of Canada's largest, **YYC Calgary International Airport** welcomes millions of visitors to Calgary each year and is a hub for major Canadian airlines **Air Canada** and **WestJet**. With two in-terminal hotels, several shops and restaurants, and a new international terminal, flying in and out of Calgary is a great experience for travellers from around the world.

Calgary's international airport is conveniently located in the northeast of Calgary, approximately a 20-minute drive from downtown, where the Calgary TELUS Convention Centre, the host venue for the 2022 Congress, and the host hotels are located. Rental cars, taxis, limousines, and airport shuttles are available for transfers between YYC and the downtown core.



Photo: Calgary TELUS Convention Centre



CONGRESS THEME, PROGRAM AND EXHIBITION

The overall theme for the Congress is **Adapting to a Changing World**.

This theme brings together the elements of climate change; technological change such as connected and automated vehicles, impacts of cyber security, new methods in winter service; regulatory change as we adapt to these new technologies; societal change as fewer people use public transportation or their vehicles because they work at home; and mid- to long-term changes in budgeting and planning as nations adapt to COVID-19 and the changed world in which we live.

The **Congress program** will begin with the official opening ceremony on February 8, followed by a senior officials' session and the opening of the technical exhibition. Technical sessions, poster sessions, foresight sessions, keynote speakers, the international snowplow championship, closing ceremony and western-style Stampede dinner round out the official program.

There will be over **50 technical sessions** under two themes: Winter Service and, new for 2022, Road Resilience. This second theme was added to respond to an emerging priority for the road

community. See the Call for Papers section for more information.

INTERNATIONAL SNOWPLOW CHAMPIONSHIP

In keeping with a tradition that began on Canadian soil during the XIII Congress held in Quebec City in 2010, we invite all countries to participate in the **IV International Snowplow Championship**. As one of the main events of the Congress, it is designed to recognize the skill and abilities of snowplow drivers from around the world, while giving delegates the opportunity for some fun competition between nations while cheering on their home country!

Technical Visits will include options such as a full-day visit to Banff and the Rocky Mountains, with a focus on avalanche control and wildlife crossings. Visits within the City of Calgary will allow delegates the opportunity to learn more about how the city manages cold Canadian winters, and the measures that are put in place to prepare for a variety of possible conditions and situations.

PROGRAM AT A GLANCE

DATE	EVENT
Tuesday February 8	Registration
	Opening Ceremony
	Senior Officials' Session
	Official Exhibit Opening
	Technical Sessions
	Welcome Cocktail Reception
Wednesday February 9	Technical Visits – Calgary
	International Snowplow Championship
	Technical Sessions
	Keynote Speaker
	Poster Sessions
Thursday February 10	Technical Visits – Calgary
	Technical Sessions
	Poster Sessions
	Closing Ceremony
	Western-style Stampede dinner
Friday February 11	Technical Visits – Banff and Calgary

EXHIBITION

The exhibition includes national pavilions and private-sector booths designed to showcase national achievements and private-sector solutions and services. The exhibit hall will be at the heart of the Congress, with coffee breaks held here as well as the interactive posters sessions. Join leaders from municipalities, provincial and territorial transport departments, academia, as well as private sector manufacturers, suppliers, consultants and providers of products and services.

Don't miss out!

Become an exhibitor to network and promote your organization's products or services to a broad group

of leaders and decision-makers from all around the world. Take advantage of the attention and interest to the transportation sector as a whole that will result from this unique Congress.

Please consult the Congress website for more information on the Congress program and exhibition later in 2020 and in early 2021.

ACCOMPANYING PERSONS PROGRAM

There will also be an accompanying persons program. Details will be available in early 2021.

CALL FOR PAPERS

PIARC (World Road Association) is calling for individual contributions on selected topics for the XVI 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 organized every four years since 1969.

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

SUBMISSION OF ABSTRACTS AND FULL PAPERS

Contributions are invited only on the topics described below. Papers that fall outside this scope will not be considered. Authors are invited to submit an abstract using the online facility from the Congress website at: <https://abstracts-calgary2022.piarc.org/> before 30 November 2020.

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 **15 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 of one of the co-authors to the Congress.

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
<i>XVI World Winter Service and Road Resilience Congress – Calgary 2022</i>	8–11 February 2022

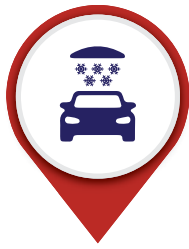
PIARC PRIZES 2022

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.

CONTACT INFORMATION

Website: <https://abstracts-calgary2022.piarc.org/>
E-mail: paperscalgary2022@piarc.org
www.piarc.org

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 to 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 events)



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 of 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
- 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 trends in the management of disastrous events 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. While the traditional disaster management approach prioritizes making infrastructure safe, the interaction with the public and other organizations is key for producing better results. New or updated managing approaches and techniques are welcome.

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 events 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 events



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 regards 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
- 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.

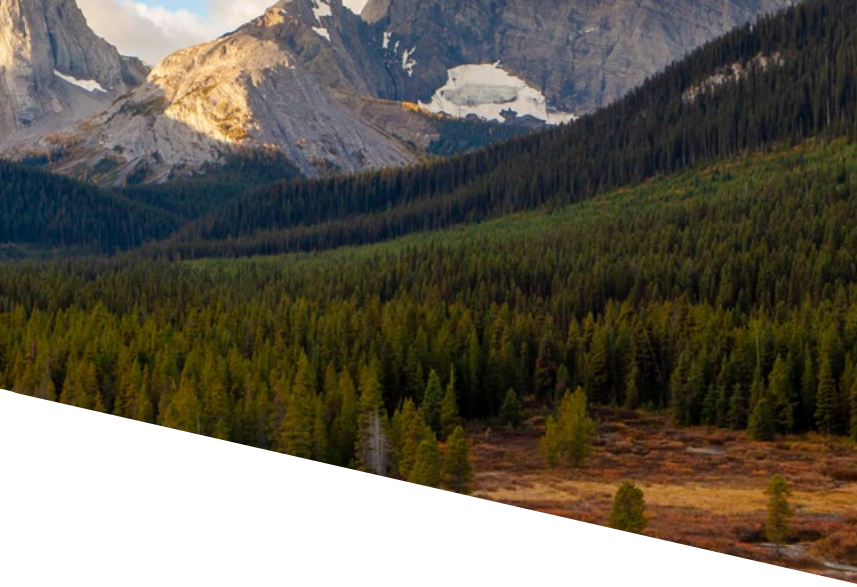


TOPIC 14: Resilience: measures to keep a road tunnel safely available for traffic under varying circumstances

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).

LANGUAGES

Canada is a country that prides itself on its multiculturalism. We are proud to offer delegates the opportunity to learn and participate in our country’s official languages of English and French. The Canadian Organizing Committee is working to incorporate Spanish as an official language of the Congress, and is excited to announce that should there be sufficient registration of delegates who indicate Spanish as their preferred language, Spanish interpretation will be provided.

IMPORTANT DATES

Now	Call for papers open
November 30, 2020	Deadline for submission of abstracts
February 2021	Exhibition information available
July 2021	Congress registration opens

Please consult the Congress website www.piarc-calgary2022.org for more up-to-the minute information on the Congress program and exhibition.

ENTRY INTO CANADA

Prior to booking travel, visitors should review all necessary entry requirements into Canada. Please consult the Government of Canada’s [Immigration and Citizenship](http://www Immigration and Citizenship) website for more information regarding entry requirements and the [Canada Border Services Agency](http://www Canada Border Services Agency) website for customs regulations.

CONTACTS

Congress Website: www.piarc-calgary2022.org

Email: info@piarc-calgary2022.org

Tourism Information: www.choosecalgary.ca/en/piarc-calgary2022

 [@PIARC_Roads](https://twitter.com/PIARC_Roads) #PIARCCalgary2022

 [PIARC — World Road Association](https://www.linkedin.com/company/piarc)

 [World Road Association PIARC](https://www.youtube.com/channel/UC...)

 [PIARC](https://www.instagram.com/piarc)



Photo: Icefields Parkway between Banff and Jasper National Parks in Alberta, Canada
Credit: Shutterstock