XXVIIIth WORLD ROAD CONGRESS
Vancouver, Canada 4-8 October 2027
Paving the Road to a Cleaner Future

Call for Papers and PIARC Prizes 2027

PIARC invites practitioners, policymakers, researchers, and industry professionals worldwide to submit abstracts exclusively on the topics outlined below, through the online submission platform no later than **31 August 2026** at:

https://abstracts-vancouver2027.piarc.org/

Submissions should present strategies, case studies, practical experiences, research findings, or innovative approaches relevant to the road and transport sector, with applicability across diverse contexts and regions.

Submissions from all regions are welcome, including perspectives from both high-income and low- and middle-income countries (LMICs), as well as from public authorities, academia, private partners, financiers, and civil society.

Authors are encouraged to address cross-cutting themes such as sustainability, resilience, digitalization, equity, and safety, including considerations related to gender equality, diversity, and inclusion when relevant.

Contributions should prioritize evidence-based insights, case studies, and transferable methodologies that demonstrate how challenges are being addressed in practice. Papers should include clear indicators of impact, measurable outcomes, and lessons learned, and demonstrate how results are used to inform decision-making, improve performance, and engage stakeholders. Submissions that show how approaches are implemented and sustained over time, rather than only conceptualized, are particularly encouraged. Forward-looking perspectives are welcome where they are grounded in clear frameworks or implementation pathways.

Submissions may also explore innovative approaches inspired by other sectors, where relevant to the road context.

About PIARC, the World Road Association

Founded in 1909, PIARC-World Road Association, is a non-political, non-profit international organization dedicated to fostering global cooperation on road and road transport issues. Today, it brings together more than 125 member governments worldwide.

Since 1908, PIARC has organized the World Road Congress every four years, providing a global forum for professionals involved in the planning, development, management, and operation of road transport systems. The Congress promotes the exchange of knowledge, international best practices, innovative solutions, and discussions on current and future challenges facing the road sector.

Vancouver 2027

The XXVIII World Road Congress will be held in Vancouver, Canada from 4 to 8 October 2027. It will include more than 50 sessions, a large exhibition, technical visits and social activities. we are expecting 5,000 participants and 60+ Ministers and Vice Ministers.

2027 VANCOUVER
XXVIII WORLD ROAD CONGRESS

For more information, please refer to the congress website:

https://wrc2027vancouver.com/

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

Call for papers

PIARC invites individual contributions on selected topics to enrich and expand the work of its Technical Committees.

All submissions will be reviewed by the relevant Technical Committees and evaluated based on originality, technical relevance, and the applicability and transferability of the results.

Accepted papers will be published in the Congress proceedings and will contribute to the technical programme and discussions of the Congress. All accepted authors will be invited to present their work during interactive poster sessions, while a selection of outstanding papers will also be featured in oral presentation sessions.

Publication of accepted papers is conditional upon the registration of at least one co-author for the Congress.

PIARC Prizes 2027

All papers submitted in response to this Call for Papers will automatically be considered for the PIARC Prizes competition and may compete for one of the award categories. Prize-winning papers will be selected by an international jury.

For each awarded paper, PIARC will cover travel expenses (economy class), accommodation (mid-range hotel), and Congress registration fees for one co-author. Selected papers will also be featured in Routes/Roads, PIARC's quarterly magazine.

The following are the Prize categories for the 2027 Congress:

1. Young Professionals
2. Authors from Low- and Lower-Middle Income Countries
3. Best Innovation
4. Road Design, Construction, Maintenance and Operation
5. Road Safety
6. Resilience of Road Infrastructure and Road Transport
7. Sustainability
8. Organisation and Administration of the Road Sector
9. Future Workforce Talent in the Road Sector
10. Most Visionary Paper – Jonathan Spear Award

Information for authors

Content: Submitted papers must be original and available for publication. Previously published material will not be accepted. Papers must remain strictly non-political and free of commercial or promotional content. Brand names should not appear in the title or abstract.

Language: Abstracts may be submitted in English, French, or Spanish. Submission in English is strongly encouraged to facilitate evaluation and wider dissemination.

Length: Abstracts must not exceed 400 words.

Submission: Abstracts must be submitted through the online platform available on the dedicated website:

https://abstracts-vancouver2027.piarc.org/

TIMELINE

Deadline for submission of abstracts	31st August 2026
Notification of acceptance of abstracts	15st November 2026
Deadline for submission of full papers	31st January 2027
Notification of acceptance of full papers	15th May 2027
XXVIIIth World Road Congress (Vancouver 2027)	4-8 October 2027
Contact: papersvancouver2027@piarc.org	

PIARC

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Strategic Theme 1 - Road Administration

1. The Transport Agency of the Future

Transport agencies worldwide are under increasing pressure to transform. Rapid technological change, evolving user expectations, climate imperatives, and growing system complexity are challenging traditional institutional models, while workforce constraints and limited capacity to integrate new technologies further complicate adaptation.

As a result, many legacy organizational structures, governance models, and delivery approaches are struggling to respond effectively to the pace and scale of change facing the transport sector.

PIARC's Technical Committee 1.1 Performance of Transport Administrations invites submissions that explore bold, forward looking visions for the Transport Agency of the Future and that address how transport agencies can transition toward more adaptive, responsive, and future-ready models.

Submissions should focus on practical approaches and demonstrated experiences related to:

- Modernizing governance and institutional frameworks to enable faster, more flexible decision-making,
- Integrating digital technologies, including Artificial Intelligence (AI), data platforms, and real-time system management,
- Strengthening organizational capacity, including workforce transformation, skills development, and new operating models,
- Embedding sustainability, resilience, and user-centric service delivery into core agency functions,
- Managing increasingly complex stakeholder ecosystems, including public-private collaboration and cross-sector coordination.

Particular interest is placed on how agencies are restructuring decision-making, modernizing service delivery, integrating digital capabilities, and adapting workforce and organizational models to respond more effectively to rapidly changing operational demands. Contributions may include case studies of successful transformation initiatives, lessons learned from implementation challenges, or proposed frameworks and strategic approaches that could guide future institutional change.

Papers should aim to provide concrete lessons learned and actionable guidance that can support transport agencies in navigating ongoing transformation and delivering effective mobility systems in a rapidly changing environment.

2. Public Value Creation by Transport Agencies

Transport agencies are increasingly expected to demonstrate the broader value of their investments across social, environmental, and societal outcomes, not only economic performance. However, the tools and frameworks used to define, measure, and communicate "public value" have not kept pace with these expectations.

Many agencies still rely on traditional appraisal and performance models focused on short-term efficiency and financial metrics, often overlooking longer-term benefits such as resilience, equity, accessibility, health, and sustainability. This can create a disconnect between what agencies deliver, what users experience, and what decision-makers are able to measure and communicate.

3. Creating and attracting the Workforce of the Future

Transport agencies worldwide are facing growing workforce challenges, including difficulties attracting and retaining talent while adapting to rapid technological change and increasingly complex system management. At the same time, the sector often draws from a relatively narrow talent pool, limiting access to the broader range of skills needed for future mobility systems.

This creates a dual challenge: addressing immediate labour and skills gaps while building workforce capacity in areas such as data science, digital systems, user experience, and systems integration alongside traditional engineering expertise.

PIARC's Technical Committee 1.1 Performance of Transport Administrations invites submissions that address how transport agencies are responding to these workforce challenges in practical and measurable ways.

Submissions should focus on approaches and demonstrated experiences related to:

- Identifying current and future workforce needs, including emerging skill gaps linked to digitalization, automation, and evolving operational models
- Strategies for attracting talent from a broader range of disciplines beyond traditional engineering roles
- Tactics and approaches to reach underrepresented groups in the transport sector, and efforts to broaden participation and inclusion
- Methods for measuring the effectiveness of recruitment, inclusion, and workforce development initiatives
- Approaches to retaining talent, including career development, upskilling, reskilling, and organizational culture transformation
- The role of Artificial Intelligence and digital tools in both shaping future roles and supporting training and education
- Case studies of organizations that have successfully repositioned themselves as attractive and competitive employers

4. Integrating community and Indigenous Perspectives into Transport Projects

Transport projects increasingly require approaches that consider the perspectives and priorities of local communities and Indigenous peoples throughout their planning, design, construction, operation, and long-term use. Experience across many jurisdictions has demonstrated the importance of early engagement, collaboration, and consideration of local knowledge to support more sustainable, accepted, and context-sensitive transportation solutions across diverse geographic and community contexts.

PIARC invites submissions exploring practical approaches, experiences, and case studies related to the integration of community and Indigenous perspectives into transportation decision-making and project delivery.

Submissions may address:

- Approaches to community and Indigenous engagement in transport planning and project development;
- Integration of Indigenous knowledge and local perspectives into project design, environmental assessment, and infrastructure development;
- Governance, partnership, and collaboration models supporting participation and consultation;
- Approaches to addressing social, cultural, environmental, and mobility considerations, including in remote, northern, and regional contexts;
- Tools and practices used to support engagement and knowledge sharing; and,
- Case studies demonstrating how integrating community and Indigenous perspectives has improved project acceptance, enhanced environmental outcomes, or strengthened social and economic benefits.

Papers demonstrating practical outcomes related to collaboration, project acceptance, mobility access, environmental stewardship, or long-term partnership development are particularly encouraged.

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5. Green Frameworks

Transport agencies worldwide are under increasing pressure to deliver infrastructure that supports economic growth while meeting ambitious environmental and social objectives. In response, a wide range of "green" frameworks, certification systems, and sustainability criteria have been introduced. However, a key challenge remains: the extent to which these approaches lead to measurable improvements in infrastructure performance, asset lifespan, cost efficiency, and environmental outcomes is not always clearly demonstrated.
Many current approaches remain compliance-driven, with limited evidence on whether they effectively influence decision-making, optimize resource use, reduce waste, or deliver long-term value. This creates uncertainty for agencies seeking to balance infrastructure expansion, accessibility needs, and environmental protection within constrained financial and institutional contexts.

PIARC's Technical Committee 1.2 Contribution of Roads to Economic and Social Development invites submissions that address how green frameworks and decision-making approaches can be applied and evaluated in practical, measurable ways.

Submissions should focus on approaches and demonstrated experiences related to:

- Developing and applying frameworks that integrate sustainability, resilience, biodiversity, and equity into infrastructure planning and delivery,
- Measuring the impact of these frameworks on outcomes such as asset lifespan, life-cycle costs, resource efficiency, and waste reduction,
- Assessing whether sustainability criteria and certification systems influence design choices, construction practices, and long-term performance,
- Embedding circular economy principles, including material reuse, waste minimization, and low-carbon solutions, into project delivery,
- Balancing infrastructure development, accessibility, and environmental protection through structured decision-making approaches,
- Governance models, partnerships, and financing mechanisms that enable more sustainable infrastructure delivery,
- The role of innovation, digital tools, and nature-based solutions in improving environmental and operational outcomes,
- Case studies demonstrating how environmental and community objectives have been successfully integrated with economic and performance considerations.

6. Resilient Transport Planning

Transport systems worldwide are increasingly exposed to disruptions driven by climate hazards, economic volatility, technological change, shifting mobility patterns, and human-driven events such as pandemics and labour disruptions. These uncertainties are challenging traditional "predict-and-provide" planning models and exposing limitations in their ability to ensure long-term resilience and continuity of service.

Transport agencies are therefore being pushed toward more adaptive, flexible, and resilience-based planning approaches capable of responding to both known and unexpected disruptions.

PIARC's Technical Committee 1.2 Contribution of Roads to Economic and Social Development invites submissions that address how resilient transport planning is being implemented in practice, with a focus on decision-making under uncertainty and real-world system performance.

Submissions should focus on approaches and demonstrated experiences related to:

- Integrating resilience, risk management, and long-term adaptability into transport planning processes,
- Moving from forecast-based models toward adaptive, scenario-based, and flexible investment strategies,

- Planning for and responding to human-driven disruptions (pandemics, labour actions, major events, sudden demand shifts, etc.), including continuity of service and recovery strategies,
- Incorporating redundancy, network robustness, and alternative routing strategies to maintain critical connectivity,
- Using digital tools, data analytics, and scenario modelling to support real-time and forward-looking decision-making,
- Governance, institutional coordination, and stakeholder engagement approaches that strengthen planning resilience,
- Case studies demonstrating how transport systems have responded to disruptions, including lessons learned from both successes and failures,
- Integrating resilience objectives with sustainability, accessibility, and economic development goals.

Papers that demonstrate how planning approaches have improved system performance, service continuity, or recovery outcomes are particularly encouraged.

7. Transparency and Digitalization in Road Finance, Procurement, and Infrastructure Delivery

Transparency in road finance and procurement is widely recognized as essential for improving governance and accountability. However, the extent to which measures such as e-procurement systems, open data platforms, and disclosure frameworks lead to measurable improvements in project outcomes, market participation, and public trust is not always clear.

In many cases, transparency is treated as a procedural requirement without clear evidence of its impact on competition, cost efficiency, project delivery, or stakeholder confidence. This raises important questions about what outcomes transparency actually drives and how it can improve performance without creating unnecessary complexity or fragmentation.

PIARC's Technical Committee 1.3 Finance and Procurement invites submissions that examine how transparency and digitalization in road finance and procurement are being applied and evaluated in practice.

Submissions should focus on approaches and demonstrated experiences related to:

- The use of e-procurement platforms, digital tools, and open data systems to improve openness, fairness, and efficiency in procurement processes,
- Evidence of how transparency has influenced outcomes, such as increased competition, participation of new market entrants, reduced costs, improved project delivery, or enhanced accountability,
- The role of transparency in shaping market dynamics, including access for small and medium enterprises and broader participation across the supply chain,
- Designing disclosure frameworks and institutional arrangements that support effective oversight and stakeholder engagement,
- How transparency measures are used to inform decision-making, strengthen governance, and build public trust,
- Managing risks associated with digitalization, including data fragmentation, interoperability challenges, and system complexity,
- Contributions examining how transparency can support more inclusive practices in road sector investment and workforce participation,
- Case studies highlighting enabling conditions, challenges, and lessons learned from implementation across different contexts.

Papers that demonstrate how transparency measures have led to measurable improvements in outcomes (such as increased competition, better value for money, or strengthened market confidence) are particularly encouraged.

8. Environmental Due Diligence, Sustainable Finance and Resilience in Road PPPs

Road public-private partnerships (PPPs) are increasingly expected to deliver infrastructure that meets higher environmental, sustainability, and resilience standards. At the same time, these requirements can introduce additional costs, risks, and complexity, potentially affecting project bankability and the ability to attract private investment.

This creates a critical challenge for road agencies and their partners: how to balance ambitious sustainability and resilience objectives with financial viability, risk allocation, and market appetite. In many contexts, there

is still limited clarity on how environmental and resilience requirements can be effectively integrated into PPP structures without reducing competition, increasing costs beyond acceptable levels, or discouraging private sector participation.

PIARC's Technical Committee 1.3 Finance and Procurement invites submissions that examine how environmental, social, and resilience considerations are being integrated into PPP financing and contractual arrangements in practical and economically viable ways.

Submissions should focus on approaches and demonstrated experiences related to:

- Identifying, assessing, and managing environmental, social, and climate-related risks within PPP project structures,
- Structuring contracts, payment mechanisms, and performance indicators to incorporate sustainability and resilience objectives,
- Approaches to balancing additional environmental and resilience requirements with project affordability and financial viability,
- Cost-sharing arrangements and risk allocation models between public and private partners,
- The role of financial instruments (green or sustainability-linked financing, blended finance, insurance mechanisms, etc.) in supporting project viability,
- Market responses to increased sustainability requirements, including impacts on competition, pricing, and investor appetite,
- Governance approaches that support transparent, balanced, and effective PPP delivery,
- Case studies demonstrating how sustainability and resilience objectives have been successfully integrated into PPPs without compromising deliverability.

Papers that demonstrate how financing and contractual approaches have influenced project outcomes, such as cost efficiency, risk management, or long-term asset performance, are particularly encouraged.

9. Procurement for Sustainability, Resilience, and Technological Transition in Road Infrastructure

Procurement and contract design are increasingly used to deliver sustainability, resilience, and innovation in road infrastructure. However, growing expectations are making procurement processes more complex, often with multiple and competing objectives.

A key challenge for road agencies is whether procurement frameworks and contract models are translating these ambitions into measurable outcomes. While sustainability and resilience requirements are increasingly included in procurement processes, their impact on performance, costs, risk allocation, and market participation is not always clear.

This raises important questions about how agencies can balance ambition with practicality and ensure procurement approaches deliver tangible benefits rather than added complexity.

PIARC's Technical Committee 1.3 Finance and Procurement invites submissions that examine how procurement and contract design are being used to deliver sustainable, resilient, and innovative infrastructure in practice.

Submissions should focus on approaches and demonstrated experiences related to:

- Designing contract structures, performance indicators, and incentive mechanisms that influence sustainability, resilience, and innovation outcomes during delivery,
- Integrating life-cycle considerations, including environmental performance, carbon, durability, and resilience, into procurement processes,
- Assessing the impact of procurement requirements on costs, competition, delivery timelines, and project performance,
- Balancing multiple objectives within procurement frameworks, including sustainability, resilience, innovation, and affordability,

- Using procurement to enable the adoption of digital and green technologies, while managing risks such as vendor lock-in, market concentration, and system fragmentation,
- Simplifying procurement processes to improve efficiency while maintaining desired outcomes,
- Case studies demonstrating what has worked—and what has not—in applying procurement as a lever for improved infrastructure performance.

Papers that demonstrate how procurement approaches have influenced delivery outcomes (such as improved performance, cost efficiency, durability, or innovation uptake) are particularly encouraged.

10. Climate Change and Other Hazards - Understanding Organisational Resilience for Road Networks Facing Natural Hazards

Transport networks are operating in increasingly complex environments driven by climate events, system interdependencies, technological change, and resource constraints. While progress has been made in strengthening physical infrastructure resilience, many disruptions continue to reveal organisational limitations that affect the ability of road authorities to effectively provide a resilient network.

Challenges such as unclear decision-making, limited coordination, insufficient access to data, and gaps in institutional capacity can compromise investment targeting risk, delay response and recovery and reduce overall system performance. This highlights the growing importance of organisational resilience in maintaining essential transport services before, during, and after disruptions.

PIARC's Technical Committee 1.4 Planning the Resilience of Road Networks - Climate Change and other Hazards invites submissions that examine how organisational resilience is being developed and applied in practice.

Submissions should focus on approaches and demonstrated experiences related to:

- Strengthening planning, decision-making processes and governance structures to enable faster and more effective responses to disruptions,
- Improving coordination across institutions, agencies, and stakeholders during planning, response, and recovery phases,
- Building organisational capacity, including workforce skills, leadership, and internal processes that support resilience,
- Integrating resilience into operational planning, asset management, and service delivery,
- Identifying and addressing institutional barriers that limit effective response and recovery,
- Case studies demonstrating how organisational changes have reduced risk and impacts, improved response times, coordination, or continuity of service during disruptions.

Papers that demonstrate how organisational improvements have led to measurable improvements to outcomes (such as faster recovery, improved coordination, or more effective service delivery) are particularly encouraged.

11. Climate Change and Other Hazards - Frameworks and Methodologies for Assessing & Planning Resilience of Road Networks

Road networks are critical infrastructures underpinning economic activity, social cohesion, and regional development. However, increasing exposure to changing and more intense natural hazards and system-wide disruptions is challenging the effectiveness of existing resilience assessment and planning approaches.

Traditional methods, often focused on individual assets or service restoration to pre-disruption conditions, frequently fail to capture system-level interdependencies and long-term adaptation needs. In addition, a significant gap remains between the development of resilience assessment methodologies and their practical use in decision-making.

This creates a key challenge for road agencies: how to apply resilience frameworks and analytical tools in ways that effectively inform planning, investment, and operational decisions into the future.

PIARC's Technical Committee 1.4 Planning the Resilience of Road Networks - Climate Change and other Hazards invites submissions that address both the development and application of resilience assessment and planning methodologies for road networks as their operating contexts evolve.

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Submissions should focus on approaches and demonstrated experiences related to:

- Developing integrated frameworks for assessing road network resilience, including system-level performance indicators and risk-based approaches,
- Applying analytical tools and methodologies to support decision-making under uncertainty, including socio-economic considerations,
- Capturing interdependencies across assets, networks, and external systems in resilience assessments,
- Bridging the gap between theoretical models and practical implementation in planning and investment processes,
- Case studies demonstrating how resilience assessments have been applied in real-world contexts.

Particular emphasis should be placed on how results are measured, interpreted, and used. Contributions are encouraged to:

- Demonstrate how resilience assessment outputs have informed planning decisions, investment prioritization, or operational strategies,
- Provide clear indicators of performance, impact, and improvement over time,
- Highlight lessons learned from implementation, including challenges, limitations, and areas for refinement,
- Show how methodologies have been adapted to different contexts, scales, and levels of data availability.

12. Technologies for Disaster Risk Reduction and Infrastructure Resilience

Across the globe, more frequent and complex disasters are placing increasing pressure on transport systems and the agencies responsible for managing them. While digital technologies are advancing rapidly, a key challenge remains: ensuring that these tools meaningfully improve preparedness, decision-making, and operational response during disruptive events.

In many cases, technologies such as AI, remote sensing, and digital platforms are available, but their integration into day-to-day operations, coordination across agencies, and impact on real-world outcomes (such as response times, service continuity, and recovery) are not always clearly demonstrated.

PIARC's Technical Committee 1.5 Disaster Management invites submissions that examine how digital technologies are being applied in practice to support disaster risk reduction and infrastructure resilience.

Submissions should focus on approaches and demonstrated experiences related to:

- Early warning systems, nowcasting tools, and predictive analytics for anticipating and managing disruptions,
- Use of digital technologies (AI, geospatial analytics, monitoring systems, digital twins, etc.) to support situational awareness and decision-making,
- Operational decision-support tools for managing mobility and infrastructure during disruptive events,
- Coordination and information-sharing systems across agencies and stakeholders,
- Temporary stabilization measures and rapid response strategies enabled by digital tools,
- Post-event analysis, learning systems, and feedback loops to improve future preparedness,
- Case studies demonstrating how technologies have been integrated into operational workflows and decision processes.

Papers that demonstrate how technologies have improved outcomes (such as faster response, better coordination, reduced disruption, or more effective recovery) are particularly encouraged.

13. Building Back Better in Practice: Technology for Resilient Recovery and Reconstruction

Following disruptive events, road agencies are under pressure to restore transport services quickly. However, rapid reconstruction often prioritizes speed over long-term performance, resulting in infrastructure that remains vulnerable to future disruptions.

This creates a critical challenge: how to balance the need for rapid recovery with the opportunity to rebuild infrastructure that is more resilient, durable, and better adapted to future risks. While concepts of "building back better" are widely promoted, their practical application (and impact on recovery time, costs, and long-term performance) is not always clearly demonstrated.

PIARC's Technical Committee 1.5 Disaster Management invites submissions that examine how recovery and reconstruction processes are being implemented in practice to improve both immediate and long-term outcomes.

Submissions should focus on approaches and demonstrated experiences related to:

- Strategies for balancing rapid restoration of service with long-term resilience and performance improvements,
- Use of temporary solutions, accelerated construction methods, and simplified processes to restore functionality while enabling future upgrades,
- Integration of resilience considerations into reconstruction design, materials, and standards,
- Planning and coordination of resources, including materials, equipment, and workforce, to support efficient recovery operations,
- Mechanisms for capturing and applying lessons learned from past events to improve future recovery efforts,
- Coordination across agencies and stakeholders to support effective and timely reconstruction,
- Financial and funding strategies that enable resilient recovery, including approaches to cost-sharing and long-term investment planning,
- Case studies demonstrating how reconstruction efforts have improved durability, reduced future risk, or enhanced system performance.

Papers that demonstrate measurable outcomes (such as reduced recovery time, improved asset lifespan, cost efficiency, or increased resilience to future events) are particularly encouraged.

14. Advancing Road Resilience for Extreme Events: Collaboration and Cooperation

Road resilience during extreme events depends not only on infrastructure and technology, but on the ability of multiple actors to work together effectively. In practice, disruptions often expose coordination challenges between road authorities, emergency services, private operators, and users, leading to delays, fragmented responses, and reduced effectiveness of recovery efforts.

This highlights a key challenge: how to organize, coordinate, and align actions across stakeholders before, during, and after disruptive events to maintain safety, continuity of service, and efficient recovery.

PIARC's Technical Committee 1.5 Disaster Management invites submissions that examine how collaboration and coordination mechanisms are being implemented in practice to improve resilience outcomes.

Submissions should focus on approaches and demonstrated experiences related to:

- Coordination frameworks between road authorities, emergency responders, operators, and other stakeholders during disruptive events,
- Communication systems and protocols that support shared situational awareness and decision-making,
- Roles and responsibilities of different actors, and how they are defined and managed in practice,
- Engagement of road users and communities, including behaviour, risk awareness, and self-help measures during disruptions,
- Operational strategies to protect road users and personnel and maintain continuity of service,
- Mechanisms for improving preparedness, including joint planning, training, and simulation exercises,
- Case studies demonstrating how collaboration has improved response times, coordination, safety, or recovery outcomes,
- Lessons learned from coordination failures and how these have informed improvements,
- Policy, strategic planning, and funding approaches supporting coordination and resilience.

Papers that demonstrate measurable outcomes (such as improved coordination, faster response, enhanced safety, or more effective recovery) are particularly encouraged.

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Strategic Theme 2 - Road Mobility

15. Roads for Accessibility and Equitable Mobility in Urban and Peri-Urban Areas

Urban regions are facing increasing pressure to provide transport systems that are safe, accessible, affordable, and inclusive for all users. At the same time, growing congestion, rapid urbanization, evolving mobility patterns, and unequal access to transport services continue to create challenges, particularly in peri-urban and underserved areas.

Road agencies and urban authorities are increasingly required to balance the needs of different users and transport modes while improving safety, accessibility, and network efficiency. This includes better integration of public transport, active mobility, and emerging mobility solutions within limited and highly contested road space.

PIARC's Technical Committee 2.1 invites submissions that address how road infrastructure and transport networks are being designed and managed to support safer, more inclusive, and better connected urban mobility systems.

Submissions should focus on approaches and demonstrated experiences related to:

- Safe infrastructure for all users, including pedestrian and cyclist safety measures, particularly in peri-urban areas
- Accessible road and transport design for persons with disabilities, elderly users, and populations with limited mobility options
- Road space design and allocation between different transport modes, including impacts on safety, speed management, and accessibility
- Road space reallocation and integration of active mobility infrastructure within existing urban networks
- Integration and prioritization of public transport through measures such as dedicated lanes, traffic management systems, and shared-use strategies
- Smart and efficient use of road infrastructure to support public transport and preferred mobility solutions, including electric mobility and active transport
- Case studies demonstrating how infrastructure and operational changes have improved accessibility, safety, connectivity, or mobility outcomes

Papers demonstrating measurable outcomes related to safety, accessibility, operational efficiency, or modal integration are particularly encouraged.

16. Evaluating Impacts and Challenges of Carbon-Neutral Cities Policies in Urban and Peri-Urban Road Networks

Cities worldwide are increasingly adopting policies aimed at reducing greenhouse gas emissions, improving air quality, and reclaiming urban space for more sustainable and people-oriented mobility. Measures such as low-emission zones, congestion charging, traffic calming, parking restrictions, and 30 km/h zones are becoming key tools for managing traffic demand and supporting multimodal transport systems.

At the same time, these policies can raise important operational, social, and political challenges related to accessibility, public acceptance, equity, freight movement, and network performance. As more cities implement these approaches, there is growing interest in understanding their real-world impacts, lessons learned, and long-term effectiveness.

PIARC's Technical Committee 2.1 invites submissions that address how urban traffic management and access regulation strategies are contributing to decarbonization and more sustainable urban mobility.

Submissions should focus on approaches and demonstrated experiences related to:

- Urban Vehicle Access Regulations (UVARs), including Low Emission Zones (LEZs), congestion charging, urban tolls, limited traffic zones, pedestrian areas, and freight access restrictions,
- Traffic calming measures, including 30 km/h zones, adapted traffic plans, and road space reallocation strategies,
- Park-and-ride systems and other measures aimed at reducing private vehicle use in urban centres,
- Physical reallocation of urban road space to support active mobility, public transport, green space, and social uses,
- Impacts of traffic management measures on air quality, congestion, road safety, public space use, and mobility patterns,
- Approaches that contribute to reducing vehicle speeds, traffic crashes, and road fatalities in urban areas,
- Challenges related to implementation, user acceptance, enforcement, accessibility, and equity,
- Case studies highlighting lessons learned, operational impacts, and future trends for metropolitan areas.

Papers demonstrating measurable outcomes related to emissions reduction, safety improvements, congestion management, or urban mobility performance are particularly encouraged.

17. Accessibility and Mobility in Rural and Interurban Areas

Rural and interurban areas continue to face significant mobility and accessibility challenges, including limited transport options, longer travel distances, and reduced access to essential services. These challenges can affect economic opportunity, access to healthcare and education, labour market participation, and overall quality of life, particularly for vulnerable and underserved populations.

PIARC's Technical Committee 2.2 invites submissions that explore the challenges, opportunities, and solutions related to accessibility and mobility in rural, peri-urban, suburban, and interurban contexts.

Submissions may address:

- Policy, planning, technical innovations, and practical measures that enhance connectivity and equitable access for all user groups, including vulnerable road users, women, and persons with disabilities,
- Approaches to improving access to essential services such as healthcare, education, employment, and commercial centres in rural and interurban areas,
- Community-based or locally adapted mobility solutions that improve accessibility to critical services and daily needs,
- Strategies to strengthen connections between rural, suburban, peri-urban, and urban areas through integrated and multimodal transport approaches,
- Sustainable development, road safety, and the integration of active transportation modes in rural mobility systems,
- Case studies and best practices from both high-income and low- and middle-income countries.

By sharing experiences, lessons learned, and practical approaches, this topic seeks to advance knowledge and foster collaboration among stakeholders to improve accessibility and mobility in rural and interurban contexts worldwide.

18. Sustainable Development of Rural and Interurban Roads Networks

Rural and interurban road networks are essential for economic development, regional connectivity, freight movement, and access to communities. However, many road agencies face increasing challenges related to aging infrastructure, climate impacts, limited funding, and rising maintenance demands, particularly across extensive low-volume road networks.

These pressures are creating difficult trade-offs between expanding networks, maintaining existing assets, improving resilience, and ensuring long-term affordability, especially in regions with constrained technical and financial capacity.

PIARC Technical Committee 2.2 invites submissions that explore sustainable approaches to the planning, financing, development, and management of rural and interurban road infrastructure.

Submissions may address:

- Approaches to planning, financing, construction, maintenance, and asset management for rural and interurban road networks,

- Strategies for balancing economic, social, environmental, and operational objectives in infrastructure investment decisions,
- Climate adaptation and resilience measures for paved and unpaved roads, including approaches to managing extreme weather impacts,
- Use of local materials, local resources, and context-sensitive construction and maintenance practices,
- Approaches for managing low-volume roads and extensive rural networks under constrained budgets,
- Innovations in maintenance practices, lifecycle management, and infrastructure performance monitoring,
- Case studies and best practices related to safe mobility advancement, rural road resilience, climate adaptation, and the use of local resources for paved and unpaved roads, with attention to the needs of different regions and income levels.

Papers demonstrating measurable outcomes related to infrastructure durability, maintenance efficiency, resilience, cost-effectiveness, or network performance are particularly encouraged.

19. AI, Automation and Innovation for Road Freight

Emerging technologies such as Artificial Intelligence (AI), automation, and connected logistics systems are rapidly transforming the road freight sector. However, their impacts on freight operations, workforce requirements, infrastructure performance, and supply chain efficiency are not yet fully understood.

At the same time, road freight operators and road agencies are facing growing pressures related to driver shortages, infrastructure wear, operational efficiency, and increasingly complex logistics systems. This creates a need to better understand how new technologies can improve freight performance while managing impacts on infrastructure, safety, and human resources.

PIARC Technical Committee 2.3 invites submissions that explore how AI, automation, and digital technologies are being applied in practice within the road freight and logistics sector.

Submissions may address:

- AI applications and use cases that improve road freight operations, logistics efficiency, infrastructure management, or road safety,
- Examples of freight automation, including automated driving systems and automated handling in logistics hubs or freight facilities,
- Impacts of automation and AI on workforce needs, including driver shortages, changing skill requirements, and the evolution of freight-related jobs,
- Solutions that improve compliance between vehicles and infrastructure to reduce road wear, improve safety, and support more efficient freight operations,
- Use of AI and digital tools to better understand and optimize end-to-end supply chains, including first- and last-mile operations,
- Case studies demonstrating how data-driven freight management has improved efficiency, reduced transit times, or informed infrastructure and transport planning decisions.

Papers demonstrating measurable outcomes related to freight efficiency, infrastructure performance, safety, operational optimization, or workforce adaptation are particularly encouraged.

20. Reducing Road Freight Enviromental Impacts and Improvement of Road Safety

Road freight transport is essential to economic activity and supply chain efficiency, but it continues to present significant environmental and safety challenges. While efforts to reduce emissions are accelerating, the transition toward new vehicle technologies, fuels, and operating models is also introducing new operational and safety considerations.

At the same time, road safety involving heavy vehicles remains a major concern. Although trucks are frequently identified in road safety discussions, there is still a need for more targeted studies, practical case studies, and evidence-based strategies focused specifically on freight transport operations.

PIARC's Technical Committee 2.4 invites submissions that address how road administrations, operators, and stakeholders are responding to the environmental and safety challenges associated with freight transport.

Submissions should focus on approaches and demonstrated experiences related to:

- Innovations and strategies to reduce the environmental impacts of road freight transport, including challenges associated with new technologies and alternative fuels,
- Road safety initiatives focused on heavy vehicles, including infrastructure measures, awareness campaigns, and operational practices,
- Policies and strategies to encourage freight vehicles to use safer and more appropriate road infrastructure,
- Case studies examining the challenges associated with freight route selection and infrastructure use (i.e. avoidance of toll roads),
- Approaches for balancing freight efficiency, environmental performance, and road safety objectives.

Contributions should prioritize evidence-based insights, case studies, and transferable methodologies, including clear indicators of impact and lessons learned. Papers demonstrating measurable outcomes related to safety, emissions reduction, operational efficiency, or infrastructure use are particularly encouraged.

21. Fair Valuing of Road Freight for Better Decision-Making and for Innovative Funding

Road infrastructure plays a critical role in supporting freight mobility and economic activity, yet the value generated by freight movement is not always well captured in transport planning, investment decisions, or funding models. At the same time, many road networks are aging, while freight vehicles continue to evolve in terms of weight, dimensions, and operational requirements, increasing pressure on infrastructure performance and maintenance needs.

This creates a growing challenge for road agencies in both high-income and low- and middle-income countries: how to evaluate the benefits generated by freight mobility and identify sustainable funding approaches to maintain and adapt infrastructure for future freight demands.

PIARC's Technical Committee 2.4 invites submissions that address how the value of freight mobility is being assessed and how infrastructure investment and maintenance are being financed in response to evolving freight needs.

Submissions should focus on approaches and demonstrated experiences related to:

- Return of experience or presentation of freight cost and benefits evaluation studies or tools,
- Funding solutions for infrastructure maintenance and adaptation (as network improvement) to new freight uses (high capacity, etc.), especially if they offer an innovative way of funding relying on the value of freight.

Contributions should prioritize evidence-based insights, case studies, and transferable methodologies, including clear indicators of impact and lessons learned. Papers demonstrating measurable outcomes related to infrastructure performance, funding sustainability, freight efficiency, or network adaptation are particularly encouraged.

22. Network-Wide Transport Planning to Improve Intermodal Freight Effectiveness

Freight transport systems are becoming increasingly interconnected, requiring coordinated planning across modes, jurisdictions, and supply chains. Road authorities and transport agencies are seeking approaches to improve intermodal connectivity, network efficiency, resilience, and sustainability while responding to evolving freight demand and operational pressures.

PIARC invites submissions exploring practical approaches, tools, and case studies related to network-wide and multimodal freight planning.

TOPICS FOR THE CALL FOR PAPERS

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Submissions may address:

- Methods for integrated, multimodal network planning that optimize freight movement across roads, rail, ports, airports, and logistics hubs;
- Tools and modelling approaches to analyze freight flows, identify bottlenecks, and evaluate system-wide performance and resilience;
- Strategies to enhance intermodal connectivity, including last-mile/first-mile solutions, terminal integration, and corridor-based planning;
- Role of digitalization, data platforms, and real-time information systems in enabling coordinated intermodal operations and decision-making;
- Governance models, institutional coordination, and policy frameworks supporting cross-sector and cross-jurisdictional freight planning;
- Investment strategies and prioritization methods that consider network-wide benefits, economic efficiency, and supply chain performance;
- Approaches to improve sustainability, including emissions reduction, energy efficiency, and modal shift optimization within freight networks; and,
- Case studies demonstrating improved intermodal efficiency, reduced congestion, increased reliability, enhanced resilience, or economic benefits through systems-level planning.

Papers demonstrating measurable improvements in freight mobility, intermodal connectivity, network efficiency, supply chain resilience, or sustainability are particularly encouraged.

23. Road Network Operations at a Turning Point: Digital Transformation and ITS for Sustainable Mobility

Road network operations are undergoing rapid transformation as digital technologies, Intelligent Transport Systems (ITS), and evolving mobility patterns reshape how roads are managed and operated. At the same time, road authorities face growing pressure to improve efficiency, reduce emissions, manage congestion, enhance safety, and deliver more user-focused mobility services, often within constrained financial and institutional environments.

This creates a key challenge for road agencies: how to implement digital transformation and ITS solutions in practical, scalable, and cost-effective ways that improve operational performance and support broader sustainability goals.

PIARC Technical Committee 2.4 invites submissions that explore how digital transformation concepts and ITS solutions are being applied in practice to improve road network operations and mobility management.

Submissions may address:

- Digital transformation case studies from road authorities and network operators,
- ITS implementation experiences demonstrating measurable outcomes related to congestion management, emissions reduction, safety, or operational efficiency,
- Digitalization of operational processes, data-driven decision-making, and automation in road network management,
- Governance, workforce, investment, and organizational changes required to support digital adoption,
- Cost-effective and incremental technology solutions for resource-constrained environments, including low- and middle-income countries,
- Integration of ITS and digital services with emerging mobility solutions and user-focused transport services,
- Lessons learned, implementation challenges, and best practices from different institutional and geographic contexts.

Papers demonstrating measurable improvements in operational performance, safety, sustainability, user experience, or system resilience are particularly encouraged.

24. AI for Road Network Operations: Opportunities, Challenges and Practical Pathways

Artificial Intelligence (AI) is creating new opportunities to improve road network operations through enhanced traffic management, predictive maintenance, incident detection, and data-driven decision-making. However, road authorities also face significant challenges related to data quality, model reliability, cybersecurity, governance, legal responsibility, and internal capacity to deploy and manage AI systems effectively.

This creates an important challenge for road agencies: how to identify where AI can deliver real operational value, while ensuring that adoption is practical, reliable, and aligned with organizational capabilities and risk management requirements.

PIARC Technical Committee 2.4 invites submissions that explore how AI technologies are being applied in practice within road network operations and infrastructure management.

Submissions may address:

- AI application case studies in road network operations, including traffic management, maintenance prediction, incident detection, and asset management,
- Data governance, data quality, and infrastructure requirements for AI deployment in road operations,
- Risk management, explainability, cybersecurity, and reliability considerations for AI systems used in critical infrastructure,
- Organizational capacity-building, workforce skills, and change management approaches supporting AI adoption,
- Procurement, governance, and policy frameworks for responsible and effective AI deployment,
- Lessons learned, barriers to implementation, and operational challenges across different institutional and geographic contexts, including low- and middle-income countries,
- Emerging technologies such as machine learning, computer vision, and IoT integration with practical applications in road operations.

Papers demonstrating measurable outcomes related to operational efficiency, safety, maintenance optimization, sustainability, or decision-making performance are particularly encouraged.

25. Digital Infrastructure and Connectivity: Enabling Bidirectional Vehicle-to-Infrastructure (V2I) Communication

Connected and automated mobility is increasing the need for reliable real-time communication between vehicles and road infrastructure. Technologies supporting vehicle-to-infrastructure (V2I/V2X) communication have the potential to improve road safety, traffic management, operational efficiency, and user services, while supporting more sustainable mobility systems.

At the same time, road authorities and operators face significant challenges related to interoperability, cybersecurity, data reliability, low-latency communication, and cross-border compatibility. Ensuring that digital infrastructure can support safe, secure, and scalable Cooperative, Connected, and Automated Mobility (CCAM) services remains a key issue for the road sector.

PIARC Technical Committee 2.5 invites submissions that explore how connectivity technologies and digital infrastructure are being deployed and managed to support real-time interaction between vehicles and road networks.

Submissions may address:

- Deployment experiences with communication technologies such as ITS-G5, C-V2X, 5G, and related connectivity systems,
- Management of low-latency and real-time data exchange between vehicles and infrastructure,
- Approaches for ensuring reliability, trustworthiness, cybersecurity, and interoperability of exchanged data,
- Use of digital twins and integrated digital platforms to support traffic orchestration and network operations,
- Applications of connectivity technologies that improve situational awareness for connected and automated systems,
- Challenges and lessons learned related to cross-border interoperability and deployment at scale,
- Case studies demonstrating benefits related to road safety, traffic management, operational efficiency, user services, or environmental performance.

Papers demonstrating measurable outcomes related to connectivity performance, safety improvements, operational efficiency, or CCAM deployment are particularly encouraged.

26. Infrastructure Support Levels and ODD Management: Defining the Interaction Between Road and Automated Vehicles

Automated driving systems are becoming increasingly capable, but their safe and efficient deployment depends heavily on the road environment in which they operate. Road authorities are therefore facing growing pressure to understand how physical and digital infrastructure can support different levels of vehicle automation and expand the Operational Design Domains (ODDs) in which automated systems can function safely.

At the same time, challenges remain related to infrastructure readiness, mixed traffic conditions, dynamic operating environments, and the need for consistent technical frameworks that align vehicle capabilities with road network characteristics.

PIARC Technical Committee 2.5 invites submissions that explore how infrastructure can support, enable, and manage automated driving systems in real-world operating environments.

Submissions may address:

- Frameworks and methodologies for defining and categorizing infrastructure readiness levels for automated driving
- Physical and digital infrastructure attributes that support vehicle automation and connected mobility
- Relationships between infrastructure readiness and the expansion or management of Operational Design Domains (ODDs),
- Monitoring and management of ODD conditions in dynamic and evolving road environments,
- Infrastructure adaptations and operational strategies for mixed traffic conditions involving automated and conventional vehicles,
- Technical, operational, and governance challenges associated with supporting automated mobility systems,
- Case studies and pilot projects demonstrating how infrastructure has enabled safe and efficient vehicle automation.

Papers demonstrating measurable outcomes related to safety, operational performance, automation readiness, or infrastructure management are particularly encouraged.

27. Governance, Economic Models, and Equity in the Deployment of Automated Mobility

The deployment of Cooperative, Connected, and Automated Mobility (CCAM) technologies is creating new governance, financial, and institutional challenges for road authorities and transport stakeholders. While technological capabilities continue to advance, questions remain regarding policy frameworks, investment models, stakeholder roles, and the long-term economic sustainability of connected and automated mobility systems.

At the same time, different countries and regions face varying levels of institutional capacity, infrastructure readiness, and market maturity, creating important challenges related to equitable access, affordability, and scalable deployment.

PIARC Technical Committee 2.5 invites submissions that explore the governance, policy, and economic dimensions of deploying connected and automated mobility systems.

Submissions may address:

- Policy and regulatory frameworks supporting the deployment of CCAM technologies,
- Cooperation and governance models between public authorities, private operators, technology providers, and other stakeholders,

- Sustainable business models and funding approaches for road authorities and infrastructure operators,
- Economic impacts, investment needs, and cost-sharing considerations related to CCAM deployment,
- Equity, accessibility, and inclusion considerations in connected and automated mobility systems,
- Challenges and enabling conditions across different country contexts, including high-income and low- and middle-income countries,
- Case studies and lessons learned from pilot projects, operational deployments, or governance initiatives.

Papers demonstrating measurable outcomes related to deployment effectiveness, operational performance, economic sustainability, or governance effectiveness are particularly encouraged.

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Strategic Theme 3 - Safety and Sustainability

28. Innovative Approaches to Road Safety Management

Road safety remains a major global challenge, with many countries continuing to experience high levels of fatal and serious injuries across their transport networks. While significant progress has been made in advancing the Safe System approach, road authorities and stakeholders still face important challenges related to governance, data quality, infrastructure design, speed management, and institutional capacity.

At the same time, rapidly evolving mobility patterns, increasing urbanization, and resource constraints are creating new pressures on road safety systems and requiring more integrated, evidence-based, and scalable approaches.

PIARC Technical Committee 3.1 invites submissions that explore innovative, practical, and effective approaches to improving road safety and strengthening Safe System implementation across diverse contexts.

Submissions may address:

- Governance frameworks and institutional approaches supporting road safety management,
- Data systems, safety performance monitoring, and evidence-based decision-making,
- Speed management strategies and their impacts on safety outcomes,
- Safe infrastructure design and operational measures for all road users,
- Multimodal safety approaches, including active mobility and vulnerable road users,
- Organizational capacity-building and cross-sector coordination for road safety implementation,
- Program evaluations, implementation frameworks, and case studies demonstrating measurable safety improvements,
- Challenges and lessons learned across low-, middle-, and high-income country contexts.

Papers demonstrating measurable reductions in fatalities, serious injuries, risk exposure, or unsafe behaviours are particularly encouraged.

29. Use of Artificial Intelligence for Proactive Road Safety Management

Traditional road safety approaches often rely heavily on historical crash data and reactive interventions. However, advances in Artificial Intelligence (AI), computer vision, predictive analytics, and automated data processing are creating new opportunities to identify and address safety risks before serious crashes occur.

At the same time, road authorities face important challenges related to data quality, model reliability, explainability, technical capacity, and the integration of AI tools into operational safety management processes.

PIARC invites submissions that explore how AI technologies are being applied to support more proactive, predictive, and data-driven road safety management.

Submissions may address:

- Predictive analytics and AI models for identifying high-risk locations, behaviours, or operational conditions
- Near-miss detection, computer vision, and automated safety monitoring systems
- AI-supported road safety audits, inspections, and infrastructure assessments
- Real-time safety analytics and operational decision-support tools
- Data governance, validation, explainability, and reliability of AI-based safety systems
- Integration of AI into road safety operations, enforcement, and traffic management processes
- Lessons learned, implementation challenges, and case studies demonstrating measurable safety outcomes.

Papers demonstrating measurable reductions in crash risk, unsafe behaviours, fatalities, or serious injuries through AI-enabled approaches are particularly encouraged.

30. Skill and Resources for Winter Service

The effectiveness of winter service operations depends heavily on the availability of skilled personnel, operational capacity, and effective workforce management. However, many road agencies and service providers are facing increasing challenges related to recruitment, retention, workforce aging, seasonal staffing demands, and public perceptions of winter maintenance work.

At the same time, winter service operations are becoming more complex due to evolving technologies, changing service expectations, and increasing operational pressures. This creates a growing need for well-trained operational and management staff, flexible staffing models, and long-term workforce development strategies.

PIARC Technical Committee 3.2 invites submissions that explore practical approaches to strengthening workforce capacity, recruitment, retention, and training within winter service operations.

Submissions may address:

- Recruitment and retention strategies for winter service personnel, including approaches to improving workforce stability and long-term employee engagement,
- Workforce diversity and inclusion initiatives, including efforts to broaden participation and improve representation within winter service operations,
- Impacts of public perception and public expectations on workforce attraction and operational delivery,
- Staffing models and operational approaches involving internal personnel, contracted services, or hybrid workforce arrangements,
- Recruitment and management of both operational and supervisory personnel for winter service activities,
- Training and education programs for operational and management staff, including the use of simulations, digital tools, and practical field training,
- Case studies demonstrating how workforce strategies or training initiatives have improved operational performance, safety, efficiency, or service reliability.

Papers demonstrating measurable outcomes related to workforce retention, operational readiness, safety performance, or training effectiveness are particularly encouraged.

31. Integration of New Technologies in Winter Services

Winter service operations are increasingly relying on advanced technologies to improve road safety, operational efficiency, service reliability, and environmental performance. At the same time, road agencies face growing pressures to optimize resource use, respond more proactively to changing weather conditions, and integrate new technologies into existing operational systems and workflows.

Advances in automation, digitalization, weather forecasting, sensor technologies, and equipment design are transforming how snow and ice control operations are planned, managed, and executed. However, challenges remain related to implementation, interoperability, operational readiness, costs, and the practical integration of these technologies into day-to-day winter service activities.

PIARC Technical Committee 3.2 invites submissions that explore how new technologies and digital systems are being applied in practice to improve winter service operations.

Submissions may address:

- Driving assistance technologies supporting winter service vehicle operations and operator safety,
- Automated or assisted spreading and ploughing systems,
- Innovations in spreading technologies, materials, and application methods,
- Snow and ice removal systems and equipment performance improvements,
- Use of digital systems and operational platforms for winter service planning and management,
- Integration of winter service vehicles with weather detection sensors and connected systems
- Road weather information systems (RWIS), forecasting tools, and predictive approaches supporting operational decision-making
- Case studies demonstrating measurable improvements in safety, operational efficiency, service quality, environmental performance, or resource optimization.

Papers demonstrating measurable operational benefits, improved forecasting accuracy, reduced environmental impacts, or enhanced winter road safety are particularly encouraged.

32. Winter Maintenance in Urban Areas

Winter maintenance in urban and cold climate environments presents a complex set of operational, technical, and mobility challenges. Road agencies and municipalities must maintain safe and accessible transport networks while managing dense road systems, multimodal mobility demands, varying traffic volumes, public expectations, and limited operational space during winter conditions.

At the same time, winter operations are increasingly expected to support active mobility, public transportation reliability, freight movement, accessibility for vulnerable users, and efficient traffic flow during periods of high congestion and severe weather. This creates growing pressure to develop integrated, cost-effective, and technically effective winter service strategies adapted to urban and cold climate conditions.

PIARC Technical Committee 3.2 invites submissions that explore practical approaches, operational strategies, and technical innovations supporting winter service operations in urban, peri-urban, rural, and cold climate environments.

Submissions may address:

- Strategies for managing dense road networks with varying traffic volumes during winter conditions,
- Optimization of winter maintenance routes and operational efficiency for service vehicles,
- Treatment methods, equipment, and operational practices for bicycle lanes and active mobility infrastructure,
- Approaches for creating continuous and safe winter active mobility networks across different infrastructure types,
- Winter accessibility for pedestrians and users with reduced mobility, including sidewalks, tactile paving, and public spaces,
- Snow storage, snow removal, thawing strategies, and urban space management during winter operations,
- Winter service practices supporting tramways, buses, rail systems, and access to public transport stations,
- Approaches for maintaining different surface types and transport modes without disadvantaging specific users,
- Communication strategies with road users, freight operators, and public transport passengers during winter events and periods of high congestion,
- Research and case studies evaluating the effectiveness of communication and public information measures during winter service operations,
- Impacts of winter service strategies on freight mobility, passenger traffic, and network performance during peak demand periods,
- Performance of winter maintenance materials and treatments in cold climate conditions,
- Construction and infrastructure practices adapted to cold climate environments and winter operational requirements,
- Financing, accessibility, and service delivery challenges related to rural roads and remote communities in cold climate regions.

Papers demonstrating measurable improvements in safety, operational efficiency, accessibility, mobility reliability, user communication, or winter network performance are particularly encouraged.

33. Innovative Approaches for Asset Management

Road agencies are increasingly adopting new technologies and digital tools to improve how road assets are monitored, managed, and maintained. At the same time, aging infrastructure, growing performance expectations, budget constraints, and increasing data volumes are creating pressure to modernize traditional asset management approaches.

Emerging technologies such as Artificial Intelligence (AI), Building Information Modelling (BIM), advanced sensing systems, and data analytics offer new opportunities to improve decision-making, optimize maintenance strategies, and enhance long-term infrastructure performance. However, challenges remain related to implementation,

interoperability, data quality, organizational capacity, and scalability across different institutional and economic contexts.

PIARC Technical Committee 3.3 invites submissions that explore how innovative technologies and analytical approaches are being integrated into road asset management practices.

Submissions may address:

- Innovative approaches for collecting, processing, and analyzing functional and structural asset management data
- Use of Building Information Modelling (BIM) for road asset management and lifecycle planning
- Applications of Artificial Intelligence (AI), machine learning, and advanced analytics in asset management
- Challenges and lessons learned related to implementation across different institutional settings, including developing countries and countries in transition.

Papers demonstrating measurable benefits related to infrastructure performance, maintenance efficiency, cost optimization, or decision-making effectiveness are particularly encouraged.

34. Innovative Asset Management Implementation Efforts

Road infrastructure asset management is a core function of road authorities worldwide, supporting the coordination of financial, operational, maintenance, risk, and planning activities. As infrastructure networks age and funding pressures increase, agencies are placing greater emphasis on structured asset management approaches that improve decision-making, optimize resource allocation, and support long-term infrastructure performance.

At the same time, implementing effective asset management frameworks remains a significant challenge for many organizations, particularly when integrating business processes, managing multiple asset classes, and aligning operational practices with strategic objectives.

PIARC Technical Committee 3.3 invites submissions that explore practical approaches and implementation experiences related to road infrastructure asset management frameworks.

Submissions may address:

- Examples of implementation of Asset Management Systems in the road sector according to ISO 55001
- Description of an asset management framework established in a road agency that led to better decision-making or improved budget outcomes
- Successful experiences integrating business processes for managing different types of assets, including cross-asset resource allocation.

Papers demonstrating measurable improvements in decision-making, budget optimization, operational efficiency, or infrastructure performance are particularly encouraged. Papers addressing the situation in developing countries and countries in transition are particularly welcome.

35. Renewal and Optimization of Road Infrastructure

Many road agencies worldwide are facing growing challenges related to aging infrastructure, increasing maintenance backlogs, evolving mobility demands, and rising expectations for sustainability and resilience. Asset management is playing an increasingly important role in helping agencies prioritize investments, optimize renewal strategies, and modernize infrastructure networks under constrained financial and operational conditions.

At the same time, road authorities are under pressure to integrate decarbonization, sustainability, and long-term performance considerations into infrastructure renewal and modernization programs.

PIARC Technical Committee 3.3 invites submissions that explore practical approaches and implemented solutions supporting the renewal and modernization of aging road infrastructure through effective asset management practices.

Submissions may address:

- Optimization of infrastructure renewal and modernization of road infrastructure,
- Innovative approaches in road asset management that consider new demands and increasingly high expectations, particularly related to decarbonization, resilience and sustainable development,

- Best practices and approaches in road asset management that support the renewal and modernization of aging road infrastructure.

Contributions should prioritize evidence-based insights, case studies, and transferable methodologies, including clear indicators of impact and lessons learned. Papers demonstrating measurable improvements in infrastructure performance, lifecycle optimization, sustainability outcomes, or backlog reduction are particularly encouraged.

36. Sustainability Assessment of Road Traffic Noise Mitigation Measures

Road traffic noise remains a major environmental and public health concern, affecting quality of life, community well-being, and the sustainability of transport systems. While a range of frameworks and methodologies exist to assess the sustainability of road infrastructure, many current approaches do not fully capture the specific performance, impacts, and lifecycle considerations associated with noise mitigation measures.

This creates a need for improved assessment methods that better integrate environmental, economic, and social dimensions and support more informed decision-making regarding the selection, implementation, and long-term management of noise mitigation solutions.

PIARC Technical Committee 3.4 (Working Group 3.4.1) invites submissions that explore approaches for assessing the sustainability and performance of road traffic noise mitigation measures.

Submissions may address:

- Methodologies and frameworks for evaluating the sustainability of noise mitigation measures across their lifecycle,
- Development of indicators, metrics, and modelling approaches related to environmental, economic, and social performance,
- Comparative analyses of different noise mitigation strategies and technologies,
- Approaches supporting decision-making for the planning, implementation, and management of noise mitigation interventions,
- Case studies and practical experiences from different territorial, climatic, and regulatory contexts,
- Innovative tools, assessment models, or analytical methods aimed at improving the representation of noise mitigation performance.

Papers demonstrating measurable outcomes related to noise reduction, environmental performance, lifecycle efficiency, sustainability assessment, or decision-making effectiveness are particularly encouraged.

37. Biodiversity-Friendly Road Infrastructure: Integrating Nature-Positive Design and Sensory Pollution Mitigation

The continued expansion and operation of road networks present a major challenge for balancing socio-economic connectivity with the protection of biodiversity and ecosystem health. Road infrastructure can contribute to habitat fragmentation, wildlife disturbance, invasive species spread, and sensory pollution such as noise, artificial light, and chemical impacts, all of which can affect ecological systems and landscape connectivity.

At the same time, road agencies and stakeholders are increasingly expected to integrate biodiversity protection, climate resilience, and environmental sustainability into infrastructure planning, design, operation, and maintenance. This is driving interest in more holistic, nature-positive, and ecosystem-based approaches to road infrastructure development.

PIARC Technical Committee 3.4 invites submissions that explore practical approaches, innovations, and collaborative strategies aimed at reducing the environmental impacts of road infrastructure on biodiversity and ecosystems.

Submissions may address:

- Biodiversity-inclusive road planning, design, construction, and operational practices,
- Nature-based solutions and green-blue infrastructure approaches supporting ecological connectivity and resilience,
- Roadside vegetation management, invasive species control, and habitat restoration strategies,
- Impacts of sensory pollution from roads, including noise, artificial lighting, and chemical or olfactory disturbances on wildlife and ecosystems,
- Mitigation measures such as acoustic pavements, wildlife-sensitive lighting, roadside vegetation, traffic management, and ecological corridors,
- Multi-functional ecological network planning approaches supporting landscape connectivity,
- Collaborative and cross-sector approaches involving road authorities, environmental organizations, wildlife experts, researchers, Indigenous and local communities, and other stakeholders in the development of effective mitigation solutions,
- Community engagement and participatory approaches used to balance infrastructure needs with biodiversity and ecosystem protection objectives,
- Case studies demonstrating measurable environmental, ecological, or operational outcomes related to biodiversity protection and ecosystem integration.

Papers demonstrating measurable outcomes related to biodiversity protection, habitat connectivity, environmental performance, or ecosystem resilience are particularly encouraged.

38. Using Sustainable Practices, Natural Materials and Novel Eco-Friendly Approaches to Enhance Road Safety

Road agencies are increasingly seeking approaches that improve road safety while also supporting environmental sustainability and infrastructure resilience. In many jurisdictions, challenges such as wildlife-vehicle collisions, flooding, erosion, and climate-related impacts are prompting greater consideration of nature-based solutions, sustainable materials, and environmentally sensitive design practices in road infrastructure.

PIARC invites submissions exploring practical approaches, experiences, and case studies related to the use of sustainable and nature-based solutions to improve road safety and network resilience.

Submissions may address:

- Approaches to reducing wildlife-vehicle collisions, including wildlife crossings, fencing systems, habitat connectivity measures, and landscape design;
- Sustainable approaches to drainage and diking systems that enhance flood protection, reduce erosion, and improve road safety and reliability;
- Use of natural, recycled, or low-impact materials in road infrastructure with demonstrated safety benefits (e.g., roadside features, barriers, surfacing);
- Integration of ecological considerations into road design, including vegetation management, green infrastructure, and environmentally adaptive alignments;
- Innovative design practices that simultaneously address safety, climate resilience, and environmental protection;
- Monitoring and evaluation methods for assessing the effectiveness of eco-friendly safety interventions, including impacts on crash reduction, wildlife protection, and infrastructure performance and;
- Case studies demonstrating measurable improvements in road safety, including reductions in wildlife-vehicle collisions, enhanced resilience to environmental hazards, or positive environmental outcomes.

Papers demonstrating measurable improvements related to road safety, environmental performance, infrastructure resilience, or wildlife protection are particularly encouraged.

39. Integrating Heritage Impact Assessment into Road & Transport Projects (Tangible and Intangible Heritage)

Road and transport infrastructure projects can have significant impacts on cultural and natural heritage through land use changes, vibration, noise, lighting, emissions, visual intrusion, and changes in accessibility and land use patterns. These impacts may affect both tangible heritage assets, such as monuments, archaeological sites, historic urban areas, and cultural landscapes, as well as intangible heritage, including cultural practices, traditional uses, sacred spaces, and community identity.

At the same time, road agencies and infrastructure planners are increasingly challenged to balance mobility, safety, and infrastructure development objectives with the protection, conservation, and continued use of heritage resources and culturally significant landscapes.

PIARC Technical Committee 3.4 invites submissions that explore practical approaches, assessment methodologies, and collaborative strategies for integrating Heritage Impact Assessment (HIA) into transport planning, design, construction, and operation.

Submissions may address:

- Heritage Impact Assessment methodologies and frameworks applied to road and transport infrastructure projects,
- Assessment approaches related to tangible heritage assets, cultural landscapes, archaeological resources, and protected natural features,
- Approaches for evaluating impacts on intangible heritage, including cultural practices, traditional uses, pilgrimage routes, and spaces of cultural significance,
- Methods and indicators such as viewshed analysis, vibration and noise assessment, landscape analysis, access and connectivity metrics, and lifecycle monitoring,
- Integration of Heritage Impact Assessment with Environmental Impact Assessment (EIA), Social Impact Assessment (SIA), and archaeological risk management processes,
- Mitigation strategies and planning approaches aimed at balancing mobility, safety, conservation, authenticity, and integrity objectives,
- Approaches involving Indigenous Peoples, traditional communities, and local populations in the identification, assessment, protection, and management of heritage and culturally significant landscapes
- Collaborative and participatory processes that integrate traditional knowledge, cultural values, and community perspectives into infrastructure planning and decision-making
- Comparative case studies from different territorial, regulatory, and socio-economic contexts, including rural areas and small towns.

Papers demonstrating effective integration of heritage protection, community engagement, and transport infrastructure objectives are particularly encouraged.

40. Performance and Applicability of Low-Cost Sensors to Assess Global Air Pollution Variability through Machine Learning (AI)

Air quality remains a major public health and environmental concern in many regions, with road transport continuing to be a significant source of air pollution. At the same time, road authorities and policymakers are under increasing pressure to better monitor, understand, and mitigate transport-related air quality impacts while supporting more sustainable and environmentally responsible mobility systems.

Recent advances in low-cost sensing technologies have made air-quality monitoring more accessible and affordable, attracting growing interest as tools for understanding region-specific pollution patterns and supporting data-driven decision-making. However, important questions remain regarding data reliability, calibration, performance consistency, and the suitability of low-cost sensors for different operational and regulatory contexts.

PIARC invites submissions that explore practical approaches, research findings, and implementation experiences related to air quality monitoring and mitigation within the road and transport sector.

Submissions may address:

- Use of low-cost sensors for monitoring road transport-related air quality impacts,
- Approaches for selecting, testing, calibrating, and deploying low-cost sensors according to local conditions and intended uses,
- Research examining data reliability, performance consistency, and quality control challenges associated with low-cost sensors across different economic settings,

- Evidence-based assessments of the strengths, limitations, and appropriate applications of low-cost sensing technologies,
- Experiences demonstrating how air-quality monitoring data has supported informed discussion and decision-making among policymakers, practitioners, and the public,
- Road administration approaches and eco-friendly transport strategies aimed at mitigating road transport impacts on air quality.

Papers demonstrating measurable outcomes related to air quality improvements, monitoring effectiveness, environmental performance, or policy support are particularly encouraged.

41. National Strategies and Policies for Decarbonisation of Road Passenger and Freight Transport

Road passenger and freight transport represent the largest share of inland mobility worldwide and must decarbonise rapidly to support climate objectives and long-term sustainability goals. At the same time, governments, road agencies, and transport stakeholders face significant challenges related to policy implementation, governance, infrastructure readiness, financing, and deployment at scale.

As countries develop and implement decarbonisation strategies, there is growing interest in understanding which approaches are effective, what barriers remain, and how lessons learned can support broader and more equitable deployment across different economic and regional contexts.

PIARC Technical Committee 3.5 invites submissions that explore strategies, policies, programmes, and implementation approaches supporting the decarbonisation of road transport systems.

Submissions may address:

- National strategies, objectives, and deployment plans for decarbonising road passenger and freight transport,
- Governance, regulatory frameworks, standards, and permitting processes supporting road transport decarbonisation,
- Fiscal incentives, carbon pricing mechanisms, and public procurement approaches supporting low-carbon transport development,
- Monitoring frameworks, indicators, and verification approaches used to assess decarbonisation progress and outcomes,
- National programmes, pilot projects, and demonstrators highlighting effective implementation practices and lessons learned,
- Comparative studies across countries and regions, including transferable approaches relevant to low- and lower-middle-income contexts,
- Interdisciplinary approaches integrating policy, engineering, economics, and equity considerations.

Papers demonstrating measurable outcomes related to emissions reduction, policy effectiveness, deployment progress, or operational implementation are particularly encouraged.

42. Production of Renewable Energy in the Vicinity of Road Infrastructure to Support the Electrification of Road Transport and Transport Infrastructure

Road transport electrification will significantly increase energy demand along road networks, particularly as charging needs expand from passenger vehicles to heavy-duty freight and long-distance transport. At the same time, electrical grids in many regions are already constrained, while remote and isolated areas may have limited or no access to reliable grid infrastructure.

Renewable energy systems, such as solar (photovoltaics), wind, battery storage, and microgrids, offer opportunities to support charging infrastructure and reduce pressure on centralized grids. Recent research and practice also point to off-grid and hybrid renewable charging models for remote, rural, northern, and isolated areas, where grid extension may be costly or impractical. Renewable energy integration may also support other road infrastructure operations with high energy demand, including road lighting, tunnels, and tunnel ventilation systems.

PIARC Technical Committee 3.5 invites submissions that explore advanced concepts for generating and using renewable energy in the vicinity of road infrastructure to support transport electrification and road operations.

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Submissions may address:

- Renewable energy generation within or near road rights-of-way, including solar, wind, and hybrid systems
- Integration of renewable energy into charging infrastructure for passenger vehicles, freight vehicles, static or dynamic charging, and battery swapping stations
- Microgrid, off-grid, and local energy solutions for remote, isolated, rural, or grid-constrained areas
- Use of renewable energy systems to support road lighting, tunnel operations, ventilation systems, and other energy-intensive road infrastructure services
- Use of road infrastructure and adjacent assets, including noise barriers, rest areas, rooftops, canopies, and parking areas, for renewable energy generation
- Energy storage, smart energy management, and local or regional balancing of transport-related energy demand
- Technical, financial, operational, and governance challenges related to deploying renewable energy systems along road corridors
- Case studies demonstrating how renewable energy systems have supported charging infrastructure, reduced grid pressure, improved energy resilience, or lowered emissions.

Papers demonstrating measurable outcomes related to energy resilience, emissions reduction, grid impact mitigation, charging availability, or cost-effectiveness are particularly encouraged.

43. Electric Road Systems (ERS)

Electric Road Systems (ERS) and dynamic charging technologies are emerging as potential solutions to support large-scale electrification of road transport, particularly for freight transport, public transit, and high-utilization mobility corridors. As interest in charging-in-motion technologies grows, road agencies and transport stakeholders are increasingly examining their technical feasibility, operational performance, infrastructure requirements, governance implications, and long-term economic viability.

At the same time, significant challenges remain related to technology selection, interoperability, system integration, financing, and large-scale deployment. Ongoing pilot projects and operational demonstrations are providing important lessons regarding where dynamic charging technologies may offer the greatest value and under what conditions they can be implemented effectively.

PIARC Technical Committee 3.5 invites submissions that explore the latest developments, operational experiences, and implementation approaches related to Electric Road Systems and dynamic charging technologies.

Submissions may address:

- Dynamic charging technologies, including inductive (wireless), conductive (rail-based), and catenary (overhead) systems,
- Design methodologies, optimization strategies, and integration approaches supporting efficient ERS deployment,
- Application scenarios for dynamic charging, including freight corridors, urban public transport routes, logistics zones, and high-demand transport networks,
- Infrastructure integration, operational performance, and energy efficiency considerations for charging-in-motion systems,
- Governance models, institutional frameworks, and public-private cooperation approaches supporting ERS deployment,
- Business models, financing mechanisms, and cost allocation strategies for large-scale implementation,
- Case studies, pilot projects, and operational demonstrations highlighting lessons learned, implementation challenges, and measurable outcomes.

Papers demonstrating measurable outcomes related to operational performance, energy efficiency, deployment feasibility, infrastructure integration, or economic viability are particularly encouraged.

44. Pavements for Urban Areas

Urban areas are experiencing rapid growth and increasing pressure on road infrastructure systems. As cities become denser and mobility patterns evolve, urban pavements are required to support a wider range of transport modes, new vehicle technologies, environmental objectives, and public space functions within increasingly constrained urban environments.

At the same time, road agencies and municipalities face growing challenges related to resilience, maintenance impacts, accessibility, noise, heat island effects, water management, and the integration of infrastructure supporting electric and multimodal mobility. These evolving demands are requiring new approaches to pavement design, materials, construction, and maintenance practices in urban contexts.

PIARC Technical Committee 4.1 invites submissions that explore practical approaches, innovations, and implementation experiences related to urban pavements and road infrastructure.

Submissions may address:

- Pavement design approaches adapted to dense urban environments and multimodal transport systems,
- Impacts of new vehicle types and emerging mobility modes, including electric and personal mobility devices, on pavement design and performance,
- Pavement solutions supporting resilience objectives such as stormwater management, water buffering, and urban heat island mitigation,
- Integration of infrastructure supporting electric mobility, including charging systems and dynamic charging concepts,
- Approaches for accommodating multiple transport users within restricted urban space,
- Urban pavement materials, construction methods, and maintenance practices aimed at minimizing disruption, noise, dust, and accessibility impacts,
- Impacts of pavement surface characteristics, including noise, comfort, and ride quality, on road users and surrounding communities,
- Case studies demonstrating measurable improvements in pavement performance, urban mobility, environmental performance, or maintenance efficiency.

Papers demonstrating measurable outcomes related to durability, user comfort, resilience, sustainability, operational efficiency, or urban livability are particularly encouraged.

45. Low-Cost Pavement Systems

Road agencies worldwide are under increasing pressure to deliver affordable and durable road infrastructure while managing constrained budgets, growing maintenance needs, and sustainability objectives. In many contexts, particularly in low-volume networks and resource-constrained environments, low-cost pavement systems are essential for improving connectivity and accessibility.

At the same time, minimizing initial construction costs does not always result in the lowest lifecycle cost. Long-term performance, maintenance requirements, operational impacts, and environmental considerations must also be considered when evaluating pavement solutions. This creates a growing need for cost-effective pavement approaches that balance affordability, durability, and lifecycle performance.

PIARC Technical Committee 4.1 invites submissions that explore innovative approaches, materials, construction techniques, and evaluation methods related to low-cost pavement systems.

Submissions may address:

- Innovative materials, construction techniques, and sustainable practices for low-cost pavement systems
- Earth roads, gravel roads, macadam roads, stabilized soil roads, surface-treated roads, and paved roads
- Lifecycle Cost Analysis (LCCA) and lifecycle performance evaluation approaches for pavement systems
- Use of local materials, recycled materials, and context-appropriate construction practices
- Approaches for balancing initial construction costs, maintenance requirements, operational performance, and environmental impacts
- Low-cost pavement solutions and maintenance approaches adapted to rural, remote, isolated, or low-accessibility areas where construction resources, materials, skilled labour, or long-term maintenance capacity may be limited
- Case studies demonstrating how low-cost pavement systems have improved connectivity, accessibility, service reliability, or lifecycle performance in rural and remote regions

- Case studies demonstrating long-term performance, maintenance outcomes, durability, or cost-effectiveness of low-cost pavement solutions.

Papers demonstrating measurable outcomes related to lifecycle cost savings, durability, maintenance optimization, sustainability, or improved accessibility are particularly encouraged.

46. Use of Alternative Materials in Pavement Mixes

Road agencies and infrastructure stakeholders are increasingly seeking ways to reduce the environmental impact of pavement construction while maintaining long-term performance, durability, and safety. Traditional pavement materials such as natural aggregates, bitumen, and cement are associated with significant resource use and carbon emissions, creating growing interest in alternative and innovative material solutions.

At the same time, advances in material science and circular economy practices are enabling the development of new binders, low-carbon materials, and secondary or waste-derived products that may partially replace conventional pavement constituents. However, questions remain regarding long-term performance, scalability, environmental benefits, and practical implementation.

PIARC Technical Committee 4.1 invites submissions that explore innovative and alternative materials for asphalt and concrete pavements.

Submissions may address:

- Use of innovative binders, including bio-binders, alternative hydraulic binders, and low-carbon cementitious materials,
- Replacement of traditional aggregates with secondary, waste-derived, or alternative materials,
- Applications of innovative materials aimed at reducing carbon emissions, improving sustainability, or supporting circular economy objectives,
- Laboratory research, field trials, pilot projects, and operational case studies involving innovative pavement materials,
- Performance evaluation, durability assessment, and lifecycle impacts of alternative pavement materials,
- Challenges related to implementation, production, standardization, scalability, and long-term monitoring of innovative materials.

Papers demonstrating measurable outcomes related to carbon reduction, material performance, durability, sustainability, or lifecycle efficiency are particularly encouraged. The sole use of traditional recycled materials (such as recycled asphalt pavement or recycled concrete aggregate) without the inclusion of innovative materials is outside the scope of this topic.

47. Carbon Reduction through the Whole Life Cycle of a Bridge

Bridge owners and infrastructure agencies are under increasing pressure to reduce the carbon footprint of bridge infrastructure while maintaining safety, durability, resilience, and long-term performance. As climate objectives and sustainability requirements become more prominent, there is growing interest in understanding how bridge design, construction, maintenance, rehabilitation, and end-of-life management can contribute to lower lifecycle emissions.

At the same time, reducing carbon emissions in bridge infrastructure requires balancing environmental objectives with technical performance, operational constraints, material availability, and lifecycle costs. This is driving interest in low-carbon materials, circular economy approaches, refurbishment strategies, and durability-focused asset management practices.

PIARC Technical Committee 4.2 invites submissions that explore practical approaches, innovations, and implementation experiences aimed at reducing carbon emissions across the lifecycle of bridge infrastructure.

Submissions may address:

- Lifecycle analysis approaches used to evaluate and reduce carbon emissions from bridge infrastructure,
- Carbon reduction strategies in bridge design, construction, maintenance, rehabilitation, and operation,
- Low-carbon materials, construction techniques, and construction equipment for bridge projects,
- Circular economy approaches in bridge infrastructure, including refurbishment, reuse, recycling, and material recovery,
- Strategies aimed at improving bridge durability and extending service life as a means of reducing lifecycle emissions,
- Case studies demonstrating measurable carbon reductions, lifecycle benefits, or sustainability improvements in bridge projects.

Papers demonstrating measurable outcomes related to carbon reduction, durability improvement, material efficiency, lifecycle optimization, or sustainability performance are particularly encouraged.

48. Climate Adaptation in Earthworks: Success Stories

Road infrastructure is increasingly exposed to climate-related risks such as extreme rainfall, flooding, erosion, landslides, drought, and ground instability. Earthworks failures can significantly affect road safety, network reliability, maintenance costs, and long-term infrastructure performance, creating growing pressure for more resilient design and adaptation approaches.

At the same time, many road agencies are seeking practical solutions that move beyond theoretical adaptation concepts toward proven, real-world applications capable of improving long-term infrastructure stability under changing climate conditions.

PIARC Technical Committee 4.3 invites submissions that explore practical experiences, case studies, and implementation approaches related to resilient earthworks design and climate adaptation.

Submissions may address:

- Case studies demonstrating successful resilient earthworks design under climate-related hazards,
- Adaptation strategies for managing erosion, slope instability, flooding, drainage, and ground movement risks,
- Design methodologies, materials, and construction practices supporting long-term earthworks resilience,
- Monitoring, maintenance, and risk management approaches for climate-vulnerable earthworks infrastructure,
- Lessons learned from implementation, operational performance, and long-term adaptation outcomes.

Papers demonstrating measurable improvements in infrastructure resilience, risk reduction, operational stability, or lifecycle performance are particularly encouraged.

49. The Future of Earthworks: Low-Carbon Innovations

Earthworks activities are facing increasing pressure to improve efficiency while reducing environmental impacts and supporting decarbonization objectives. At the same time, advances in digital technologies, equipment, and construction practices are creating new opportunities to modernize traditional earthworks operations and improve overall project performance.

PIARC Technical Committee 4.3 invites submissions that explore low-carbon innovations and digital tools that are transforming earthworks practices and supporting more sustainable and efficient infrastructure delivery.

Submissions may address:

- Low-carbon innovations, digital tools, and implementation approaches supporting more sustainable and efficient earthworks operations.

Papers demonstrating measurable outcomes related to emissions reduction, operational efficiency, sustainability, or construction performance are particularly encouraged.

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50. Smart Asset Management: Monitoring and Early Warning for Earthworks

Managing geotechnical risks is becoming increasingly important as earthworks infrastructure is exposed to aging assets, climate-related hazards, and growing operational demands. At the same time, advances in sensing technologies and continuous monitoring systems are creating new opportunities to improve risk management, maintenance planning, and long-term infrastructure performance.

Integrating monitoring technologies into asset management and maintenance workflows may help road agencies improve safety, optimize interventions, and better manage lifecycle costs associated with earthworks infrastructure.

PIARC Technical Committee 4.3 invites submissions that explore the use of smart sensing technologies and monitoring approaches for earthworks asset management and geotechnical risk mitigation.

Submissions may address:

- Applications of sensing technologies, continuous monitoring systems, and data integration approaches supporting geotechnical risk management, maintenance planning, long-term safety, and lifecycle optimization for earthworks infrastructure.

Papers demonstrating measurable outcomes related to risk reduction, infrastructure safety, maintenance efficiency, or lifecycle cost optimization are particularly encouraged.

51. Digitalization of Road Tunnel Design and Management

Tunnel operators and road authorities are increasingly adopting digital technologies to improve safety, inspection, maintenance, operational performance, and emergency preparedness. Advances in drones, Artificial Intelligence (AI), sensing systems, and Digital Twins are creating new opportunities to improve tunnel monitoring, automate inspections, support predictive maintenance, and enhance operational decision-making.

At the same time, integrating these technologies into tunnel operations presents important challenges related to workflow integration, data governance, cybersecurity, validation, scalability, and long-term operational management.

PIARC Technical Committee 4.4 invites submissions that explore how digital technologies are being applied to support tunnel operations and lifecycle management, with a particular focus on the operational phase of tunnel infrastructure.

Submissions may address:

- Applications of drones for tunnel inspection, condition surveys, as-built modelling, and operational monitoring
- Use of Artificial Intelligence (AI) for defect detection, anomaly recognition, predictive maintenance, and operational decision support
- Digital Twin applications integrating geometry, sensors, operational data, and simulation models for tunnel management
- Continuous monitoring, performance forecasting, scenario testing, and operational simulation approaches
- Integration of digital technologies into tunnel inspection, maintenance, emergency response, and operational workflows
- Data governance, cybersecurity, validation metrics, and scalability considerations for digital tunnel systems
- Case studies demonstrating measurable benefits such as reduced inspection time, improved detection rates, optimized maintenance, enhanced operational efficiency, or improved safety.

Papers demonstrating measurable operational, safety, maintenance, or lifecycle management benefits are particularly encouraged.

52. Sustainability of Tunnel Operation: New Approaches

Road tunnels are complex infrastructure systems that require significant amounts of energy for daily operation, safety systems, ventilation, lighting, monitoring, and maintenance activities. As energy costs rise and sustainability objectives become more prominent, road authorities and infrastructure managers are increasingly expected to improve the energy efficiency and environmental performance of tunnel operations.

At the same time, sustainable tunnel management extends beyond energy consumption alone and includes considerations related to equipment durability, maintenance practices, material use, operational organization, resilience, and long-term lifecycle performance.

PIARC Technical Committee 4.4 invites submissions that explore practical approaches, technologies, and strategies supporting sustainable and energy-efficient tunnel design, operation, and maintenance.

Submissions may address:

- Energy-efficient tunnel operation, maintenance, and control strategies,
- Self-generation and on-site supply of renewable energy for tunnel infrastructure,
- Optimization of lighting systems, ventilation systems, sensors, and operational control systems,
- Energy storage solutions and resilience strategies supporting tunnel operations during power disruptions or blackout conditions,
- Approaches for improving equipment durability, maintenance efficiency, and lifecycle performance of tunnel systems,
- Monitoring, data analysis, and performance management approaches supporting sustainable tunnel operations,
- Policies, governance frameworks, procurement approaches, and sustainability criteria supporting energy-efficient tunnel management,
- Case studies demonstrating measurable reductions in energy consumption, operational costs, emissions, or maintenance requirements.

Papers demonstrating measurable outcomes related to energy efficiency, sustainability, operational resilience, lifecycle optimization, or environmental performance are particularly encouraged.

53. Road Tunnel Safety, Operation and Maintenance in Low and Middle Income Countries (LMIC)

Road tunnels are complex and resource-intensive infrastructure systems that require specialized approaches for operation, safety, maintenance, and long-term management. In low- and middle-income countries (LMICs), tunnel authorities and operators often face additional challenges related to financial constraints, limited technical resources, evolving regulatory frameworks, operational capacity, and local environmental or geographic conditions.

At the same time, tunnel solutions and operational practices developed in high-income countries may not always be directly applicable or sustainable in LMIC contexts. This creates a growing need for context-appropriate, practical, and cost-effective approaches adapted to local operational realities and infrastructure needs.

PIARC Technical Committee 4.4 invites submissions that explore challenges, practical experiences, and good practices related to tunnel operation, safety, and maintenance in low- and middle-income countries.
Submissions may address:

- Operational, safety, maintenance, and management challenges specific to tunnels in LMIC contexts
- Adaptation of tunnel standards, technologies, and operational approaches to local conditions and available resources
- Cost-effective and context-appropriate solutions for tunnel safety, maintenance, nitoring, and operation
- Organizational, technical, and governance approaches supporting tunnel management capacity in LMICs
- Lessons learned and case studies demonstrating practical implementation experiences and good practices in LMIC tunnel projects.

Papers demonstrating practical, scalable, and sustainable approaches adapted to LMIC conditions are particularly encouraged.

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54. Decarbonisation of Road Construction and Maintenance

Decarbonisation remains a major challenge for the road sector as agencies and infrastructure owners seek to reduce greenhouse gas emissions across the full lifecycle of road infrastructure projects. Planning, design, construction, maintenance, material production, transportation logistics, and equipment operations all contribute to the carbon footprint of road infrastructure systems.

At the same time, road authorities and industry stakeholders are increasingly expected to integrate low-carbon practices, technologies, and decision-making approaches into infrastructure delivery while balancing operational, financial, and performance requirements.

PIARC Technical Committee 4.5 invites submissions that explore current strategies, tools, technologies, and implementation approaches aimed at reducing greenhouse gas emissions in road infrastructure construction and maintenance.

Submissions may address:

- Strategies and technical methods for decarbonisation in road planning, design, construction, and maintenance
- Identification and reduction of carbon-intensive practices, processes, and materials within infrastructure projects
- Low-embodied carbon materials, decarbonisation technologies, and optimization approaches supporting emissions reduction
- Planning, coordination, logistics, and operational decisions influencing carbon outcomes, including haul distances, equipment mobilisation, sequencing, and resource efficiency
- Selection, operation, and decarbonisation of construction and maintenance equipment, vehicles, and machinery, including electrification and alternative fuels
- Procurement approaches, contracting models, financing mechanisms, and performance-based incentives supporting low-carbon infrastructure delivery
- Monitoring tools, indicators, lifecycle assessment methodologies, carbon calculators, and digital systems supporting emissions measurement and decision-making
- Case studies demonstrating measurable reductions in greenhouse gas emissions, operational impacts, or lifecycle carbon performance.

Papers demonstrating measurable outcomes related to emissions reduction, operational efficiency, lifecycle optimization, or implementation effectiveness are particularly encouraged.

55. Global Perspectives on Road Design Standards: Comparison, Transferability and Development - Global Perspectives on Road Design Standards: Comparison, Transferability and Development

Road design standards play a critical role in supporting safe, efficient, and resilient transport infrastructure. However, significant differences exist between national and regional road design guidelines due to variations in traffic conditions, economic capacity, geography, climate, policy priorities, and mobility needs. At the same time, evolving transport challenges, new mobility concepts, digital technologies, and automated vehicles are creating pressure to modernize and adapt existing standards.

This creates growing interest in understanding how road design standards are developed, applied, compared, and transferred across different contexts, as well as how they can respond to emerging transportation demands while remaining practical and context-appropriate.

PIARC Technical Committee 4.5 invites submissions that explore the development, comparison, adaptation, and application of road design standards and guidelines worldwide for both rural and urban roads.

In particular, papers should address:

- comparison of national road design standards and guidelines,
- identification of key design parameters and their variability,
- transferability of road design standards between countries,
- challenges in applying standards in different economic contexts (HIC vs LMIC),
- development and structure of road design guidelines,
- extreme cases and boundary conditions in design standards,
- influence of local conditions (traffic, environment, policy) on standards,
- integration of new mobility concepts into existing standards,
- the role of road design standards in the context of automated vehicles,
- use of data and digital tools in developing or updating standards,
- case studies demonstrating innovative or non-standard approaches,
- application of road design standards in real-world projects, including lessons learned and integration into project delivery processes,
- implementation challenges and corresponding mitigation strategies in practice.

Papers demonstrating practical applications, successful adaptation of standards, or measurable improvements in safety, operational performance, or project delivery are particularly encouraged.

56. BIM Applications in Road Design and Digital Transformation

Building Information Modelling (BIM) is increasingly transforming road infrastructure design and project delivery by supporting digital workflows, improved coordination, data integration, and lifecycle management. As road agencies and infrastructure stakeholders continue to adopt digital design approaches, BIM is becoming an important tool for improving efficiency, collaboration, sustainability, and project performance across the road sector.

At the same time, implementation challenges remain related to standards, interoperability, organizational readiness, data management, and the integration of BIM into existing design and construction practices. Differences in national approaches, project maturity, and technological capacity also create variability in how BIM is applied across countries and project phases.

PIARC Technical Committee 4.6 invites submissions that explore the implementation, development, and practical application of BIM in road design and infrastructure projects.

In particular, papers should address:

- implementation of BIM in road design projects,
- comparison of BIM standards across countries and project phases,
- BIM maturity levels in infrastructure design,
- integration of BIM with digital construction and digital twins,
- level of detail (LOD) requirements at different design stages,
- benefits of BIM for road safety, efficiency, and sustainability,
- challenges and barriers in BIM adoption,
- transition from traditional design to digital workflows,
- case studies of BIM application in road infrastructure projects,
- data management of BIM data in the life cycle (micro to large scale),
- future trends in digitalisation of road design.

Papers demonstrating measurable improvements in project delivery, coordination, efficiency, lifecycle management, or digital integration are particularly encouraged.

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57. New Road Data Collection and Usage Methods of Road Statistics for Decision-Making

Road agencies and infrastructure managers are increasingly relying on data-driven approaches to support planning, operations, maintenance, safety, and investment decisions. Traditional data collection methods are now being complemented or replaced by innovative technologies capable of generating more accurate, real-time, large-scale, and continuously updated road information.

At the same time, the growing availability of data from sensors, connected devices, communication networks, and digital platforms is creating new opportunities, as well as challenges related to data integration, quality, interoperability, sharing, and practical use in decision-making processes.

PIARC invites submissions that explore innovative methods, technologies, and applications for collecting, managing, sharing, and using road-related data and performance indicators.

Submissions may address:

- Innovative data collection methods and technologies, including sensors, GPS, GSM, Wi-Fi networks, Bluetooth, modelling approaches, and emerging measurement tools
- Development and application of indicators related to infrastructure condition and performance, construction and maintenance activities, traffic flow, congestion, resilience, environmental impacts, road safety, and service levels
- Use of data to support investment planning, transport policy evaluation, maintenance optimization, operational management, and sustainability objectives
- Data sharing platforms, interoperability approaches, and best practices supporting collaboration and effective use of road-related data
- Methodological advances and practical applications demonstrating how innovative data collection leads to actionable insights, technical standards, improved decision-making, and enhanced road management strategies
- Case studies demonstrating measurable benefits related to safety, operational efficiency, infrastructure performance, sustainability, or policy outcomes.

Papers demonstrating measurable improvements in data quality, operational decision-making, infrastructure management, or policy effectiveness are particularly encouraged.#