

## Executive Summary

The eight meeting of PIARC Technical Committee E.1 Adaptation Strategies and Resiliency was held in conjunction with the World Road Congress in Abu Dhabi, UAE on 6th-10th October 2019. The Congress was held at the conclusion of the PIARC cycle from 2016-2019 and the theme of this event was "Connecting Cultures, Enabling Economies".

The aim of this Congress is to share worldwide techniques, innovations, political strategies, trends and developments, best practices and experiences in the fields of road, infrastructures and transport between Ministers, governments, private sector, road and transport administrations and organizations, academics, solutions' providers, experts and practitioners from all countries across the world. This Congress takes place at the end of each PIARC four-year cycle to showcase the work conducted throughout the cycles and provided an opportunity to present reports and papers at the global level, as well as enabling extensive networking opportunities.

The Congress involved more than 5,000 delegates (3,000 full time attendees), 46 Government Ministers including our Deputy Prime Minister, and hosted more than 100 meetings and almost 500 speakers. The Australian Delegation was led by Roads Australia and Austroads and comprised approximately 35 people from Australia and New Zealand. Full details on the Congress program is provided at: <https://www.piarc.org/en/activities/World-Road-Congresses-World-Road-Association/XXVI-World-Road-Congress-Abu-Dhabi-2019>

During the Congress, TC E.1 held its final meetings to coordinate the presentations to be provided at two sessions:

- Workshop: Climate Change Adaptation – Monday 7th October
- Technical Session E.1: Adaptation Strategies/Resiliency – Wednesday 9th October

The purpose of the Workshop was to outline the key stages of the PIARC International Climate Change Adaptation Framework for Road Infrastructure developed in the 2012-2015 cycle. Throughout this current cycle, work on this Framework has been extended by way of the reports published (detailed below). The Workshop was well attended, and I provided number of presentations throughout this session to highlight the key aspects of the Framework.

At the Technical session for E.1, the outcomes of the TC E.1 Adaptation Strategies and Resiliency published reports were delivered. These included presentation of the reports, *Adaptation methodologies and strategies to increase the resilience of roads to climate change – Case Study Approach (Working Group 1)*; *Refinement of the PIARC International Climate Change Adaptation Framework for Road Infrastructure (Working Group 2)* and *Analysis and Categorisation of Climate Change Adaptation Studies (Internal Case Study Taskforce)*. For this Session, I was the co-chair together with Jürgen Krieger, the current Chair of TC E.1 (pictured below), and also provided a presentation on the Working Group 1 report. These sessions were well received and included the presentation from members of the TC E.1 Marie Colin and Fabien Palhol from France, who received the Best Paper Award on Adaptation of Roads Standards, Guidelines and Regulations to Climate Change.

Additionally, meetings were held by PIARC General Secretariat at the commencement and conclusion of the Congress. At these meetings the launch of the next Strategic Plan for the 2020-2023 cycle was discussed.



**Co-Chairing the Technical Session on the findings from TC E.1 and Presenting at the Workshop on Climate Change Adaptation**



## Work Program

The work of the Technical Committee E.1 builds on the outputs of the previous cycle to further refine the *International Climate Change Adaptation Framework for Road Infrastructure*. The activities of TC E.1 are divided into two Working Groups and an internal Taskforce:

- Working Group 1 (WG1) aims to investigate and disseminate information regarding current adaptation strategies being adopted to increase the resilience of road infrastructure.
- Working Group 2 (WG2) involves the refinement of the *International Climate Change Adaptation Framework for Road Infrastructure* (based on the Special Project developed in the 2011-2015 cycle) and follow-up of its implementation.
- Case Study Taskforce has been formed to consolidate case studies using a database. The outputs of these working groups are complementary, with the results of WG1 informing the refinement of the Framework developed by WG2.

These reports are now available from the PIARC website, and a summary of each report is detailed below:

### **Working Group 1 – Adaptation Strategies to Increase Resiliency (Caroline Evans, Australia, Working Group Leader)**

Working Group 1 has produced a report entitled *Adaptation Methodologies and Strategies to Increase the Resilience of Roads to Climate Change – Case Study Approach*. This report undertakes a state-of-the-art case study analysis of adaptation strategies to increase the resilience of road infrastructure at the policy, strategic, system level and project specific level. This includes consideration of:

- Data requirements regarding climate change adaptation of road infrastructure.
- Vulnerability and criticality of road infrastructure assessment.
- Adaptation measures with regard to possible threads resulting from climate change.
- Cost-benefit analysis of climate change adaptation.

The WG1 Report provides the methodological detail supporting each stage of the refined PIARC International Climate Change Adaptation Framework for Road Infrastructure, by referring to state-of-the-art case study examples.

The outcomes of this report were presented at the Congress by Caroline Evans (Arcadis, Australia) and Fabien Palhol (Cerema, France). This report can be accessed from the following link:

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.piacr.org%2Fen%2Forder-library%2F31335-en-AdaptationMethodologies%2520and%2520Strategies%2520to%2520Increase%2520the%2520Resilience%2>

[520of%2520Roads%2520to%2520ClimateChange%2520%25E2%2580%2593%2520Case%2520Study%2520Approach&data=02%7C01%7CCaroline.Evans%40arcadis.com%7Cd76c88dfa9874e8c8bce08d7497e51f2%7C7f90057d3ea046feb07ce0568627081b%7C1%7C0%7C637058679237591218&data=himSvbU1p6XWWTL3BukCkhPRvCaYBYOcUASfCfCzfl%3D&reserved=0](https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.piarc.org%2Fen%2Forder-library%2F31390-en-Refinement%2520of%2520PIARC%25E2%2580%2599s%2520International%2520Climate%2520Change%2520Adaptation%2520Framework%2520for%2520Road%2520Infrastructure&data=02%7C01%7CCaroline.Evans%40arcadis.com%7Cd76c88dfa9874e8c8bce08d7497e51f2%7C7f90057d3ea046feb07ce0568627081b%7C1%7C0%7C637058679237591218&data=himSvbU1p6XWWTL3BukCkhPRvCaYBYOcUASfCfCzfl%3D&reserved=0)

### **Working Group 2, Refinement of Climate Change Adaptation Framework (Gordana Petkovic, Norway, Working Group 2 Leader)**

Working Group 2 has developed a report, *Refinement of PIARC's Climate Change Adaptation Framework*. WG2 had the task to review collected case studies and other relevant experience and proposed refinements of the original edition of the International Climate Change Adaptation Framework for Road Infrastructure. The experience from the implementation of the Framework internationally is provided, together with a comparison with other existing frameworks. Additionally, input into the refinement of the Framework has been undertaken in this cycle. The main output for the refinement of the Framework is formed from case studies collected by the Case Study Task Force.

At the Congress, the outputs of this report were presented by Gordana Petkovic, Norway. The full details of the report can be accessed as follows:

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.piarc.org%2Fen%2Forder-library%2F31390-en-Refinement%2520of%2520PIARC%25E2%2580%2599s%2520International%2520Climate%2520Change%2520Adaptation%2520Framework%2520for%2520Road%2520Infrastructure&data=02%7C01%7CCaroline.Evans%40arcadis.com%7Cd76c88dfa9874e8c8bce08d7497e51f2%7C7f90057d3ea046feb07ce0568627081b%7C1%7C0%7C637058679237591218&data=l12ic875oc8z9xtx13k2jgfv0whQv2TYFvSf0HqUbsA%3D&reserved=0>

### **Case Study Task Force (Beata Krieger, Germany)**

This is an internal report which comprises the process in which over 70 reports were collected and classified relating to case studies on climate change adaptation and resiliency of road infrastructure. The report provides an overview of the work undertaken by the TC E.1 internal Task Force, and was presented at the Congress by Beata Krieger, Germany.

## **World Road Congress**

At the conclusion of each PIARC cycle, a Congress is held. The theme of the Congress was "Connecting Cultures, Enabling Economies". This event was held from the 6<sup>th</sup> to 10<sup>th</sup> October 2019 and enabled a networking opportunity for more than 5,000 delegates (3,000 full time attendees), 46 Government Ministers including our Deputy Prime Minister, hosted more than 100 meetings and heard from almost 500 speakers.

During the Congress, two TC E.1 meetings were held to finalise the presentations, and related sessions which the TC was involved in the planning stages. There were a number of sessions which TC E.1 coordinated. These included:

- Workshop: Climate Change Adaptation.
- Technical Session E.1: Adaptation Strategies/Resiliency. In addition to the presentations which provided the outcomes of the work developed by TC E.1. There were a number of other presentations on the topic of resilience which were provided as follows:
  - Methodological Framework for Adapting Road Infrastructure to Climate Change in Mexico.
  - Frameworks and Methodological Approaches for Climate Change Adaptation of Roads – A Conceptual Framework for Understanding Adaptation Planning of Urban Road Infrastructure.
  - Adaptation of Road Standards, Guidelines and Regulations to Climate Change.
  - Optimisation of the Respond and Recovery Process within Holistic Risk Management.
  - Embedment of Climatic Effects in the Road Asset Management Process.

Additionally, the topic of resilience was also covered at the following sessions:

- Strategic Direction Session: The Progress of Climate Change Adaptation and Mitigation Actions in the Transport Sector after the COP21 Paris Agreement – This session was held to provide participants with an opportunity to examine the future challenges and road policy directions from a political and strategic perspective. This session was based on national reports prepared by member countries such as the United Arab Emirates, Czech Republic, Mexico, Norway, UK and Germany.
- Technical Session E.3: Disaster Management – This session included presentations on the reports delivered by TC E.3, as well as additional papers from the UK, Netherlands, Nepal and Mexico.



*Some of the members of TC E.1 from Norway, Germany, Mexico, France, China, Australia and South Africa, who attended the Congress in Abu Dhabi*

## Learnings and Dissemination

Participation in the Technical Committee meetings has provided an opportunity to share learnings about the progress of Technical Committee between Australia and New Zealand. This also involved the dissemination of key projects into the state-of-the-art practice reports which have been published for this cycle. The outputs of the WG1 and WG2 reports will assist in informing Austroads members to analyse road networks and to select and assess the adaptation measures with regard to the consequences of climate change. There were a number of LinkedIn posts to disseminate the knowledge shared at the Congress.

## Conclusion and Recommendations

Much of the work of this Committee will continue in the next cycle through Technical Committee 1.4 Climate Change and Resilience of Road Networks, which will be led by Caroline Evans, Australia. The PIARC Draft Terms of Reference outlines the objectives of this Committee in detail.

**Caroline Evans**  
**TC E.1 Member and Working Group 1 Leader**  
Principal Economist, Arcadis