

SP13 VULNERABILITY OF ROAD SYSTEMS TO CLIMATE CHANGE

Recommendations to Decision makers

Within the lifetime of existing and planned highway infrastructure around the world significant changes are expected in the world's climate. These changes are not uniform, they vary geographically. This variation combined with the variation in the characteristics of highways across the world and the local regions within which they sit, means that the impacts of climate change will also vary. The significance of these impacts such as increased risks of floods and the need to take appropriate responses can only be judged at the local/regional level. There are unlikely to be uniform global responses.

Road administrations and decision makers now need to begin to factor climate change adaptation issues into their processes. Currently there is no comprehensive, quantitative assessment of the various transportation sector costs and opportunities associated with climate change.

As a necessary first step towards doing this, decision makers need to support the necessary collaborations between engineers and climate scientists to ensure that relevant tools are developed to inform the adaptive design, maintenance and operation of highways.

Technical aspects

The development of highway design codes across the world have generally been based around the use of historic weather data for the regions from which the codes originate. Under the conditions of changing climates this reliance on historical records as a guide to future conditions is problematic.

Currently however, the development of climate models has not allowed highway network operators to consider in sufficient detail, the impacts that climate change may have on their networks. There has been neither the spatial resolution nor a sufficient quantification of the uncertainty in the projections of climate change to inform investment decisions. Indeed the present tendency to average climate change impact globally is likely to obscure consequences for local and regional areas. In order to identify and evaluate the potential interaction between transportation and climate change, we need a reliable comprehensive assessment of the anthropogenic microclimate changes at the regional and sub regional level, the scope and magnitude of infrastructure vulnerability to climate variability and how such climatic changes could influence these variations.

However, climate models that can address these two issues are beginning to become available and understanding and applying these tools to the review of existing standards and practices and their revisions as necessary, will soon become practical.

Recommendations to PIARC

Climate change represents a challenge to one of the paradigms that underpin highway design, maintenance and operational codes across the world. The paradigm being that whilst local climate can vary the extent of that variation can be allowed for through the study of historical data. Climate change requires us to consider the adoption of risk based approaches with climate change currently recognised as one of the least well defined uncertainties.

The challenge for PIARC is to ensure that this new factor of a varying climate is considered across all aspects of its work to ensure that highways are designed and can be maintained and operated in line with these emerging new risks. To achieve this goal, PIARC needs to promote the collaboration of highway organisations with climate scientists and others to ensure that appropriate tools are developed.