



Ministry of Transport, Public Works and Water Management
Directorate General of Public Works and Water Management
Road and Hydraulic Engineering Institute



“Adapting Europe’s roads for climate change” Conclusions of Brussels Workshop, 12 June 2007



Introduction

Climate change is a high priority topic for European society and industry. Much effort is being expended to developed methods of reducing the production of Greenhouse gases and thereby mitigate the future impacts. However regardless of the levels of success that can be achieved, there is a growing need:

- for Europe’s road infrastructure to be adapted to accommodate the inevitable effects of climate change,
- and for operators to identify vulnerabilities and to develop relevant responses

The requirement for adaptation is driven by two factors. The most optimistic scenarios for combating greenhouse gas reduction imply that some further changes will occur. In addition, there is a growing recognition that based on historical information, there is a greater range and variability of climatic conditions than has traditionally been taken into account and it is compounded by the greater density of urbanisation in Europe.

In conjunction with Rijkswaterstaat-DWW and POLIS, FEHRL organised a workshop on Climate change effects and measures. The main aims of the workshop were to;

- share available knowledge between the key stakeholders
- to investigate the consequences of climate change for infrastructure
- to prepare a FEHRL programme on climate change
- to help create an environment for greater coordination of research
- to consider some of the overlaps between mitigation and adaptation strategies
- to raise the awareness of climate change as a challenge for road authorities

The speakers at the workshop included Michel Ray (Director of Innovation, EGIS), Jorgen Christensen (Chief Counsellor, Danish Road Directorate), Yvonne Rogbeck (Swedish Geotechnical Institute), Gordana Petkovic (Norwegian Public Roads Administration), Werenfried Spit (Rijkswaterstaat-DWW), Martin Pipa (Head of ITS, Czech Transport Research Centre-CDV).

Conclusions

The workshop felt that the initial objectives of the event had been achieved. It was clear that the subject was one that urgently required greater cooperation between different stakeholders, member states and regions. It was recognised that the challenges facing road authorities, both national and local, were substantial and a pan-European recognition was needed in order to reduce duplication and to be prepared before the negative impacts of the problems materialize in a substantial way. .

Consider the unforeseen consequences of a changing climate - the workshop highlighted the differing events and issues that will need to be addressed. These included those factors that might normally be anticipated such as floods, wind damage to infrastructure and tree falls, landslides and erosion, rutting of pavements as well as road closures and damage due to forest fires and the effects on skidding resistance and road safety. There was an identified need to raise awareness of these issues with relevant stakeholders and that recent events provide sufficient basis to do this.

Better identify the magnitude of extreme events – the speakers identified a worrying lack of knowledge about the possible magnitudes and frequency of extreme events. Whilst there is useful information about average temperatures, rainfall and sea level rises, information is not available concerning maximum wind speeds, maximum localised rainfall levels etc. Whilst the natural reluctance of meteorologists to extrapolate outside their models was recognised, road authorities are faced with a lack of information about the events which have the strongest impacts on infrastructure design or vulnerability. It was concluded that closer dialogue with meteorological experts was needed.

Develop a new approach using risk management - it was concluded that in most cases, climate change could not be addressed by simply developing existing practises. It was recognised that a risk-analysis approach is now needed where the consequences of extreme events assume greater importance. The traditional concept of 100 year event (i.e. flood, etc.) is now unsafe because the hypothesis of a stable climate is simply wrong now.

Identify the vulnerable segments and spots of the road network – it was demonstrated that implementation of simulations on detailed and accurate mapping of networks and links can prepare the road manager for the consequences and allow for timely mobilisation and prioritisation of preventive actions when extreme weather is forecasted.

Identify the costs of climate change on infrastructure - it was concluded that more effort should be made to determine the costs of a changing climate on Europe's road, transport networks and services. It was recognised that the political profile of infrastructure impacts was not high and consequently neither the impacts on the infrastructure nor the costs of adaptation were considered in policy discussions. It was recognised that greater emphasis should be placed on identifying the costs.

Act promptly to reduce impacts and costs - It was concluded that early implementation of existing knowledge throughout the road network could reduce the ultimate impacts and costs. It was agreed that many preventative measures would not add substantially to costs or resource use although studies were needed to identify where this was appropriate.

Understand if compromises are needed now to avoid pain later – It was recognised that some of the consequences of climate change may affect the ability of road authorities to meet other legislative requirements. For example, where rainfall, and consequently run-off from roads increase, meeting directives on water quality could be difficult. In addition, requirements such as those on bio-diversity or habitat fragmentation may affect the ability of road authorities to take necessary preventative actions that would mitigate the future impacts of climate changes. It was agreed that more research was needed in this area.

Recognise the interdependence of roads and the transport system – the workshop acknowledge that roads were part of an integrated transport network where impacts on one part of the system affected other modes. Specific examples included the dependence of cities on sometimes vulnerable public mass-transit systems where roads provided backup or even emergency evacuation.

Plan for the worst - it was recognised that improvements were needed in preparation of emergency plans for dealing with extreme events. Such preparations should not only include the immediate emergency responses (including rescue and evacuation), the development of plans to maintain resilient networks but also to include such issues as limiting environmental damage.

Learn by doing – because of the complexity of the subject, it was recognised that the best way for appropriate expertise to be developed was by direct exposure to the problems. Therefore it was suggested that knowledge exchange is a priority when problems occur. For example, it was proposed that staff exchanges should be accelerated when dealing with disasters and extreme events. Some experts and tool are already available for operational work.

Share and develop technical knowledge - it was agreed that further efforts should be considered to understand what is already known, to collate that information and share the knowledge especially in the field of floods/erosion, landslides, rock slips and avalanches, bearing capacity of roads, rutting and other pavements effects (including skidding resistance), winter maintenance and emergency planning. Systematic and organized capitalisation of experience should be organized at national level, with a European methodology to facilitate optimum use of data and avoid a replication of incidents.