

POSITION PAPER

A RESILIENT ROAD NETWORK FOR ADAPTATION TO CLIMATE CHANGE

EUPAVE calls on the European Commission and road authorities to build the resilient, durable transport infrastructure that will be needed to adapt to a changing climate. Concrete pavements, thanks to their durability and robustness, are apt to meet the challenges posed by the future climate.

The fact that the global climate is changing due to human activity is overwhelmingly supported by historical observation (IPCC 2013). Current climate models generally project that the climate will continue to change and do so at an increasing rate over the next century or longer (IPCC 2013; IPCC 2014), notwithstanding the agreement reached at COP21¹.

Adaptation to climate change is the process of making our buildings and infrastructure “future-proof” by designing them to be able to withstand the changed climate of the future. According to the European Commission, the EU-wide cost of *not* adapting to climate change could reach at least €100 billion a year by 2020, rising to €250 billion a year by 2050². Therefore, the European Union has adopted a Strategy on Adaptation to Climate Change³, which focuses on promoting Member State action, integrating adaptation into EU policies, and supporting better informed decision-making. When it comes to infrastructure, it includes the development of guidelines for project developers, climate-proofing for major EU-funded projects, as well as looking at the role of European standards.

■ The effect of climate change on roads and pavements

The two main consequences of climate change that will affect roads are increases in temperature and precipitation. Europe’s road network can be expected to suffer various stresses as a result: flooding, erosion of embankments and foundations, loss of road structure integrity and loss of pavement integrity.

Most models project some increase in average air temperature from now to 2050. An increase in the frequency and duration of extreme temperatures is also projected, mainly in the south of Europe. According to the European Environment Agency, this increase in hot days during the summer will lead to softening and rutting of flexible pavements⁴. Additionally, increased temperatures will intensify freeze-thaw cycles in the north of Europe, which could accelerate the deterioration of pavements and cause soil and slope instability and ground movement.

Moreover, the increased frequency of storm surges and flooding will affect granular subbases and subgrades of pavements if drainage systems have not taken this into account, leading to damage to pavements.

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■ Concrete solutions

Resilience can be understood as the capacity to anticipate and minimise potential destructive forces through adaptation or resistance. Cement and concrete solutions for roads are therefore resilient solutions.

Concrete pavements are long-lasting and are built to withstand changes in temperature or moisture. Concrete stiffness remains constant in the range of ambient temperatures, not suffering softening or rutting. In fact, the surface of concrete is robust and it keeps its properties (microtexture, macrotexture, roughness and skid resistance) over time, independently of climate effects.

Regarding the base layer of the road, cement bound granular mixtures including lean concrete and roller compacted concrete are high quality, robust and resilient solutions.

“Concrete pavements are durable and resilient, providing the ideal solution to the effects of a changing climate”

■ What policies are needed?

Taking a long-term approach to procurement of transport infrastructure has multiple advantages: reduced life-cycle costs and reduced environmental impact thanks to durability, reduced maintenance etc. This is also relevant for adaptation to climate change. It is clear that acting to make Europe's road network more resilient should be done sooner rather

than later. In continuing to rely on short-term fixes, Europe will find its road network less resilient in the face of the climate challenges of the future.

European standards have been identified by the European Commission as an adaptation tool. Indeed, it is relevant to make general (horizontal) standards sufficiently demanding to ensure roads built today will be “future-proof” for tomorrow. This will set a level of performance to be reached – without necessitating a change in product standards.

EUPAVE calls on the European Commission, Member States and road authorities to ensure the road network is adapted to the effects of climate change, starting now. In particular, the European Commission and Member States should:

1. Make long-term thinking a mandatory component in public tendering for road building
2. Consider the resilience of the entire road network in Member State adaptation plans as part of the EU Adaptation Strategy
3. Make available data for climate projections, so that road authorities can base their decisions on likely climate and weather scenarios for the future.

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¹ <http://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf>

² http://ec.europa.eu/clima/publications/docs/factsheet_adaptation_2014_en.pdf

³ http://ec.europa.eu/clima/policies/adaptation/what/index_en.htm

⁴ Adaptation of transport to climate change in Europe, EEA, 2014