

Climate resilience and long-term vision of road infrastructure

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"Climate resilience and long-term transport investment" – 25 January 2022



Resilience





Resilience

• Definition by IPCC (2014):

 "the capacity of social, economic and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganising in ways that maintain their essential function, identity and structure, while also maintaining the capacity for adaptation, learning and transformation"

In our context

 "the capacity to absorb stresses and remain functional in the face of external stresses imposed upon it by climate change"



Climate change – the consequences

• Extreme temperatures

- $\,\circ\,$ Softening of viscoplastic materials
 - rutting of asphalt pavements
- $\,\circ\,$ Intensified freeze-thaw cycles
 - Accelerated deterioration of pavements
- Wildfires

Increased precipitation

- \circ Flooding
 - Erosion of embankments and foundations
 - Loss of road structure integrity and pavement integrity









Climate change – the consequences

- Some figures (EEA) high emissions scenario
 - o [2011-2020]: warmest decade
 - 2019: +1.1° above pre-industrial levels
 - Human induced global warming: +0.2°C/decade
 - Weather-driven fire danger in southern Europe: projected increase of 30-40% by the end of this century, compared with 1981-2010
 - Heavy rain in winter and summer: projected increase for 2071-2100 compared to 1971-2000
 - for southern Europe: 25%
 - for central and eastern Europe: 35%





Climate change – the consequences

- Natural disasters \implies necessary removal of debris
 - Intense traffic of HGV on roads that were not designed for it
 - Increase in IRI = less smooth surfaces
 - Faster degradation for asphalt roads in comparison with concrete
 - Concrete pavements are less impacted by overloading and provide the highest resilience to flood and wildfire damage





Climate change – mitigation



-22,5 kg CO₂/m²

30 to 60% compensation of CO₂ for cement production



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Climate change mitigation

• Pervious concrete pavements



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Long-term investment policy

- Societal benefits of a resilient, robust road network
 - \circ Saving lives
 - Positive impact on road safety
 - Free traffic flow for emergency services
 - Saving money
 - Lower repair cost
 - Lower impact on economy thanks to increased availability of the transportation network
 - Saving environment
 - Less impact (emissions, ressources,...) due to rehabilitation or reconstruction



Long-term investment policy

- Infrastructure networks will be affected by the physical impacts of climate variability and change, but will also play an essential role in building resilience to these impacts
- New infrastructure assets should be prioritised, planned, designed and operated to account for the climate changes that may occur over their lifetimes.
- Existing infrastructure may need to be retrofitted, or managed differently, given climate change.

Ref: "Climate-resilient Infrastructure" – Policy Perspectives – OECD ENVIRONMENT POLICY PAPER NO. 14, 2018

Concrete roads, either as newly constructed pavements or as overlays on existing asphalt pavements, are part of these solutions.



Thank you for your kind attention