ROAD DESIGN, CONSTRUCTION AND MAINTENANCE

OBJECTIVE

Increase the resilience of road transport infrastructure to weather extreme events and to climate change.

DESCRIPTION

Operations to improve the road pavement more resilient to:

- High temperatures: adjustment of bituminous mixture design (use of binders with higher softening point, including polymer modification of bitumen, selection of stronger aggregate skeleton); adjustment of structural design of the pavement (flexible, semi-rigid and rigid/composite designs); greater use of concrete due to its resistance to high temperatures and other advantages (longer lifetime, possibility of increased load, lower need for maintenance) albeit slightly higher purchase costs; changing the design of the concrete pavement mixture to reduce the amount of water required; increase the reflectance (albedo) of the road surface e.g. by means of using bright, coloured elements on the road or reflective coatings of road surfaces; cooling pavements with water.
- Intense precipitation: use of permeable/reservoir pavements where water is stored in the pavement structure and infiltrated into the soil or discharged by a drainage system; use of porous top layers that can facilitate the drainage of the water to the sides of the road and prevent aquaplaning; for concrete surfaces use of higher cement contents and lower water cement ratios are recommended; development of hydrophobic coatings suitable for use at the micro-mechanical and or pavement surfacing level.

Road drainage system:
To make the road drainage system more resilient to the effects of extreme rainfall it is necessary to install water retaining facilities (e.g. dams, reservoirs) and structural protection measures (dikes, embankments). The design for culverts should be adjusted to accommodate higher water volumes within a short period of time.
To make bridges and other structures more resilient to the increased frequency of floods, the greater flow of rivers, erosion and instability of the slopes and temperature fluctuations, it is necessary to adapt their design, construction and management over time.

EXPECTED RESULTS

Increased roads maintenance: cleaning and maintenance of drainage systems, recovering storm damages, cleaning of roads, snow and ice removal.

RESULT INDICATORS

Number of resilient roads infrastructure.

INVOLVED ACTORS

Administrations and/or agencies responsible for road transport management; research institutions working in the field of sustainable development transport; research institutes specialized in climate research; construction companies working in the field of engineering constructions.

EXPECTED TIMELINE FOR ACTION

- Short term (1-4 years)

BEST PRACTICES

- Grimsel – Swiss
- France

CRITICALITIES

The construction of new roads or the adaptation of existing ones according to new climate proofed standards can conflict with territorial development plans (e.g. for housing), other sectoral strategies or environmental protection objectives.

SCOPE OF THE ACTION

- Adaptation

TYPE OF PROPOSED ACTIONS

- Grey
- Soft

SECTOR OF ACTION

- Transport and infrastructure
- Urban settlement

CLIMATE IMPACTS

- Extreme precipitation
- Extreme temperatures
- Floods

IMPLEMENTATION SCALE

- Municipality
- Region / Country

SOURCE

https://climate-adapt.eea.europa.eu/metadata/adaptation-options/climate-proofed-standards-for-road-desig

n-construction-and-maintenance