Climate change adaptation needs of the core transport network in Spain

Alberto Compte
Current vulnerability of the road network to climate

Number of incidents per year recorded in the Tele-Ruta Service per 100 km, depending on road type
(Data from 2010 to 2012)
The Road Units' perception of the current impact of different climatic factors on traffic conditions.

- Ice
- Snow
- Wind
- Fog
- Drought / High temperatures
- Coastal storms and sea level
- River floods
- Persistent rainfall
- Short heavy rainfall

Number of responses:
- Not applicable / No response
- Low
- Moderate
- High
- Very high
Main climatic events associated with remedial/rehabilitation measures on roads

- Short heavy rainfall
- Persistent rainfall
- Rainfall
- Floods / River floods
- Ice
- Snow
- Wind
- Fires
- Temperatures

Current vulnerability of the road network to climate
Current vulnerability of the road network to climate

Main road infrastructure assets on which remedial/rehabilitation measures have been performed due to climatic events

- Measures > 1 M€ (25 measures)
- 1 M€ > Measures > 0,1 M€ (61 measures)
- Measures < 0,1 M€ (311 measures)
Current vulnerability of the rail network to climate

Average annual distribution of incidents caused by weather events recorded by ADIF

- Conventional network
- High-speed network

- Torrential rain
- Lightning / Storms
- Snow
- Ice
- Fog
- Strong winds
- Track-side fires
Current vulnerability of the rail network to climate

Average annual distribution of weather-related incidents affecting train movement recorded by Renfe Operadora (data from 2010-2011)

- Torrential rain
- Lightning / Storms
- Snow
- Ice
- Fog
- Strong winds
- Track-side fires
Current vulnerability of the port network to climate

Percentage of Port Authorities with port operation problems due to climatic variables

- Waves
- Overtopping
- Interior agitation
- Floods
- Access problems at the entrance
- Draught restrictions
- Large waves produced by swell
- Extreme winds
- Air quality
- Extreme precipitation
- Cold or heat waves
- Currents
- Fog

With risk of suspension of port activity
Without risk of suspension of port activity
Risk of suspension of port activity not specified
Current vulnerability of the airport network to climate

Number of level-1 incidents by airport and type
(Period analysed: 2007-2011 - Sample: 119 incidents)