

INFRARISK

Final Dissemination Conference

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New hazards and transport infrastructures

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- Created in 2004 as a mirror of the European Construction Technology Platform ECTP
- Contributing to the construction sector through **promoting public-private partnerships in research, development and innovation**, carried out among enterprises, industrial associations, universities, research centres, technological centres and customers.



Working groups

- **Internationalisation of R&I** : Acciona, Ferrovial
- **Promoting innovation**: OHL, University of Cantabria
- **Transport infrastructures**: Dragados, Vías 
- **The city of the future**: Cartif and Tecnalia research organisations
- **Construction processes**: CYPE, Itainnova, Technical University of Madrid (UPM)



Conferences Workshops



Internationalisation

- Coordination of **NTPs network** (15-20 countries)
- Partner at **REFINET CSA** (www.refinet.eu) on transport infrastructures, coordinated by ECTP Infrastructure & Mobility Committee
- Member of **INFRAVATION** Scientific Panel (road infrastructures)




New scenarios for transport infrastructures

- Climate change
- Extreme natural and man-made hazards
- Earthquakes, flood, landslides, heat and wind increasing, rainfalls, etc.
- **Cascading effects**: vulnerability during successive hazards



Requirements for infrastructures

XX and XXI century:

- **Ultimate Limit States**: safety against partial or total collapse under loads
- **Serviceability Limit States**: deformations, vibrations, cracking in concrete, etc.
- **Durability** during the service life (50, 100, 300 years)
- **Sustainability**: energy impact and other environmental considerations, recycling, etc.
- **Climate change**: new hazards 



New scenarios for transport infrastructures

- Preventive strategies
- Remedial strategies
- The selection of strategies has to be considered in the framework of **social** and **financial** issues (*Ex.: cost of traffic delay after extreme hazards versus higher initial investment*)



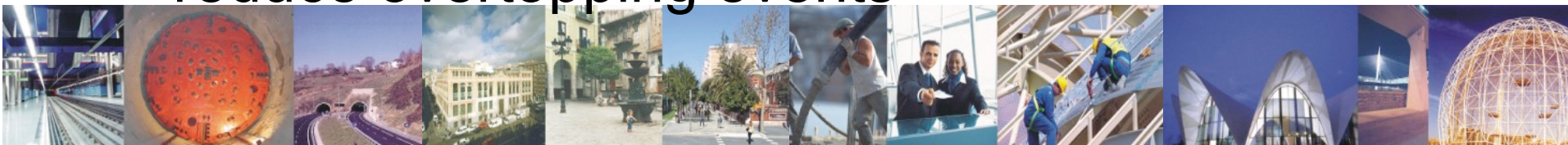
New & modified standards to consider these “new” scenarios

- ✓ **Actions** due to extreme hazard events
- ✓ Resilient **materials**
- ✓ Resilient **infrastructures**: bridges, tunnels, earthworks (slopes and embankments), pavements, rails, breakwaters, etc.
- ✓ **Foundations**



New design considerations

- ✓ **Foundations** to avoid scours: protection in piers and abutments; piles versus footings; longer spans in bridges avoiding piers in the water
- ✓ Structural **redundancy & robustness**
- ✓ **Earthwork slopes**: lower angle, land cover, etc.
- ✓ Improved **drainage** systems
- ✓ Combination of **fibres and steel bars in concrete**
- ✓ New **asphalt mixes** avoiding rutting due to heat increasing, etc.
- ✓ Longer **runways** in airports due to heat increasing
- ✓ Height increasing of **breakwaters & crest walls** to reduce overtopping events



- Relevance of the **maintenance** for better performance of infrastructures under extreme hazards
- Collection of **data** from the conditions of the infrastructures (**network management systems**):
 - For operation & exploitation
 - For durability considerations (repairs, etc.)
 - For improving strategies during/after extreme hazard events ←



- **Upgrading of existing infrastructures is a urgent need**, due to:
 - ✓ Material deterioration
 - ✓ New demands: traffic,
 - ✓ Climate change ←
 - ✓ ...

.... and a opportunity



Shall we need more research and innovation to deal with transport infrastructures and climate change?

Many thanks

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