INFRARISK: Novel indicators for identifying critical INFRAstructure at RISK from natural hazards

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Extreme, low probability, natural hazard events can have a devastating impact on critical infrastructure (CI) systems in Europe and the Mediterranean. The EU project INFRARISK (Novel Indicators for identifying critical INFRAstructure at RISK from natural hazards) aims to develop reliable stress tests to establish the resilience of European CIs to rare low frequency extreme events and to aid decision making in the long term regarding robust infrastructure development and protection of existing infrastructure.

The core objective of the INFRARISK project is to develop a stress test framework to tackle the coupled impacts of natural hazards on interdependent infrastructure networks through identifying rare low-frequency natural hazard events, which have the potential to have extreme impacts on critical infrastructure. A stress test structure is been developed for specific natural hazards on CI networks and a framework for linear infrastructure systems with wider extents and many nodal points (roads, highways and railroads) further applicable across a variety of networks (e.g. telecom, energy).

An integrated approach to hazard assessment considering the interdependencies of infrastructure networks, the correlated nature of natural hazards, cascading hazards and cascading effects, and spatial and temporal vulnerability is established and implemented through the development of GIS based and web based stress test algorithms for complex infrastructure networks. The developed framework will be tested through simulation of complex case studies.

The methodological core of the project is based on the establishment of an ''overarching methodology'' to evaluate the risks associated with multiple infrastructure networks for various hazards with spatial and temporal correlation. This is the basis for the development of stress tests for multi-risk scenarios which defines the general framework, providing a tool for decision making based on the outcome of the stress test. The overarching methodology captures and incorporates, into a GIS platform, the outputs from an extensive profiling of natural hazards and infrastructure, and analysis of single event risk for multiple hazards and space-time variability of a CI network.

An INFRARISK strategic decision support tool is been developed to ensure network models and stress test procedures are integrated and used under specific process workflows and modules.

The application on selected case studies in Italy and Croatia will verify the modelling techniques and procedures developed in INFRARISK.