

Resilience of Infrastructure Networks: Maintenance of Bridges in Mountainous Environments

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Abstract : Infrastructures are key elements to ensure the operational functionality of the transport system. The collapse of a single bridge or, equivalently, a tunnel can lead an entire motorway to be considered completely inaccessible. As a consequence, the paralysis of the communications network determines several important drawbacks for the community. Recent chronicle events have demonstrated that ensuring the functional continuity of the strategic infrastructures during and after a catastrophic event makes a significant difference in terms of life and economical losses. Moreover, it has been observed that RC structures located in mountain environments show a worst state of conservation compared to the same typology and aging structures located in temperate climates. Because of its morphology, in fact, the mountain environment is particularly exposed to severe collapse and deterioration phenomena, generally: natural hazards, e.g. rock falls, and meteorological hazards, e.g. freeze-thaw cycles or heavy snows. For these reasons, deep investigation on the characteristics of these processes becomes of fundamental importance to provide smart and sustainable solutions and make the infrastructure system more resilient. In this paper, the design of a monitoring system in mountainous environments is presented and analyzed in its parts. The method not only takes into account the peculiar climatic conditions, but it is integrated and interacts with the environment surrounding.

Keywords : structural health monitoring, resilience of bridges, mountain infrastructures, infrastructural network, maintenance

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