

Progetto DPC-ReLUIIS 2024-2026 WP 6

Monitoraggio e dati satellitari

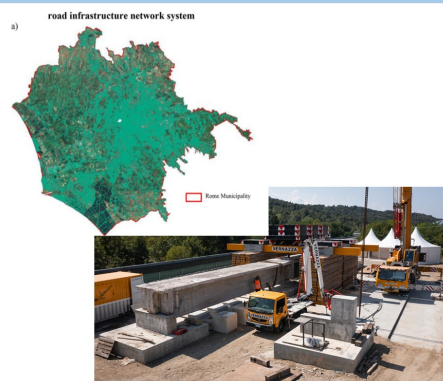
Task 6.1-2

Risk Management of Road Infrastructures

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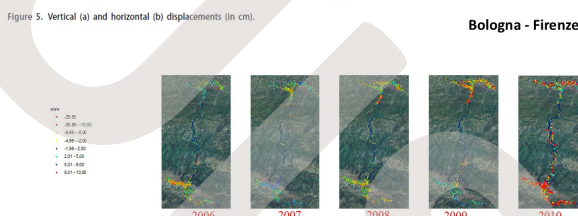
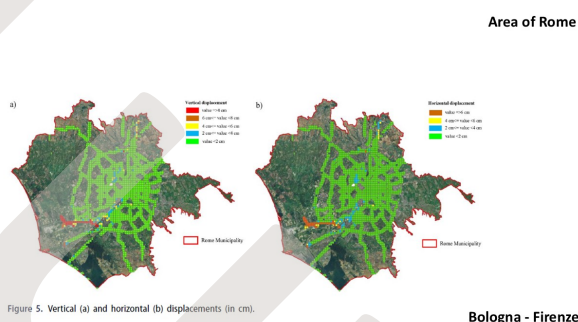
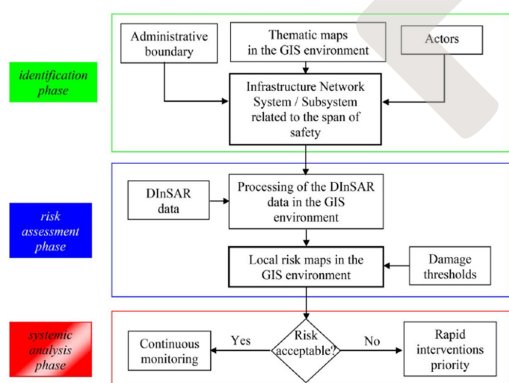
Motivation

The proposed framework advances beyond the traditional method of evaluating **road infrastructures**, adopting a systemic approach that seeks to optimize the interrelations among infrastructures. This perspective is further extended by including not only infrastructures but also the actors involved in their **management** and **governance**. Given the central role of infrastructure maintenance in sustaining the global economy, the management of ageing reinforced concrete (RC) and prestressed concrete (PRC) bridges is particularly critical. In Italy, many such bridges remain in service despite prolonged exposure to environmental and traffic-related stressors. Recent years have therefore seen increasing efforts to renew outdated bridges and related systems. Decision-making in this context hinges on balancing coordination and fragmentation, depending on the span of safety and associated risk levels. Coordination and fragmentation serve as conceptual tools to highlight governance strategies, helping decision-makers avoid poor cooperation and inadequate responses. Risk assessment integrates advanced techniques, such as **satellite-based differential interferometric synthetic aperture radar (DInSAR)** combined with GIS platforms, alongside **full-scale experimental tests**.



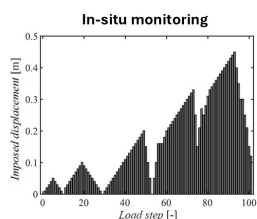
Satellite-based differential interferometric synthetic aperture radar (DInSAR)

The approach is intended to identify the most appropriate organizational mode for **infrastructures management**. The potential of this approach was tested in a sample area of Rome and of Bologna-Firenze (Italy), and the results reveal a significant span of safety with a common negligible risk, and a subspan of safety with a moderate risk.



Full-scale experimental test on PRC bridge beam

Here are presented the results of a **full-scale experimental test** on a PRC bridge beam from a 60 years old PRC girder bridge. The preliminary results of the load test are presented, along with the outcomes of post-test laboratory evaluations of the concrete and steel reinforcement, discussing the potential influence of the deterioration process on the ultimate behaviour.



Non-linear numerical modelling

