

Advanced nonlinear modelling of existing overpass bridges using OpenSees

The seismic vulnerability assessment of existing bridges has become a topic of strong interest for the scientific community due to the strategic role that they play during the emergency management phase. This seminar will focus on the main vulnerabilities and modeling issues of existing bridges with specific reference to a very common structural scheme adopted for bridge overpasses and viaducts in Italy, represented by multi-span simply supported prestressed concrete bridges.

The focus will be especially on the non-linear behavior and modeling of existing bridges through the analysis of the behavior of its components and their mutual interaction with specific emphasis on reinforced concrete structures subjected to seismic actions. The tools for the construction of a numerical model reproducing a 3D bridge will be provided.

With reference to an existing articulated cantilever viaduct with a Niagara-type scheme built in the '70s, the second part of the lesson will specifically focus on the use of the OpenSees software, with basic concepts regarding the object-oriented approach including the definition of geometry, elements, and materials for the numerical model with emphasis on the modeling strategies for RC viaducts components and their mutual interaction.

The seminar is addressed to PhD students with a basic knowledge of the OpenSees software.