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ReStructure 2.0 Webinar Series

Sala Stampa - Aula Magna – Convention Center Università della Calabria

2:00pm March 20, 2023 (Time Zone: Europe/Rome)

NON-LINEAR METHODS TO ACCOUNT FOR SOIL- STRUCTURE INTERACTION IN THE SEISMIC DESIGN OF BRIDGES

Abstract: Modern approaches to the design of earthquake-resistant structures tend to exploit the non-linear response of constructions in order to ensure a satisfactory performance even in the occasion of very severe seismic events. Because soil is an important source of non-linearity, the non-linear interaction of structural members with the soil needs to be considered in any analysis methods used to design structures in the non-linear range. This seminar presents some of the strategies that can be employed to this purpose, with a specific emphasis on the seismic design of bridges. A decoupled method is presented first, in which the response of the soil-foundation system is expressed through elastic-plastic constitutive relationships at the macro scale, that can be added to the global structural model of a bridge. It is shown that this is a very convenient approach thanks to its great computational efficiency and to a clear physical meaning of the main constitutive ingredients of the model. The second part of the seminar illustrates a different, partially coupled approach in which the perspective is reversed: it is a simplified representation of the structural model that is inserted into a complete model of the soil-foundation system to evaluate its seismic performance. Implementations of this second strategy are presented for the cases of suspension and girder bridges.



Presenter Bio-Sketch: Luigi Callisto is a full professor of geotechnical engineering at the Sapienza University of Rome. He graduated in Naples in 1990 and got a PhD at Sapienza University in 1996. Prof. Callisto served briefly at the University of Florence and at the University of Bristol before becoming a researcher and then a professor at Sapienza. His main research interests include the constitutive behaviour of clayey soil, the behaviour of foundations, deep excavations and tunnels in soft soils, the development of tools for the seismic design of geotechnical systems. Over the last years, prof. Callisto has been engaged in code-drafting at the national and European scale.

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