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HISTORIC MASONRY STRUCTURES: GEOMETRY AND STABILITY

Lezione aperta per il corso di *Analisi del comportamento strutturale e dei dissesti delle costruzioni storiche*, docenti Emanuele Reccia e Antonio Cazzani

Venerdì 24 Maggio 2024
dalle ore 15:00 alle ore 18
Aula Magna "Gaetano Cima" del DICAAR
Facoltà di Ingegneria e Architettura
ex complesso Mauriziano,
via Corte d'Appello 87, Cagliari

ABSTRACT

Masonry construction was dominant in building and civil engineering until the 19th century. Throughout the 19th century, iron, steel, and reinforced concrete gradually displaced masonry. The theories and calculation tools taught today in Schools of Architecture and Engineering refer to steel and reinforced concrete. This theory is inapplicable to masonry structures, with a material that is essentially discontinuous, heterogeneous, and anisotropic, and that can only withstand compression (one-sided material). Besides, the boundary conditions of Historic Masonry Construction are essentially unknowable.

Professor Heyman has developed the Modern Theory of Masonry by translating the Principles of Limit Analysis to this structural type. For a "standard" material, the Fundamental Theorems of Limit Analysis are verified. Crucially, the Safety Theorem leads to the "equilibrium approach" (Heyman). It is not possible to perform a correct analysis with an incorrect or inadequate theory. Those who want to work in the field of historic heritage intervention must learn the new theory of masonry structures.

The main objective of this conference is to give an overview of the Theory of Factory Structures and its application to the study of historic buildings. In the first part, the theory will be presented; in the second part, its application to real cases will be discussed.

SHORT CV

Architect 1981. Some work as free architect. 1983-85. Collaboration with a Software Company in documentation. 1985 began of Doctor Studies at the Polytechnic University of Madrid. 1989 Assistant in the School of Architecture in Madrid. PhD in 1990. Since 1993 Professor of Structural design in the School of Architecture Polytechnic University of Madrid. 1997-2003 Secretary of the Spanish Society of Construction History (SEdHC), founded in 1997. Since 2003, President of the SEdHC. Teaching Structural Design, Construction History, and Historic Structures. 2010-13, Head of the Master on Building Structures of the UPM. In the last thirty years work as a structural consultant of Historical Constructions (40 expertises on buildings and bridges, among them, San Juan de los Reyes, Cathedrals of Tudela, Palma de Mallorca, and Santiago de Compostela, bridge of Navea, etc.). Most of the publications and technical reports can be downloaded freely from the Digital Library of the Polytechnic University of Madrid (www.ad.upm.es). Main topic: Masonry Structures and Construction History.