SESSION: Mechanical properties of masonry construction and structural mechanisms of decay (part II)

INSTRUCTOR: Giorgio Croci

TIME: Tuesday, 10th May/ 14:40 – 16:00 (1.5 hours)

SESSION OUTLINE

ABSTRACT
This lecture is a follow up to Mechanical Properties of Masonry Construction and Structural Mechanisms of Decay (part I). This session will present various case studies of world monuments that illustrate the principles of masonry construction behavior, identification and analysis of the mechanisms and patterns of deterioration, and the design of remedial repairs. In addition, the cases present the application of a conservation methodology from an engineering perspective and display how a methodological approach informs the conservation decision making process.

The studies presented are divided in the following categories:

- **Arches, vaults, and domes**: the Domus Aurea, the Roman Pantheon, Hagia Sophia, Brunelleschi’s dome, and Saint Peter’s Basilica by Michelangelo
- **Seismic problems**: the Basilica of St. Francis of Assisi, Hagia Sophia and Hagia Irene in Istanbul, the Basilica of Collemaggio in L’Aquila, and the Prambanan Temple in Indonesia
- **Soil settlement problems**: the Tower of Pisa (this project will be presented in consideration of the site visit during the study tour), the Ducal Palace of Modena, the Ducal Palace of Genova, and the Towers of Angkor.

The cases present actual scenarios where structural principles, theory and conservation methodology were applied. They reveal the limitations of theory and the realities of the field.

OBJECTIVES
To display how specific theoretical principles and general criteria are applied to the reality of construction.

CONTENT OUTLINE
Structural behavior of monuments and historic buildings

- **Vertical structures**: pillars, columns, towers, bell towers, minarets, and obelisks Example: the Obelisk of Axum
- **Horizontal structures**: arches, vaults, domes, and lintels. Examples: Pantheon, Hagia Sophia, Brunelleschi’s dome, and Saint Peter’s Basilica by Michelangelo
- Damage and decay of masonry structures
- **Seismic behavior of structures**: the Basilica of St. Francis, the Colisseumin Rome, Trajan’s Market in the Roman Forum Case Study: The Tower of Pisa
SESSION OUTLINE CONT’D

READINGS

= Essential reading material
= Available online


