

Special Session Proposal for Earthquake Engineering

SERA – Adjacent Interacting Masonry Structures – Shake table test and Blind prediction competition

Short description

Historical city centers throughout Europe have developed and densified during centuries, leading to the formation of masonry building aggregates. In building aggregates, facades of adjacent buildings can share a structural wall. In this case, a connection between older and newer unit is done through interlocking stones or by a layer of mortar. Furthermore, since the densification was often a process spanning throughout long time, it is common for adjacent units to be constructed of different materials, to have different distributions of openings, and different floor and roof heights. Advances in development of analysis methods for such aggregates have been impeded by the lack of experimental data. The SERA project AIMS (Seismic Testing of Adjacent Interacting Masonry Structures) provided such experimental data by testing an aggregate of two buildings under two horizontal components of dynamic excitation. With the aim to advance the modelling of unreinforced masonry aggregates, a blind prediction competition was organized before the experimental campaign. Each group was provided with a complete set of construction drawings, material properties, testing sequence, and the list of measurements to be reported. The applied modelling approaches spanned from limit analysis and equivalent frame models to finite element models using shell and solid elements, and discrete element models. Participants were asked to describe the predicted damage mechanisms and to provide force-displacement responses, maximum observed displacements, and interface openings. After the test, participants were provided with the actual seismic input and with the test data to run post-diction analyses. Special sessions is a great opportunity to discuss test results and compare them with pre- and post-diction analyses, as well as to discuss the implications of different modelling approaches and assumptions on the results.

Conveners

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