Session ID: SDM-6

Title
REPRESENTING THE PHYSICS OF EXTREME LIMIT STATES IN FRAME SIMULATIONS: CHALLENGES AND DEVELOPMENTS

Convenors
A. Kanvinde [1], D. Lignos [2]

Description
Structural elements encompass several extreme limit states that may trigger structural collapse during earthquake shaking. The current state-of-the-art in nonlinear frame simulations with emphasis on earthquake loading feature phenomenological models that, to a large extent, miss important aspects of the associated physics behind deteriorating phenomena. This necessitates the availability of experimental data to explicitly characterize the response of structural members and systems under extreme loading so as these models can be calibrated. To date, only a handful of these experiments is available due to the existent complication to replicate ultimate failure modes across scales even in a laboratory environment. In recent years, concerted efforts worldwide have focused on the development of models of various fidelities. These models attempt to capture some of the missing physics associated with ultimate limit states, conditioned on the construction material, and at the same time they retain computational efficiency so as we reduce the reliance on available physical experiments to simulate structural collapse. The objective of this session is to bring together world experts to present and discuss the latest research advancements along with current challenges in physics-informed computational modeling of extreme limit states in earthquake-induced frame simulations. The session will include technical presentations and a focused panel discussion.

Invited Speakers
G. Deierlein [3], M. Kenawy [4], W. Wang [5], P. Sideris [6], E. Spacone [7], Y. Zhu [5], D. Heredia Rosa [2], S. Kunnath [1], J. Hajjar [8]

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