Session ID: SHR-5

Title

FORWARD-LOOKING EARTHQUAKE RISK MODELLING AND QUANTIFICATION: RECENT ADVANCES AND PERSPECTIVES

Convenors

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Description

As urban populations continue to grow in many regions, new structures are being built on previously undeveloped land, the density of urban settlements is amplifying (often uncontrollably), and multiple infrastructure systems are being expanded or enhanced to meet ever-increasing needs. These changes fundamentally alter the exposure and vulnerability of people, their built environment and their livelihoods to earthquake risk. Yet, conventional approaches to earthquake risk modelling generally estimate risk using a snapshot of exposure and vulnerability conditions at one temporal instant, typically the present or a moment in the recent past (e.g., at the most recent census). Urgent modelling advancements are necessary to better represent the impact of today's decisions on earthquake disaster risk projections.

Some other limitations exist in current earthquake risk modelling frameworks:

1. The effect of earthquakes and subsequent demands imposed on engineered systems are often investigated in isolation. However, the functionality of any urban system during and after a devastating seismic event depends on the performance of multiple systems acting interdependently.

2. Current approaches generally focus on a single hazard, ignoring any hazard interactions - such as those that are cascading (e.g., liquefaction, tsunami, etc.) or cumulative over time (e.g., a series of aftershocks) - and potential interrelated impacts (e.g., due to damage accumulation).

3. Direct economic losses (i.e., the monetary value of physical damage) are generally the primary metric to quantify earthquake risk. However, they provide an incomplete measure of the total impact of any event, especially for the most marginalised socioeconomic and demographic groups, who suffer the most.

This session will showcase some recent research and practice advances as well as perspectives for addressing these shortcomings, paving the way towards a paradigm shift in how we approach earthquake risk modelling.

Invited Speakers

J. Baker [3], D. Lallemant [4], S. Loos [5], A. Barbosa [6], A. Calderon [2], C. Mesta [7], C. Huang [8], R. Guragain [9], M. Polese [10]

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