

ANIDIS 2025 - *Proposta Special Session*

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Title: *Earthquake-resistant structural systems conceived adopting a life cycle thinking approach*

Abstract:

Designing earthquake-resistant structural systems is a key strategy to foster resilient and sustainable communities, thereby aligning with one of the UN's Sustainable Development Goals. Seismic-proof structures help reduce losses and casualties during earthquakes, mitigating their associated social, environmental, and economic impacts. However, to effectively enforce a broader concept of sustainability, encompassing eco-efficiency, safety, resilience, comfort and cost-effectiveness, a life cycle approach should be adopted, considering the entire lifespan of a building – from raw material procurement and construction to use, decommissioning, and end-of-life. The approach requires integrating new design objectives—such as adaptability, flexibility, damage minimization, and circularity, among others. Innovative structural solutions can emerge from re-engineering existing techniques or conceiving new structural solutions by adopting design choices like the adoption of reused/reusable components, demountable and accessible elements, dry connections, etc.

This Special Session seeks contributions on technical solutions and/or best-practice case studies that incorporate one or more life cycle thinking (LCT)-based design objectives and strategies in the construction of new buildings or in the seismic retrofitting of existing structures.

Some examples include (but are not limited to):

- Construction techniques adopting eco-efficient bio-based materials, conceived to be dry-assembled, easily demountable at the end-of-life, etc.
- Conceptual design of retrofit systems aimed at optimising seismic performance while minimizing raw material consumption.
- Damage-control lateral force resisting systems for new constructions or retrofit interventions.
- Structural systems designed for the use of reused/reusable elements or recycled/recyclable materials.
- The combination of one or more of the above approaches.