

# ISSUES AND STRATEGIES FOR EARTHQUAKE RESILIENCE IN ITALY

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Forum topics	<input type="checkbox"/> Energy in 21st Century	<input type="checkbox"/> Cultural Heritage in Digital World
	<input type="checkbox"/> Engineering Capacity Building	<input checked="" type="checkbox"/> Disaster Risk Management & Governance for Resilient Communities
	<input type="checkbox"/> Construction 4.0	<input type="checkbox"/> BIM Lifecycle, Facility & Asset Management

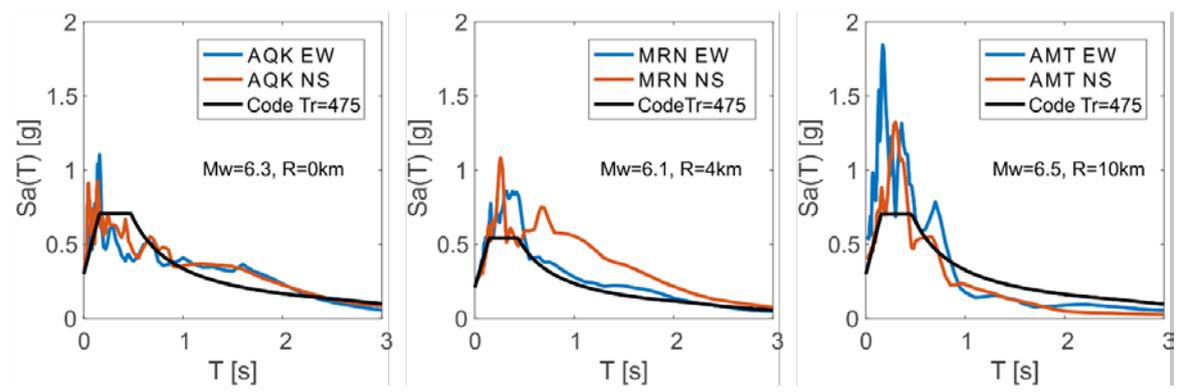
## Abstract:

Problems - Issues / Challenges-Needs	Earthquakes with magnitude equal or larger than six occur, on average, every eight years in Italy. Given the dense urbanization of the country, these earthquakes typically determine significant damage and lifeline disruption in the affected areas. This is mainly because the vast majority of the building stock is designed with obsolete codes if any. Nevertheless, it has been recently demonstrated that this kind of earthquakes, which are relatively frequent, can possibly pose a threat also to constructions conforming to the state-of-the-art performance-based seismic design if they are located near to the earthquake source. Furthermore, it has also been observed that modern seismic design does not ensure uniform failure risk across the country.
Solutions - Methods / Results - Findings	The country is becoming increasingly aware of the situation and it is developing some policies to manage and reduce the seismic risk at a national scale. As it regards the existing building stock, the Italian government in the last two years has launched an initiative to promote seismic real-estate structural upgrading related to tax-deductible cost. The technically relevant part of the so-called <i>sisma-bonus</i> initiative is that it is based on a quantitative risk assessment (in terms of the annual expected loss) for the building before and after the seismic upgrading. Nevertheless, the impact of <i>sisma-bonus</i> is still relatively limited as some administrative issues impair its diffusion. As it regards new constructions, research has found that despite the uniform risk principle for citizens, code-conforming design does not warrant the same structural failure risk, which increases as the seismic hazard of the construction sites increases. Such a variation of the failure rate can be as large as a few orders of magnitude. Moreover, it has also been demonstrated that earthquakes of magnitude around six or more, around their source, are expected to systematically expose the structures to performance demands beyond what considered in design. These issues can call for some thoughtful discussion toward the next generation of European seismic codes.
Novelty - Value / Relevance to ...	The value of the presentation stays in the risk management issues and policies in Italy, which could be a paradigm for other European countries exposed to relevant seismic hazard. The relevance is for engineers, policy makers and emergency managers.
Forum statement	...

## Keywords:

Risk; Earthquake; Resilience; Policy-making.

## Graphics:



Comparison of recorded and design spectra during: L' Aquila (2009) earthquake (left), Emilia (2012) earthquake (center), the central Italy (2016) earthquake (right).