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Correlation between seismic intensity measures and structural performances of non-ductile and code conforming RC buildings in Italy

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Seismic input has a fundamental role in the non-linear seismic response of structures, as widely discussed in the technical literature (e.g. Masi, 2003; Kwon and Elnashai, 2006). More specifically, in (Masi et al., 2011) the importance of an accurate selection of the accelerograms to be used in vulnerability studies of Reinforced Concrete (RC) framed buildings is demonstrated. To achieve realistic estimations of structural performances, such a selection needs to be based on intensity measures capable of appropriately representing the damage potential of real seismic events.
To this end, the studies on gravity-load designed RC buildings (e.g. Masi and Vona, 2012) shows that an effective intensity measure to be used is the Housner Intensity, IH. Results show that an integral seismic parameter, such as IH, is more effective than peak (e.g. PGA) or spectral (e.g. elastic spectral ordinate at the fundamental period of vibration of the building) parameters in representing the damage potential of a ground motion.
These results refer to structures with highly degrading behavior such as existing RC buildings designed only to gravity loads thus lacking of detailing and structural system design able to provide adequate seismic performances. In this contribution some non linear dynamic analyses are performed on newly designed RC buildings complying with modern seismic codes. The role of some intensity measures on the seismic response of an archetype structure studied in the framework of the RINTC Project (Iervolino et al., 2016, this conference) is identified. Some comparisons between results found on non-ductile and code conforming structures, especially pointing out the influence of masonry infills, are carried out. Further, results are analyzed also adopting a modified seismic parameter based on the classical expression of the Housner intensity.

References

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