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Developing analytical tsunami fragility functions for Italian coastal communities

Marta Del Zoppo, Marco Di Ludovico, and Andrea Prota
University of Naples Federico II, Department of Structures for Engineering and Architecture, Italy (marta.delzoppo@unina.it)

In a probabilistic tsunami risk assessment framework, the definition of vulnerability of the physical assets of coastal communities plays a fundamental role. Therefore, current research is moving towards the definition of a general methodology for developing analytical tsunami fragility functions for the physical assets to be used in loss-assessment frameworks at community scale. Herein a methodology is proposed for developing analytical tsunami fragility functions and its application on an inventory of RC buildings representative of the Mediterranean coastal communities is illustrated. Simple mechanics-based models are defined for the damage assessment of reinforced concrete (RC) buildings with breakaway infills under tsunami lateral loads. A simulated design procedure is adopted for the definition of the buildings inventory, relying on Monte Carlo simulation to account for geometrical and mechanical uncertainties. One key feature of the approach is that intermediate damage states prior to collapse are defined to account for light/moderate damage to both structural and non-structural components subjected to tsunami onshore flows.