Vademecum for the seismic verification of existing buildings: application to some relevant buildings of the Trieste Province

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The procedure we developed and applied to a few relevant cases leads to the seismic verification of a building by: a) use of a scenario based neodeterministic approach (NDSHA) for the calculation of the seismic input, and b) control of the numerical modeling of an existing building, using free vibration measurements of the real structure

The key point of this approach is the strict collaboration of the seismologist and the civil engineer, from the seismic input definition to the monitoring of the response of the building in the calculation phase. The vibrometry study allows the engineer to adjust the computational model in the direction suggested by the experimental result of a physical measurement



The procedure has been applied to several relevant buildings of the Trieste Province





10° 12° 14° 16° 14° 16° 18° 20° 18° 20 10° 12°

Regional scale

Definition of the

seismic input

















The seismological and morphostructural analyses then allow for the definition of the "scenario

NDSHA seismological elaborations



The seismological modelling provides parameters that, transformed into engineering terms, may allow for a reliable and proper assessment of the load to be borne by the structures of particular relevance (e.g. bridges, dams, industrial areas at risk, hospitals, schools and buildings of considerable historical interest) in case of a strong earthquake, allowing for the verification of the suitability of the design of the structures present in the study areas and of the sites where they insist









earthquakes", i.e. of the strong earthquakes that may take place in the region of interest, that are used to generate a database of accelerograms obtained by the realistic modelling of the ground motion, carried out using the physical-mathematical principles that are at the basis of the generation, propagation and local amplification of the seismic waves, as suggested by the Italian regulation (§ C3.2.3.6 and § 3.2.3.6)

Engineering analysis

The phase of numerical modelling of the building is partly made in advance and in part accompanied by the survey of the geometry, of the structural characteristics and of the materials that compose it

In the correct modelling of existing buildings it can not be ignored, alongside the traditional approach of numerical modeling,

Experimental measure of the resonant frequencies along the principal axes of the building

the modal summation technique.



