DEVELOPMENT OF A NATIONAL SYSTEM FOR PREVENTION AND MITIGATION OF EARTHQUAKE DAMAGES TO PEOPLE AND PROPERTIES, AND THE REDUCTION OF COSTS RELATED TO EARTHQUAKES FOR THE STATE - PreM(ium)Risk

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In the context of strategies to achieve a better safety, the implementation of an insurance system can be regarded as a kind of risk transfer. It means that the cost of damages is shared among all the individuals subject to the same risk and distributed uniformly in time. It doesn't have direct influence on the total costs; however, the tax break and the reduction of the insurance premium for the individuals who decide to upgrade their buildings, can produce an incentive to risk mitigation measures, having indirect influence on the factor of vulnerability and so contributing to the reduction of risk itself.

We analyze, through numerical and experimental approaches, new solutions for the use of innovative materials, and new techniques for the reduction of seismic vulnerability of structural, non-structural and accessory elements. These concepts are schematically represented in this sketch.

In this table to the left we present the results on an initial cost-benefit analysis of the expected costs related to the application of retrofitting measures to existing buildings in Italy.

Conclusions

We conclude stating that seismic risk can be reduced in cost-effective manner by the implementation of appropriate risk mitigation measures, as proposed through this poster and represented in the figure below.

As an example of methodological development carried out in this project, the figure to the right (top panel) shows a map of probability of exceedance of PGA=0.2 g in 50 years for soft soil in Calabria. It was obtained from a synthetic seismic catalog lasting 100,000 years produced by the application of a physically based earthquake simulator. This preliminary result is compared (bottom panels) with the hazard maps adopted for the same region by the Italian National Building Code (NTC2008) for the 16th, 50th and 84th percentile, respectively.

The application of this ongoing methodological study is supposed to be transferable to a variety of different environments for planning and verification purposes.