

Earthquake Risk Modeling
Discussion Group Summary

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I. Commentary of the Status of Earthquake Risk Modeling

- In the field of natural hazards risk assessment, earthquake risk modeling has matured considerably over the last 20 or so years. Advances in computer capabilities and geographic information systems (GIS) have helped foster growth of this field. Advances have fostered a commercialized risk modeling industry and contributed significantly to the fields of insurance/financial risk management
- Key purpose of earthquake risk modeling is risk reduction (both pre- and post-catastrophe). Common pre-catastrophe application is insurance/financial risk management (e.g. insurance portfolio management). Common post-catastrophe application is emergency response and recovery planning
- Earthquake risk modeling has a potential applicability in a broader range of sectors of society, both public/government and private/commercial
- Earthquake risk modeling, particularly GIS-based modeling products and outputs, are a valuable educational tool for risk decision makers, in both the private and public sectors

II. Opportunities for Earthquake Risk Modeling

- Modeling, and the process of model development (e.g. hazard, vulnerability and loss components) can help facilitate communication between various scientific sectors in the catastrophe-related fields
- Modeling, the model development process, and modeling outputs can help facilitate communication between decision makers and stakeholders
- GIS is a very useful, unifying medium for earthquake risk modeling, in helping to create a visual image of modeling/loss results for both scientific groups and other risk decision makers and stakeholders

III. Impediments for Earthquake Risk Modeling

- Modeling approaches need to be thought out holistically, rather than on a piecemeal (i.e. component by component) basis. For example, each component needs a similar level of resolution, for the reliability of the outputs will be closely tied to the lowest level of resolution of any of the inputs
- In the model development process and in model implementation, speed and accuracy often compete
- Earthquake risk modeling is more advanced than many other perils which limits its applicability in some (lower risk) regions of the world
- Many modeling issues are often cultural and geographic dependent (e.g. base resolution, data availability, proprietary nature of some data, performance criteria, and modeling assumptions)
- Politics can impede the public application of earthquake risk modeling

- Data standards and availability are significant impediments to multinational/cross-border modeling applications

IV. Success Stories for Earthquake Risk Modeling (that should be evaluated for other regions and modeling applications)

- Leadership by the US Federal Emergency Management Agency for multi-stakeholder development of the country-wide HAZUS (hazards US) earthquake loss estimation methodology and GIS software application
- Insurance risk modeling and the establishment of this technology in less than a decade, particularly in the US and the UK