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Natural catastrophe risk modelling and catastrophe risk management

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Financial losses resulting form natural catastrophe have been under increasing trend in recent years. Destructive earthquakes, windstorm and flooding have been associated with considerable economic losses in developed countries in recent years. To add to that, such events have also resulted in disastrous human casualties and social consequences when they happened in developing or under developed countries. Examples of such destructive events are the 26 Dec 2003 Bam quake and also Asian Tsunami taking place exactly a year later on the Bam quake anniversary. The large number of casualties and high value of economic loss in these events were caused by a combination of severe hazard intensity and high vulnerability of the built environment and population. Whereas hazard severity and frequency are governed solely by the natural phenomenon itself, the losses caused are controlled by the vulnerability and geographical location of the built environment relative to the area affected by the event. Significant advances made in computer technology regarding analytical speed and storage media, as well as better quality of geosciences data in recent years provide essential requirements for more reliable natural catastrophe hazard assessment. Natural hazard models usually estimate the hazard severity and frequency of natural phenomena. Such models have been well established in many engineering applications. However, in order for such studies to be effective and useful for risk managers and policy makers, further efforts are needed to project natural hazard impact on built environment and human activities. Natural catastrophe risk can represent overall social and economic impacts of natural hazard on human and the built environment. Such impacts include, among others, loss of life, injury, damage and loss to properties, business interruption and loss of profit. Evaluating the social and economic impacts of natural catastrophes involves a number of different disciplines ranging from earth science to engineering. Computer-based probabilistic models can be used to evaluate potential losses from fu-

ture events and provide facilities for better managing such risks. Natural catastrophe risk models may also be used by local government for risk mitigation, post-disaster reaction, recovery planning and public awareness programs. In the commercial field, such models are also used for the assessment of risk and accumulated exposure at all levels from a local to an international scale.