

## ESTIMATES OF BUILDING STOCKS AS A BASIS FOR DETERMINING RISK<sup>1</sup>

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In the event of earthquakes and other natural disasters, it is extremely useful to have as rapidly as possible approximate estimates of the total number of buildings at risk. Strong regularities and relationships characterize social systems which should make it possible to arrive at satisfactory estimates even with minimal information about the social system which has been affected. These regularities can be derived deductively from a knowledge of the nature of social systems, and a model of the relationships between the number and types of buildings and other characteristics of the system can be created. Empirical investigations can then calibrate the parameters of the model to determine within narrow ranges what the numerical relationships are likely to be. Then with minimal information about a social system subject to a disastrous event, rapid estimates can be made concerning the number of buildings at risk.

The most important concern in earthquakes and other disasters is loss of human life and physical injury. Consequently, various tabulations of major earthquakes frequently use as a threshold criterion some stated number of deaths or some magnitude of shock. Frequently, events of high magnitude are excluded from the list, if they did not result in any loss of life. The second most important concern is with human deprivation and suffering as a consequence of the loss of buildings, structures, and artifacts. Earthquakes and other disasters are usually reported in terms of the number of individuals or households who were made homeless or who were left without shelter. In this regard homelessness or loss of shelter is used as a surrogate for the destruction of buildings and their contents. In addition to dwellings themselves, this implies clothing, furniture, utensils, stores of food, linkages to vital services such as water supply, waste water disposal, electricity, telephone, gas and other fuels. Not only are survivors without shelter from the elements, they are without heat, light, food, means of cooking, water for drinking and personal hygiene, bedding, and clothing. Homelessness also is used to imply the loss of other kinds of buildings although these are sometimes stated explicitly. The most important are places of work, and again the loss is not merely that of the structures themselves, but of the tools, machinery, equipment and inventories that were associated with these buildings. Having estimates of the number of buildings at risk can assist pre-event disaster preparedness planning and planning for disaster