THE FEMA-NIBS METHODOLOGY FOR EARTHQUAKE LOSS ESTIMATION

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METHODOLOGY OVERVIEW

This brief overview of the FEMA-NIBS earthquake loss estimation methodology is intended for local, regional, or state officials contemplating an earthquake loss study.

The methodology was developed over a 4 ½ year period for the Federal Emergency Management Agency (FEMA) by the National Institute of Building Sciences (NIBS) to provide a tool for developing earthquake loss estimates for use in:

- Mitigating the possible consequences of earthquakes,

- Anticipating the possible nature and scope of the emergency response needed to cope with an earthquake-related disaster, and

- Developing plans for recovery and reconstruction following such a disaster.

If developed for areas of seismic risk across the nation, such estimates also will help guide the allocation of federal resources to stimulate risk mitigation efforts and to plan for federal earthquake response.

The methodology was pilot tested in Portland, Oregon and Boston, Massachusetts and calibrated with data from Northridge, Loma Prieta and other earthquakes.

Use of the methodology will generate an estimate of the consequences to a city or region of a "scenario earthquake" – that is, an earthquake with a specified magnitude and location. The resulting "loss estimate" generally will describe the scale and extent of damage and disruption that may result from potential earthquakes. The following information is provided by the methodology:

- *Quantitative estimates of losses* in terms of direct costs for repair and replacement of damaged buildings and lifeline system components; direct costs associated with loss of function (e.g., loss of business revenue); casualties; people displaced from residences; quantity of debris; and regional economic impacts.

- *Functionality losses* in terms of loss-of-function and restoration times for buildings, critical facilities such as hospitals, and components of transportation and utility lifeline systems and rudimentary analysis of loss-of-system-function for electrical distribution and potable water systems.

- *Extent of induced hazards* in terms of fire, flooding and hazardous materials.

To generate this information, the methodology includes:

- Classification systems for assembling information on the building stock, the components of highway and utility lifelines, and demographic and economic data;

- Methods for evaluating damage and calculating various losses; and

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