Earthquake Loss Estimation Study for the New York City Area

Full Mitigation Best Practice Story

Multiple Counties, New York

Manhattan, NY - A preliminary forecast of the type of losses that the New York City area could suffer after an earthquake is the subject of this study funded by FEMA Region II and coordinated by the Multi-Disciplinary Center for Earthquake Engineering Research. The initial stages of this study involved fact-finding and assessment, with the development of preliminary soil maps and building inventories. The primary objective of this study was to carry out an initial risk characterization for Manhattan below 59th Street.

This study describes the scale and extent of damage and disruption that may result from potential earthquakes in Manhattan. In assessing the risks involved, this research has made a significant contribution toward improving our understanding of seismic hazards in Manhattan by forecasting potential losses so that strategies may be formed to reduce their impacts.

The primary objective of this study is to develop and implement a comprehensive risk and loss characterization for Manhattan in the event of an earthquake. This resulted in a complete building inventory of every structure in Manhattan was assembled from a variety of sources. Combined with a detailed geotechnical soil characterization of Manhattan, this building inventory has been used to model scenario earthquakes in HAZUS.

When viewed in context with additional information about regional demographics and seismic hazards, the model serves as a tool to identify the areas, structures and systems with highest risk and to quantify and ultimately reduce those risks.

Deterministic and probabilistic earthquake scenarios were modeled and simulated in Manhattan, which provided intensities of ground shaking, dollar losses associated with capital (the building inventory) and subsequent income losses. This study has also implemented a detailed critical facilities analysis, assessing damage probabilities and facility functionality after an earthquake.

This study is unique, because it is currently one of the most detailed and site-specific applications of HAZUS or any other earthquake loss estimation. This research has collected information about every building in Manhattan and a large amount of soil data. With this work, it is possible therefore to establish the building inventory information for the island of Manhattan at the individual level for all buildings—a unique accomplishment for HAZUS applications.

Activity/Project Location	
Geographical Area:	**Multiple Counties in a State**
FEMA Region:	**Region II**
State:	**New York**
County:	**Bronx County; Kings County; New York County; Queens County; Richmond County**

Key Activity/Project Information

Sector: **Public**

Hazard Type: **Earthquake**

Activity/Project Type: **HAZUS-MH**

Activity/Project Start Date: **01/1999**

Activity/Project End Date: **12/2003**

Funding Source: **Other FEMA funds/ US Department of Homeland Security**

Activity/Project Economic Analysis

Cost: **Amount Not Available**

Non FEMA Cost:

Activity/Project Disaster Information

Mitigation Resulted From Federal Disaster? **No**

Value Tested By Disaster? **Unknown**

Repetitive Loss Property? **Unknown**

Reference URLs

Reference URL 1: **http://www.nycem.org/techdocs.asp**

Reference URL 2: **http://www.hazus.org**

Main Points

- A preliminary forecast of the type of losses that the New York City area could suffer after an earthquake is the subject of this study funded by FEMA Region II and coordinated by the Multi-Disciplinary Center for Earthquake Engineering Research.
- The primary objective of this study was to carry out an initial risk characterization for Manhattan below 59th Street.
- In assessing the risks involved, this research has made a significant contribution toward improving our understanding of seismic hazards in Manhattan by forecasting potential losses so that strategies may be formed to reduce their impacts.