

Risk Assessment

SAN FRANCISCO

**PUBLIC-
PRIVATE**

Partnership

The San Francisco Bay Area is one of the highest seismic risk regions in the United States. Economic losses from the 1989 Loma Prieta earthquake Magnitude 7.1 (M=7.1), which was centered in a rural area of 300,000 people just south of the San Francisco Bay Area, reached nearly \$10 billion while the Federal contribution for recovery programs exceeded \$2.5 billion.

Case Studies

SAN FRANCISCO, CALIFORNIA

Major earthquakes that are forecast for this area will again result in lives lost and billions of dollars in property damage and economic disruption.

According to the U.S. Geological Survey, the five million citizens in the nine counties surrounding the San Francisco Bay will most likely experience at least one 6.7 earthquake within the next 30 years. FEMA, the California Office of Emergency Services, local governments, utilities, universities, and corporations all have a stake in preparing for and mitigating against these forecasted earthquakes.

That's why in 1998, the Federal Emergency Management Agency (FEMA) chose the San Francisco Bay Area as a logical region to begin implementation of HAZUS to help mitigate losses from future earthquakes. This marks the first regional implementation of HAZUS, the nationally standardized, earthquake-loss estimation software.

Golden Gate Bridge



Case Studies

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San Francisco Bay Area, California

HAZUS is the Federal Emergency Management Agency's national risk assessment system that is currently available to all local governments, utilities, and corporations for free. Along with the software, users receive databases, training, and technical support.



Case Studies

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San Francisco Bay Area, California

The project area includes San Francisco, San Mateo, Santa Clara, Contra Costa, Alameda, Solano, Napa, Sonoma, Santa Cruz, and Monterey Counties.

The purpose of the project has been to partner the geographic information system professional community with earthquake experts and risk managers in order to implement the HAZUS earthquake risk assessment capabilities for the San Francisco Bay Area. This partnership, known as the San Francisco Bay Area HAZUS User Group, has become the foundation of an important public-private partnership of 100 organizations and corporations based on the known regional earthquake threat.

The regional earthquake risk assessment is intended to provide politicians and risk managers with standardized products to develop plans and strategies so that they can compare and prioritize local mitigation projects. Preparedness, response, and recovery applications are also natural outcomes from HAZUS products and the regional earthquake risk assessment.



HAZUS Software and Databases Develop



California earthquake damage.

Since 1993, the Federal Emergency Management Agency under agreements with the National Institute of Building Sciences, has led the development of the HAZUS earthquake loss-estimation software, comprehensive building and infrastructure databases for the nation, and the building inventory tool for earthquake risk assessment purposes. HAZUS runs on personal computers and utilizes Geographic Information System (GIS) software to map and display analysis results.

San Francisco Bay Area, California

The earthquake damage and loss estimation module of HAZUS was completed and released in 1997, along with training and technical support. Wind and flood modules are under development and are scheduled for release to the public in 2002.

In 1999, FEMA released an enhanced version of HAZUS, HAZUS 99, with advanced applications, updated databases, and a ten-fold increase in processing speed. HAZUS 99 analysis outputs for mitigation, preparedness and planning, and response activities include a one-page Quick Assessment Report, a 19-page comprehensive Global Summary Report, and mapping capabilities to display five types of analytical output, enhanced by GIS thematic information.

HAZUS includes information about building and lifeline inventories and earthquake parameters.

HAZUS allows users to estimate: 1) direct earthquake damage to buildings, critical facilities, transportation routes, and utilities; 2) induced earthquake damage including fire following earthquake and debris generation; and 3) social impacts including shelter demands, casualties, and direct and indirect economic losses.

Earthquake loss estimation using HAZUS

Databases available with HAZUS include general building stock including residential, commercial, and industrial facilities; lifelines such as highway bridges, airports, and ports; and critical facilities like hospitals, schools, police stations, fire stations, dams, and hazardous materials sites. Demographic data from the 1990 Census is included and is being updated with the 2000 Census data.

HAZUS allows the user to manipulate, update, and improve each of the above inventory databases. **HAZUS users can input additional local data on building inventory, critical facilities, and lifelines such as water, energy, and communications systems, as well as geographical hazards. Users can also substitute their own databases.**



California earthquake damage.

San Francisco Bay Area, California

The goal of the San Francisco Bay Area HAZUS project is to save lives and reduce property losses after the next major San Francisco Bay Area earthquake. This can be done through preparedness, planning and mitigation actions based on loss-estimations by HAZUS for various likely earthquake scenarios.

The mission of the project is to:

- Implement FEMA's HAZUS software in the San Francisco Bay Area;
- Develop partnerships with national research laboratories, universities, corporations, utilities, and nonprofit organizations, as well as, federal, state, and local governments;
- Use results generated from HAZUS pilot projects to understand the steps required to implement the HAZUS earthquake module, as well as, the future flood and wind modules;
- Organize the HAZUS User Group to use HAZUS and share HAZUS results from scenario exercises and response situations; and
- Share project successes nationwide.

The project's five strategic objectives have been to:

1. Train GIS professionals, earthquake experts, and risk managers using HAZUS;
2. Create an active HAZUS User Group;
3. Create a comprehensive San Francisco Bay Area earthquake risk assessment;
4. Improve the inventory and accuracy of databases available to all HAZUS users; and
5. Develop and exercise an emergency management protocol linking all partners to HAZUS earthquake loss-estimates and response information immediately following a regional earthquake.



Damage to a highway.

Marketing has been a critical and successful component of the project.

Numerous materials have been created building on the Project Impact theme of developing partnerships to build disaster resistant communities.

FEMA has been able to accelerate the implementation of HAZUS regionally by dedicating a project coordinator who solicits

volunteer support through electronic mail, a dedicated web site, marketing materials, meetings, training, and networking through the HAZUS User Group. The Bay Area HAZUS User Group has become a strong viable partnership of federal, state, and local government and private sector HAZUS users and supporters. This group has, in turn, mentored other areas in implementing HAZUS.

HAZUS has become an important technological tool for mitigating future earthquake risks in the San Francisco Bay Area and has the potential to do the same in other high-risk areas of the nation. It is hoped that the partnerships developed in the HAZUS User Group in the San Francisco Bay area will serve as a model for other communities.

Improving hazard mitigation, both locally and nationally, will not only depend on the development of state-of-the-art HAZUS software for earthquake, wind, and flood hazards, but also on regional implementation strategies that include partnerships with risk managers, hazard experts, and GIS professionals from the government, utility, and corporate communities.

Visit the HAZUS User Group web site, www.hazus.org

Project Cost: \$232,000 and matching volunteer

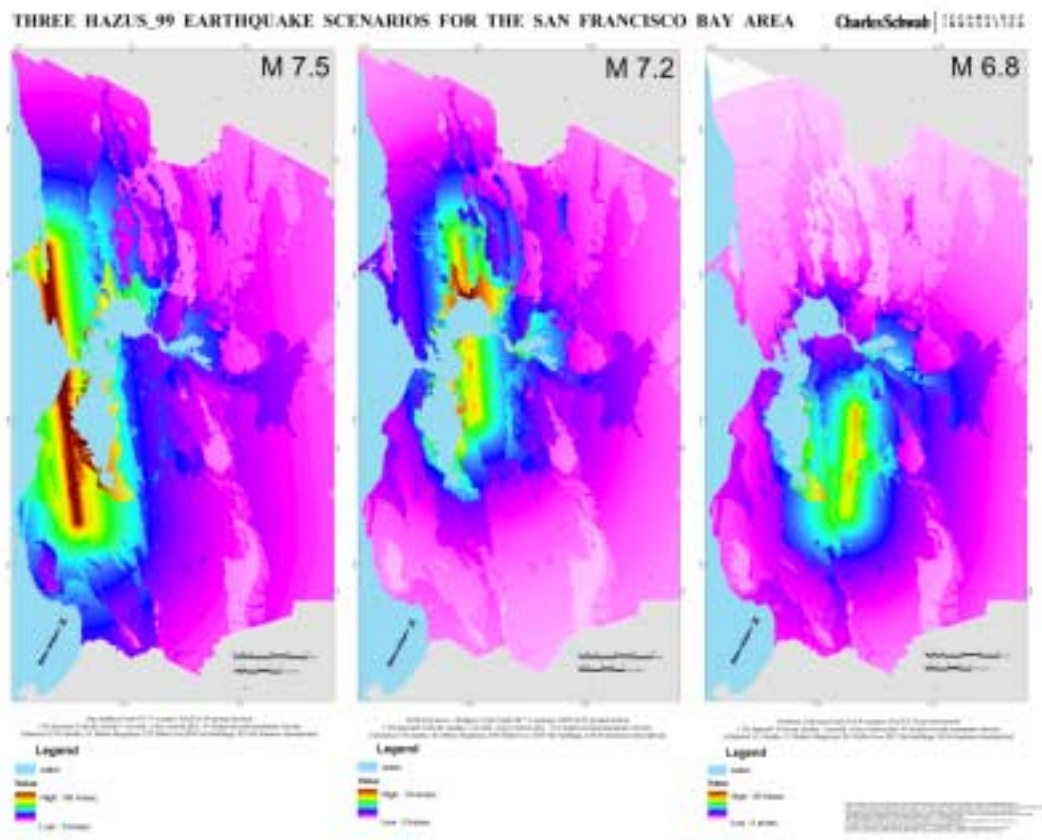
Funding Source: National Earthquake Hazards Reduction Program & FEMA IX program funds

HAZUS and Charles Schwab & Co.

Since 1999, Charles Schwab & Co., Inc. has used FEMA's HAZUS software to create earthquake scenarios that support disaster planning and emergency operations exercise design. This has been possible through the cooperative efforts of FEMA's Project Impact and the San Francisco Bay Area HAZUS User Group.

Charles Schwab & Co., Inc. has partnered with FEMA, the U.S. Geological Survey, the California Division of Mines and Geology and Governor's Office of Emergency Services to develop their in-house earthquake modeling capability. They benefit from FEMA collaboration to exchange HAZUS training, share data, and gain the ability to utilize NEHRP soils classification data as it becomes available in digital form. With HAZUS, earth science digital information products can be translated into company-specific mitigation tools.

Schwab uses HAZUS to create custom scenarios that help to validate business process continuity plans, to support emergency operations simulation exercises, and to create precisely customized information products for employee awareness. National and international businesses like Schwab will benefit from the flood and wind peril modeling that will be supported by HAZUS with future releases.



Case Studies