

FEMA Building Science Branch

Hazard Overview: Multihazard

FEMA P-1087 / March 2017



Building Science Branch



Every year, natural disasters and man-made hazard events cause fatalities and injuries, and cost billions of dollars in property damage throughout the United States. Mitigation creates real value for the American people by reducing loss of life, injuries and property damage for communities who are faced with these hazards as well as by minimizing disruption and enabling faster recovery.

The FEMA Building Science Branch studies these hazards and provides technical services within FEMA, to the rest of the federal government and to our private sector partners. With a focus on earthquake, wind, flood and other natural and man-made hazards, the Building Science Branch takes a lead role in developing state-of-the-art publications, guidance materials, tools, training, technical bulletins and recovery advisories that incorporate the most up-to-date building codes, flood damage resistant requirements, seismic design guidelines and wind design requirements for new and existing buildings.

For more information on the Building Science Branch, visit <u>www.fema.gov/building-science</u>.

Hazard Mitigation



Hazard mitigation is the effort to reduce loss of life and property by lessening the impact of disasters. It is most effective when implemented under a comprehensive, long-term mitigation plan. State, tribal, and local governments engage in hazard mitigation planning to identify risks and vulnerabilities associated with natural disasters, and develop long-term strategies for protecting people and property from future hazard events. Mitigation plans are key to breaking the cycle of disaster damage, reconstruction, and repeated damage. Developing hazard mitigation plans enables state, tribal, and local governments to:

- Increase education and awareness around threats, hazards and vulnerabilities;
- Build partnerships for risk reduction involving government, organizations, businesses and the public;
- · Identify long-term strategies for risk reduction;
- Align risk reduction with other objectives;
- Identify implementation approaches that focus resources on the greatest risks and vulnerabilities; and
- Communicate priorities to potential sources of funding.

Read more about mitigation: <u>www.fema.gov/what-mitigation</u>.



Multi-Hazard Mitigation and Design Concepts Wind, Flood, and Earthquake Training Videos FEMA P-940 CD / March 2014



FEMA P-940CD presents three videos based on webinars abridged from the FEMA training course E312, Fundamentals of Building Science – Multi-Hazard Mitigation and Design Concepts. Each video explains the hazard and the hazard-related damage, and provides users with some common sense tools to assist with specific mitigation work. This resource can be downloaded in the FEMA Library.

Hazus

<u>Hazus</u> is a nationally applicable standardized methodology that contains models for estimating potential losses from earthquakes, floods, and hurricanes. Hazus uses Geographic Information Systems (GIS) technology to estimate physical, economic and social impacts of disasters. It graphically illustrates the limits of identified high-risk locations due to earthquake, hurricane and flood. Users can then visualize the spatial relationships between populations and other more permanently fixed geographic assets or resources for the specific hazard being modeled, a crucial function in the predisaster planning process.



Federal, state and local government agencies and the private sector can download the latest version of Hazus free-of-charge by visiting the FEMA Flood Map Service Center (MSC).

Hazus is used for mitigation and recovery, as well as preparedness and response. Government planners, GIS specialists and emergency managers use Hazus to determine losses and the most beneficial mitigation approaches to take to minimize them. Hazus can be used in the assessment step in the <u>mitigation planning process</u>, which is the foundation for a community's long-term strategy to reduce disaster losses.

Hazus analysis can include potential loss estimates from:

PHYSICAL DAMAGE

Physical damage to residential and commercial buildings, schools, critical facilities, and infrastructure.

ECONOMIC LOSS

Economic loss, including lost jobs, business interruptions, repair, and reconstruction costs.

SOCIAL IMPACTS

Social impacts, including estimates of shelter requirements, displaced households and population exposed.

Mitigation Best Practices

<text><text><text><text><text><text><text><text><text><text><text><text><text>

FEMA has compiled a sampling of mitigation <u>best practices stories</u>, offering insight into actions taken by people to mitigate against disasters. Topics include assistance, flood, grants, and wind.

To see how others are protecting their lives and property, see <u>mitigation case</u> <u>studies compiled by FEMA</u>. These contain in-depth, analytical information about innovative projects throughout the United States that deal with all types of hazards. Topics include risk assessment, design and construction, privateand public-sector cooperative efforts, and costs and funding mechanisms.

Risk Management Series



The <u>Risk Management Series (RMS)</u> is a FEMA series directed at providing design guidance for mitigating multihazard events. The series includes a large cadre of man-made disaster publications directed at strengthening the building inventory to reduce the potential impact from the forces that might be anticipated in a terrorist assault.

The objective of the series is to reduce physical damage to structural and nonstructural components of buildings and related infrastructure, and to reduce resultant

casualties from impact by conventional bombs, chemical, biological and radiological (CBR) agents; earthquakes; floods; and high winds. The intended audience includes architects and engineers working for private institutions, building owners/operators/managers and state and local government officials.

QuakeSmart

As part of addressing all-hazards, it is critical for businesses to also incorporate actionable earthquake mitigation solutions into their planning and business decisions. QuakeSmart is a 3-step mitigation process that businesses can integrate in their existing or future disaster plans and business decisions:

IDENTIFY RISK

When identifying your risks, the initial step is to determine if your business is at risk for earthquakes. This includes identifying if your facility is in an earthquake hazard area. Then you identify your potential vulnerabilities: structure, non-structural components, and contents (hazard + vulnerability = risks). Learn more at: www.fema.gov/ guakesmart-toolkitstep-1-identify-your-risk

MAKE A PLAN

Making a mitigation project plan means defining a scope of work, budgeting funds to pay for it, and then scheduling the time to get it done. Depending on your earthquake risks and funding, sometimes the budget or schedule will prompt you to reduce or increase the scope. Discover resources for making a plan at: www.fema.gov/ guakesmart-toolkitstep-2-make-plan

TAKE ACTION

Implement your mitigation project plan and solutions. Nonstructural solutions might be taking the simple step of anchoring a bookshelf or file cabinet to the wall, as well as adding removable straps to secure the shelf's contents, and a safety latch to prevent the cabinets from opening during shaking. Find other ways to take action at: www.fema.gov/ quakesmart-toolkitstep-3-take-action

Community Planning

Ask your local officials the following questions about your community's disaster and emergency plans:

Does my community have a plan?
Can I obtain a copy?
What does the plan contain?
How often is it updated?
What should I know about the plan?
What hazards does it cover?

In addition to finding out about your community's plan, it is important that you know what plans are in place for your workplace and your children's school or day care center. Ask your employer about workplace policies regarding disasters and emergencies, including understanding how you will be provided emergency and warning information. Contact your children's school or day care center to discuss their disaster procedures. Further resources are available at the <u>Building Science Community</u> <u>Rebuilding Resources</u> page.

FEMA Building Science Library

Communities can strengthen their ability to reduce the loss of life, injuries and property damage by taking advantage of the vast resources available in the FEMA Building Science Library. The information in the library can help communities and interested citizens understand impacts from hazards, determine the appropriate standards for new construction, determine how best to retrofit existing structures to mitigate the risk of damage, and understand the benefits of enhancing or updating building codes to reduce the community's risk. View the catalog in the <u>Building Science Library</u>.



Catalog of FEMA Building Science Branch Publications and Training Courses TDM: P.757 / Feeh Main / Mein Inst.

🛞 FEMA

Protect Your Business

Raise computers above flood level and move them away from windows.
Secure equipment that could move or fall during an earthquake.
Prior to hurricanes, cover or protect vital documents and electrical equipment from potential wind driven rain.
Store vital documents in a secure off-site location.
Move heavy and fragile objects to low shelves.
Regularly back up vital electronic files.

