

Talking Points for Media Interviews

A Guide for EERI Members



Introduction

This guide is intended to be used by EERI members in preparing for media interviews. It is divided into two main sections that, in turn, are subdivided for easy reference as follows:

IMPORTANT POINTS

- General Earthquake Risk
- Research Funding

BACKGROUND INFORMATION

- Hazard Mitigation
- Earthquake Size and Impact
- Buildings and Codes
- Response and Recovery
- EERI's Earthquake Professionals

IMPORTANT POINTS

The first two topic areas in this Guide are *for emphasis* by EERI members interviewed by the media following an earthquake or other event that attracts attention to seismic issues. They are points upon which there is general agreement in the earthquake community; referring to them will present a consistent message that will serve to *advance the causes of earthquake engineering practice and research*.

Try to incorporate the points into your answers regardless of the questions you are asked.

■ The sound-bite is in bold.

- Bullets contain additional information.

General Earthquake Risk

■ Many parts of the United States are at high risk to very damaging earthquakes.

- All or parts of 39 states are in earthquake risk zones.
- There will be urban earthquakes in the future that will cost the nation \$100-\$200 billion each, and involve the potential loss of thousands of lives.

■ Most U.S. cities are unprepared for a major earthquake.

- Only a few cities in California have promoted earthquake loss reduction by creating programs to require or reward structural retrofits.
- From sheltering to housing recovery to infrastructure reconstruction, most cities have not made it a high priority to learn and plan, so they won't know how to meet these challenges in the aftermath of an earthquake.

■ The building stock and infrastructure in the United States are very vulnerable to earthquakes.

- Building codes for new buildings reduce casualties, but some regions have yet to adopt building codes appropriate for seismic safety.
- The large stock of existing structures built to outmoded codes is a significant hazard to life and limb.
- Strengthening existing structures is expensive; in the United States less than 2% of our buildings are replaced every year.

- In addition to improved construction practices, other approaches to casualty and damage reduction include better risk management, emergency preparedness, and response training.

Research Funding

■ Federal funding for earth science and earthquake engineering research is eroding.

NEHRP

- For the past 25 years, the National Earthquake Hazard Reduction Program (NEHRP) has provided resources and leadership that have led to significant advances in understanding the components of earthquake risk and have yielded useful tools for reducing it.
- However, NEHRP funding has fallen approximately 40% in real dollars since its inception in 1978.
- NEHRP is approved for the next five years, but each year we will have to work with Congress to see that it is funded at appropriate levels.
- NIST's new leadership of NEHRP is not sufficiently funded. A reasonable level has been authorized, but has not currently been funded.

NSF

- Earth science and engineering research support from the National Science Foundation has been generally reduced.
- The George E. Brown Jr. Network for Earthquake Engineering Simulation (NEES) will expand the state of knowledge in earthquake engineering, but there are inadequate research funds for NEES and for other theoretical and analytical research.

- The Advanced National Seismic System (ANSS) will increase our understanding of earthquake generation and dynamics through the deployment of instrumentation in seismic risk zones. However, appropriations for ANSS are authorized at only one-tenth of the more than \$300 million that was authorized.

BACKGROUND INFORMATION

The five categories of useful facts that follow are meant to help you answer technical questions. You may wish to review these before an interview, or refer to them during one. These points, agreed upon by specialists within the EERI membership, are intended to provide accurate bases for your responses.

After earthquakes and tsunamis elsewhere, reporters often ask, “Can this happen here?” This information will help you construct your answer appropriately.

■ **The sound-bite is in bold.**

- Bullets contain additional information.

Hazard Mitigation

■ **We know that hazard mitigation will reduce losses.**

- Earthquakes damage structures—buildings, roads and bridges, and utility and communications systems. Those damaged structures can kill and injure people and cost a great deal to fix. Hazard mitigation attempts to reduce all earthquake losses in various ways, *before* the next earthquake.
- Structures can be strengthened to resist shaking, either when they are built or later in their lives, or they can be sited in areas less subject to violent shaking, ground failure, or tsunami inundation.
- Building codes are designed to protect life safety by preventing buildings from collapsing; they are not intended to eliminate all damage or risk to building occupants during an earthquake.
- Hazard mitigation requires scientific knowledge of the earthquake hazard in an area, an understanding by architects,

engineers, and builders of how to reduce structural damage, and willingness on the part of communities or building owners to spend the money and time necessary to cut losses.

- Decisions to invest in seismic safety are made by many individuals and groups. There are decision makers in governments—local, county, state, and federal. They may be elected officials or career civil servants. In private companies—small and large—decisions are made by owners, executives, or boards of directors. In public organizations such as schools and community service agencies, there may be decision makers at many levels. In schools, for example, seismic safety decisions can be made by teachers, PTA members, principals, and superintendents. Leaders of families make decisions to increase their seismic safety, as do single people living alone.

Earthquake Size and Impact

■ **Keep it simple when discussing magnitude, intensity, and ground motion.**

(Thanks to *Promoting Seismic Safety: Guidance for Advocates*, by researchers at the three EQ centers with funding from FEMA, 2004. The complete document is available at: <http://mceer.buffalo.edu/publications/Tricenter/default.asp>)

- **Every earthquake is unique.** Each earthquake is a unique combination of many characteristics: location, magnitude, depth, type of fault, mechanism of fault rupture, and direction of rupture. In addition, the soils in the area control how fast seismic waves move, how quickly their energy dissipates, and whether or not they focus on particular sites.
- **Magnitude is the usual measure of an earthquake.** The magnitude of an earthquake is a measure of the energy released by the earthquake. Generally, higher magnitude earthquakes have greater shaking intensities at the epicenter, shake for a longer time, and affect a larger area. Several magnitude scales are currently in use, and each one is different, especially for larger earthquakes. The well-known Richter scale

is one magnitude scale, but seismologists have increasingly begun to favor the *moment magnitude scale* because it gives more accurate results for larger earthquakes and those more distant from recording devices.

- **Intensity is one way to describe how an earthquake feels.** Earthquake intensity scales qualitatively describe the effects of ground shaking rather than the energy released. While an earthquake is described by a single magnitude, it produces a pattern of shaking intensities across an area. Typically, the shaking is strongest near the epicenter and then weakens with increased distance from the epicenter. Because the intensities describe what the shaking feels like and how it affects different types of structures, they are terms that most people understand. Engineered structures are designed to withstand certain shaking intensities.
- **Earthquakes of similar magnitudes have different effects.** Two earthquakes of magnitude 6.5 can cause dramatically different levels of ground shaking intensity because they may differ in depth or type of fault rupture. The 2001 magnitude 6.8 Nisqually earthquake, for example, shook a wide area near Seattle but caused much less damage than the 1994 magnitude 6.7 Northridge earthquake in Los Angeles because the Nisqually earthquake was extremely deep and did not cause severe shaking at the earth’s surface. Earthquakes of similar magnitude can also cause differing levels of damage according to their proximity to populated areas. The 1995 magnitude 6.9 earthquake in Kobe, Japan, was much more devastating than the Northridge quake because the strongest shaking was in the densely populated areas of Kobe, whereas the strongest shaking in the Northridge quake was under the mountains north of Los Angeles.
- **It’s not only about the fault line.** Everyone in a seismically active region should be concerned, not just those located “on the fault line.” Because earthquake waves radiate out from faults and cause damage over large areas, seismic safety precautions are important region-wide. It is more important to pay

attention to the over-all level of earthquake activity in an area than to know only the location of faults. The most current U.S. Geological Survey seismic hazard maps of the United States are at <http://geohazards.cr.usgs.gov/eq/>.

- **Seismologists can estimate long-term earthquake probabilities.** Based on historic earthquakes and evidence of prehistoric earthquakes, seismologists are able to estimate the long-term probabilities of earthquakes in seismically active areas. These estimates are only approximate because we do not have enough years of records to make statistically reliable estimates yet. However, the estimates are a useful basis for seismic building codes, as well as for comparing hazard levels between regions, and for understanding the likelihood of future damaging earthquakes at any specific location. We know where large earthquakes have occurred in the United States in the past few hundred years. We know that similarly large earthquakes will occur again, in some places more likely than in others. We do not know precisely where, when, or how strong they will be.
- **Short-term earthquake prediction is not possible.** Seismologists are not able to predict imminent earthquakes as a weather forecaster can predict a hurricane. Due to the physical characteristics of fault rupture, such predictions may never be possible. Because earthquakes occur without warning, increased seismic safety is vital.
- **An earthquake can strike at any time.** If seismologists say a damaging earthquake has a 50% chance of occurring in a region during the next 30 years, that can be translated to mean it has approximately a 2% chance of occurring in any given year. The probability is the same this year as it will be next year or two years from now. People often speak of earthquakes occurring sometime in the future, but the truth is that they can happen *right now*.

Buildings and Codes

■ Remember that you are talking to non-engineers.

(Thanks again to *Promoting Seismic Safety*, referenced above.)

- **What seismic building codes can do.** Engineers design new buildings according to building codes. Seismic building codes reflect the latest knowledge about both earthquake dynamics and building behavior, and are intended to protect people inside buildings by preventing collapse and allowing for safe evacuation. Structures built according to code should resist minor earthquakes undamaged, resist moderate earthquakes without significant structural damage, and resist severe earthquakes without collapse. Buildings designed according to code will be earthquake-resistant, but not *earthquake-proof*.
- **Newer buildings are generally safer than older buildings.** Because they are built under more advanced codes, newer buildings are usually (but not always) safer than older buildings. Steel-frame high-rises and newer wood-frame low-rises are usually (but not always) the safest structure types. Exceptions to these generalizations can be caused by the configuration of the building, the quality of the construction, the design of the joints, and the way seismic waves strike a particular site.
- **Seismic codes vary across the United States.** The seismic provisions of building codes are based on earthquake hazard maps that show the probabilities of certain levels of earthquake shaking in particular areas. The codes reflect the fact that some places are more likely than others to have strong earthquakes. The entire country is not required to meet the same seismic design standards as the state with the greatest risk: California. Places that have less severe and less frequent earthquakes have less stringent design requirements: seismic codes require less in Boston than in Los Angeles, but they require more in southern Illinois, near the New Madrid seismic zone, than in Chicago, which is less likely to have a strong earthquake.
- **Older buildings are frequently dangerous.** In the western United States, seismic codes have made substantial improvements in construction since the mid-1970s. However, seismic codes did not come into wide use in the eastern United States until the early or mid-1990s. Buildings constructed prior to these respective dates in each area are not as seismically safe as buildings built to newer codes. Retrofitting buildings to improve seismic resistance is possible, but often costly, so choices must be made about which buildings are most important. It makes economic sense to target the most dangerous structures or the most dangerous features of those structures, such as flimsy parapets. Where huge stocks of old buildings are vulnerable to earthquakes, as in the East and Midwest, net reductions in risk will be small if seismic codes apply only to new buildings.
- **Some structures are more important than others.** Buildings with high occupancy, critical response services (fire, police, hospitals), and vulnerable populations (schools, nursing homes) are required by codes to be built with more stringent design limits. It is also important to protect utilities and infrastructure. Damage to critical structures leads to more life loss, larger economic loss, greater social disruption, and slow community response to and recovery from earthquakes.
- **Nonstructural hazards.** Buildings are full of nonstructural components—light fixtures, heating ducts, water pipes, windows, suspended ceilings, furniture, and equipment—that can fall on people, move and break, or block escape routes. On the exterior, plaster, falling bricks, parapets, window glass, or the facades of buildings can cause casualties to people walking by or trying to exit. Structural frames can prevent the collapse of buildings, but most of the economic loss occurs to nonstructural elements. Codes only recently began to address mitigation of nonstructural hazards in buildings, so much damage and loss reduction is still up to owners and occupants.

- **Adherence to seismic codes is not as expensive as many think.** Complying with a seismic code adds relatively little to the costs of a structure. The most recent study estimates that it adds less than 1% to the purchase price of a home, and from 1%-2% to the total cost of new commercial and industrial buildings (see *Promoting the Adoption and Enforcement of Building Codes*, Robert Olshansky, FEMA, 1998). Newer technologies (e.g., base isolation, passive and active dampers) may provide the highest level of protection, but at an additional 1-10% of the total cost. However, they may be the most economic solution to various retrofit problems.
- **Building code adoption is a state or local responsibility.** All states have a legal obligation to regulate building safety as a matter of public welfare. In most states, the day-to-day aspects of this obligation rest with local governments. Some states require local adoption and enforcement of building codes; others do not. The fact that codes are required does not guarantee that all localities comply—some fail to adopt and others fail to enforce. In states that do not require codes, localities are free to do as they wish. In fact, many earthquake-prone communities in the United States do not have up-to-date building codes with seismic provisions.

Response and Recovery

- **Effective emergency response requires trained professionals. Disaster recovery takes a long time because many organizations and community groups must have a say in it.**

(from *Disaster Hits Home*, by Mary Comerio, 1998, UC Press).

- **Aftershocks can continue for days or weeks.** These are usually smaller in magnitude than the first earthquake, but they can further damage weakened structures. Damaged buildings often have to be re-inspected after each aftershock.
- **Emergency Response—1 to 3 days.** Fires are put out. Searches are conducted for the injured and dead. Triage operations are set up in hospitals. Those without food or shelter are directed to public buildings that have been desig-

nated as shelters, but many people fend for themselves in public parks or yards. Victims and emergency service providers try to get information on the extent of the damage, but the process is slowed when communication systems are damaged, power is interrupted, and roads are closed.

- **Assessment and Assistance—1 to 4 weeks.** Power and other lifeline services are restored, roads are cleared of debris, and traffic is rerouted. State and local governments are assisted by FEMA to move victims out of shelters and find them temporary housing. Some victims depend on family, friends, and/or religious and community organizations for assistance. Teams of professionals (engineers, architects, building officials) inspect and tag buildings as Red—unsafe to enter, Yellow—limited entry, and Green—no structural damage. Researchers collect data on the physical and social impacts of the earthquake. Homeowners with damage contact their insurance companies if they have earthquake coverage. Businesses and institutions hire engineers to do detailed damage assessments. For many damaged buildings, the process of deciding on repair or reconstruction can take up to a year.
- **Recovery—2 to 20 years.** While road and infrastructure repairs may move quickly, damaged buildings require significant amounts of time for repair or replacement. The recovery process requires time for inspections, design and planning decisions, financing and construction. Examples include the Los Angeles, San Francisco, and Oakland City Halls, the Cypress freeway structure, the Bay Bridge, and heavily damaged multi-family apartments in Los Angeles.

EERI's Earthquake Professionals

- **EERI membership is made up of earthquake experts in many disciplines.**

- **Seismologists** study earthquakes and the structure of the earth by focusing on the origins and propagation of seismic waves in geological materials. These materials can range from a laboratory sample to the earth as a whole, from its surface to its

core. Seismologists evaluate potential earthquake incidence in order to help minimize earthquake impacts.

- **Geologists** study the planet Earth: the materials it is made of, the processes that affect those materials, the land forms, and history. They conduct research into the formation and movement of the earth's crust, and evaluate how the ground will perform in earthquakes.
- **Structural Engineers** design structures such as office towers, theaters, hospitals, and houses, as well as infrastructure such as pipelines and bridges. They team with architects to create new buildings or to renovate existing structures. They ensure that each structure has the strength and flexibility required to perform its function safely and economically. After earthquakes, structural engineers evaluate damaged buildings in order to improve their understanding of damage causes.
- **Geotechnical Engineers (Soil Engineers)** study the properties of the soils beneath structures and determine how the soils will behave when shaken by earthquakes. Failures of the soils—through liquefaction, landslides, or collapse—can cause significant damage to the overlying structures.
- **Social Scientists:** Some record what happens to disaster victims and how they cope with the situation; others track institutional responses to disaster such as emergency management and recovery processes. Findings from their research help to improve post-disaster response and human services. Examples include sociologists, psychologists, political scientists, economists, geographers, public health experts, planners, and policy analysts.
- **Emergency Managers** are typically employed by cities, counties, and states to develop the government's capabilities to respond to disasters. These professionals coordinate preparedness, training, and exercising before a disaster, and emergency response after one. They use earth science and engineering information to promote preparedness and mitigation among the general public or with target groups.

©2005 Earthquake Engineering Research Institute
Web Site: <http://www.eeri.org>