

# L Summary

The Earthquake Hazards Reduction Act of ( 1977 (Public Law 95-124) proposes to reduce the risk to life and property from future earthquakes by establishing and maintaining an earthquake hazards reduction program. The implementation plan required by the Act to direct these activities has been submitted to Congress. Within 300 days of enactment, the President must designate a lead agency, assign responsibilities in the program to appropriate agencies, and establish goals and target dates for the program.

Congress required the implementation plan to deal with:

- preparations for earthquakes, including prediction, evaluation, earthquake warnings, and response planning;
- development of ways for State and local government to use information about earthquake risks in land use planning;
- development of standards and codes for earthquake-resistant construction;
- examination of how earthquake hazards can be reduced through Federal construction loans and licenses;
- determination of the appropriate roles of insurance loans and relief in moderating the impact of earthquakes; and
- dissemination of information about all aspects of earthquakes.

This paper identifies 14 basic issues with which the implementation plan must cope in order to achieve its objectives. These issues and the associated questions developed under each of them comprise criteria against which the plan may be evaluated. Consequently, this paper is intended to assist the committees of Congress in their evaluation of the plan. This paper was prepared independent of the implementation plan and without knowledge of its proposed contents.

The issues, while all basic to a successful program, are arranged in a rough descending order of importance of their resolution to a successful program.

The issues are treated in detail in the same sequence on pages 17 to 36.

## FOURTEEN KEY ISSUES

### Issue 1: Federal vs. State and Local Responsibilities

The tensions evoked by the division of power and responsibility among the various levels of Government involved in earthquake hazards reduction should be resolved.

The Federal agencies would consider it most convenient if their initiatives took priority and were uniform across the country. This would ignore regional and local differences in awareness, perspective, extent of hazard, competing objectives, and differences in distribution of power and responsibility.

### Issue 2: Earthquake vs. An All Natural Hazards Strategy

While it may be convenient for researchers and the large Federal agencies to handle hazards categorically, the practicalities of State and local government organization and function increasingly require integrated planning and operations for all hazards. Similarly, Federal construction and housing programs also could be responsive to all hazards not just to one or a few selected hazards.

### Issue 3: Narrowing Choices vs. Widening Choices: The Acquisition of Information

There are three aspects of the acquisition of information with which the implementation plan should be concerned:

- **Quality of Past Information.**—Theories about the behavior of faults, of structures, and of people based on information gathered in the past may prove false and, in turn, lead to actions wasting money and effort and even endangering lives and property.
- **Adequacy of Current Information for Program Planning.**—Successful execution of the implementation plan will depend upon coordination of a myriad of Federal, State, and local laws related directly or indirectly to earthquake hazards reduction. Conflict could

easily arise with flood control, environmental policy, historical preservation, building codes, and land use planning policies.

- **Providing for Future Information.**—Explicit planned decisions on what information should be sought in further research are essential to steady progress in earthquake hazards reduction.

New problems, such as those arising from new technologies, may require innovative approaches and creative solutions. Established bureaucracies, however, tend to restrict funding to “tried and true” methods.

People are keys to information use. Therefore, future needs for professionals in architecture, planning, emergency preparedness, and many other related fields should be ascertained and plans made so that an adequate number of persons can be trained.

#### **Issue 4: Narrowing Choices vs. Widening Choices: The Role of Dissemination and Utilization of Knowledge**

Another basic conflict involves the balance between legislative or regulator imposition of solutions and the dissemination of needed information to local and State entities that can then use the data to work out their alternatives and influence the selection among them.

There is need for a mechanism by which users and their particular needs can be identified. Prior research has yielded data that is not being put to use. At the same time, action sometimes occurs prematurely in areas where more or better quality research could lead to more rational and effective solutions.

The citizen who wants to be involved in local planning and decisionmaking also needs good information keyed to the nonspecialist. Here the Federal specialist can be invaluable as an advisor and information source.

#### **Issue 5: Engineering Design vs. Socioeconomic Strategies**

Because they behave in a logical, consistent, predictable manner, yield easily quantifiable data, and perform their tasks unaffected by emotions or value judgments, mechanical devices and engineered structures tend to appeal to public officials and other decisionmakers.

However, effective community decisionmaking requires that community experience and values be applied to problem-solving through management of human systems, i.e., social, economic, legal, and political systems.

A good historical example of the conflict between the engineering and management approaches can be found in the changing attitudes toward adjustments to flood hazards, where dam building is being supplanted by insurance and land management strategies. The clear need is for an integrated plan of complementary strategies.

#### **Issue 6: Life Safety vs. Property Value-Oriented Programs: Balancing Needs**

**No implementation plan** would be written deliberately to place lives in jeopardy or to protect one class or group at the expense of others. However, it is quite possible that the ultimate effect of certain procedures, regulations, or policies may be just that. On the other hand, when the emphasis is only on preventing death and injury, there is a tendency to take only those minimum measures which protect life, rather than to look beyond the minimum in order to protect the community's economic health after the quake. Measures to limit potential economic losses usually will require more stringent construction and siting control than is necessary to achieve only life safety objectives.

#### **Issue 7: Life Safety vs. Property Value-Oriented Programs: Hazardous Buildings**

The single greatest life-threatening earthquake hazard, and the one most difficult to alleviate, is the old, unreinforced masonry building. There are hundreds of thousands of these in quake-prone cities. In a major earthquake, they would be death-traps. Their collapse would also create debris barriers that firefighters and emergency rescue vehicles could not pass.

Yet, these buildings represent sizable real estate investments, often by owners unable or unwilling to finance the retrofit or replacement. They are homes to those who lack the money and/or the desire to live elsewhere. Some of these buildings offer historic and esthetic values to communities which wish to preserve them, but lack the means to bring them “up to code.”

These buildings constitute a hazard too great to be ignored, but too expensive for individual owners or communities to alleviate within a short time.

### **Issue 8: Federal Regulations Overriding Conflicting State Laws vs. State-by-State Resolution: Building Codes**

Building codes are the single most important, direct way to mitigate earthquake hazards.

Some States have statewide building codes, others leave code adoption and enforcement to individual counties and cities, some of which have no building codes at all. Most emphasis has been placed on the supporting structure of buildings, neglecting nonstructural components. There is a pressing need for more attention to code and design requirements for nonstructural elements, especially for “lifeline systems,” i.e., essential public service delivery systems such as transportation, communications, and utilities.

All building codes, whatever their emphasis, tend toward only minimum life safety standards. Mistakenly, public decisionmakers and their constituents often believe that codes are all-inclusive and all-protective. The timelag between technological developments and their appearance in the codes is often great. Even when new developments are incorporated in the Uniform Building Code, few States require that local jurisdictions update their versions of the code.

### **Issue 9: Prediction vs. Present Capabilities**

Reasonably accurate and useful means of earthquake prediction may not lie far in the future. Still, it is unlikely that earthquakes will be predicted usefully or reliably by the time the initial appropriation for Public Law 95-124 expires. In addition, predictive methods that work in one geophysical province may not work in another. The need to plan for the wise use of earthquake prediction should not blind decisionmakers to the present problem of how to cope until such measures become available. In addition, studies to date suggest major new consequences—both beneficial and detrimental—of prediction, which in turn require further study.

The plan must resolve the tension between developing future prediction capability and dealing with quakes likely to occur before that capability

is at hand. The need to mitigate basic structure loss, however, will not be reduced by development of a predictive capability, as prediction, alone, cannot reduce damage vulnerability of building stocks.

### **Issue 10: The Picture of the Present vs. The Images of the Future: Choosing Alternatives**

Present public policy actions are unlikely to have a great effect on the quality of life or the public well-being in the short term. Their major effects, both planned and unplanned, will be in the future. It is useful, therefore, to look to the future and make explicit the assumptions about the future world which guided the plan.

### **Issue 11: The Picture of the Present vs. The Images of the Future: Resolving Ambiguities**

The Act states that “It is the purpose . . . to reduce risks . . . from future earthquakes in the United States . . . “

Neither the faults that cause earthquakes nor the damages that result from seismic activity respect national boundaries. Thus, a quake with a U.S. epicenter may cause damage in Canada and Mexico, or a quake with an epicenter in Kamchatka may cause damage along the western coast of the United States. An earthquake originating beneath international waters may cause tsunami along U.S. shores. The intent of the Act regarding these conditions is not clear.

Were these or other ambiguities identified by the plan? Do they suggest a need to return to Congress for clarification?

### **Issue 12: The “Normal” Disaster vs. The Catastrophe**

A maximum credible disaster—a disaster taking thousands of lives and running into tens of billions of dollars—implies a major discontinuity of economic and community life. On the other hand, the Government desires to maintain a comfortable sense of continuity of institutions. It would be worthwhile to identify a threshold of disaster requiring an extended recovery period, during which the normal operating laws, rules, and regulations of society would need to be suspended. This concept would go well beyond martial law

and suggests that debts, insurance, bank payments, commercial obligations, and so on might be handled in a unique way. A model for this would be postwar European recovery. Such a strategy might address many of the difficulties that the disruption a major disaster (or its prediction) might unleash upon the whole United States or a regional economy.

This conflict between saving lives and restoring the economic balance of the country (or a region) on the one hand, and the constitutional questions raised by such extreme solutions on the other, requires careful analysis and anticipatory planning.

### **Issue 13: Interagency Conflicts: New vs. Existing Agencies**

Public Law 95-124 provides for leadership to coordinate the efforts of the many agencies. Most States already have agencies responsible for emergency preparedness, environmental concerns, and geology, and these have ties with Federal agencies having implementation responsibilities.

Interaction among the several State agencies, and between State and local bodies, ranges from cooperation to competition so intense that it impedes effective action.

It may be that the only solution in some States will be to consolidate all earthquake planning

functions into one new agency. In others, varying degrees of consolidation and coordination should develop. In still other States, effective interagency programs may already be functioning.

Existing agencies at both Federal and State levels have the advantage of experienced personnel familiar with problems and procedures. On the other hand, these bureaucracies may overcommit themselves to their own sets of regulations and priorities. The implementation plan must achieve balance among these conditions in order for the legislation to be effective.

### **Issue 14: Urgency of Need vs. Limited Capabilities**

It is often widely believed that brief, all-out efforts can solve major problems or accomplish great feats. Unfortunately, this has rarely proved to be the case.

Congress (and the President) will need to be apprised of the success or failure of the plan from time to time, and certainly by the end of the initial appropriation period.

If the plan is succeeding, then some measure of its success must be made available. If the plan is not achieving any of its aims, it must be recast or abandoned.