

Chapter 2

A DECISION-MAKING GUIDE

INTRODUCTION

While the seismic rehabilitation of existing buildings presents many of the same challenges to private as well as public sector decision-makers, this publication is intended primarily for local government officials, especially those in planning, redevelopment and building departments, and public agency and private engineers who find themselves involved in the public policy aspects of seismic rehabilitation.

Despite the fact that each building has "its own story" when it comes to seismic rehabilitation, similar public policy issues reappear so often that providing a generalized approach to achieving seismic rehabilitation is possible. Therefore, a generic, four-step process is outlined for use primarily by local government officials as well as, building owners, engineers, and/or private consultants seeking approval from local governments to seismically rehabilitate a building or group of buildings.

Secondarily, this publication is directed toward private-sector decision-makers. The term "private sector" is admittedly quite broad, encompassing the owner of one office building in a small city in a low seismic risk (and awareness) zone, the owner of multiple-unit apartment buildings in a zone of moderate risk (and awareness), a large corporation with facilities in high seismic risk (and awareness) zones, and all those in between.

Nonetheless, despite obviously different contexts and specific problems, the shared nature of the earthquake-vulnerable structure problem establishes certain commonalities between the private and public sectors. Although some parts of this publication may be more relevant than others, the hope is that it will be useful to corporate facility managers who wish to seismically rehabilitate a building or group of buildings and must secure appropriate approvals and support from chief executive officers, boards of directors, or clients. It is important to note, however, that the engineering expertise of a design professional (architect, engineer, code official) is a prerequisite to the appropriate use of the *Guidelines* documents.

It should be noted that even if community or private-sector decision-makers responsible for one or more types of earthquake-vulnerable structures anticipate and address the social, economic, and political complications inherent in seismic rehabilitation, the problems will not be eliminated. This approach will, however, facilitate their management. In addition, effectively managing the human or nontechnical problems of seismic rehabilitation hopefully will make the use of the separate but companion engineering publications, the *Guidelines* documents, more tailored and therefore more sensitive to particular situations and environments.

AN OVERVIEW OF THE FOUR-STEP PROCESS

A common four-step problem-solving process follows:

1. Defining the problem
 - 1A. Conducting preliminary analysis
 - 1B. Conducting detailed analysis (+ feedback)
2. Developing and refining alternatives (+ feedback)
3. Adopting an approach and implementation strategy (+ feedback)
4. Securing resources and implementing (+ feedback)

As in many processes of this type, this generic four-step model emphasizes the feedback function at every step because no existing building seismic rehabilitation effort can possibly succeed in isolation, no matter how splendid the technical components. Seismic rehabilitation takes place in a wide variety of socioeconomic and political contexts, and continuous feedback and adjustments are necessary for success. The number of affected buildings, the acceptable level of risk defined by the selected rehabilitation performance objectives, the duration of the program,

the cost, and the social and economic impacts are interdependent. By the very number and nature of the variables, seismic rehabilitation decision-making is very complex for it must balance so many considerations.

The level of detail, amount of data collected, degree of analysis, formality of procedures, and resources committed will vary with the intended use of the engineering publications (the *Guidelines* documents) and with the conditions and circumstances faced by the reader. As a result, given differing community, jurisdictional or corporate contexts, each reader must determine the extent of data collection and analysis of alternatives needed. In other words, each step constitutes a kind of progressive discovery leading to a better understanding of the issues. Each step tests whether the seismic risk justifies the cost and effort involved in taking the next step. Thus, the process is essentially iterative with the steps building on assumptions and estimates of the nature and scope of potential problems and then allowing expansion and refinement of the approach.

Step 1, "Defining the Problem," actually comprises two substeps: "preliminary analysis" and "detailed analysis." Preliminary analysis (Step 1A) entails an initial and perhaps even cursory survey of the general issues raised by an identified earthquake threat. Because earthquake-induced life and property losses tend to be concentrated in building types already known to be vulnerable, once a relatively specific degree of seismic risk and likely consequences have been identified, the issue of seismic rehabilitation arises almost immediately. Therefore, the product of Step 1A is simply a good enough understanding of the seismic risk, the possible scope of potential building rehabilitation efforts, and the implications of such rehabilitation for owners, occupants, and the community so that an informed decision to proceed or not proceed can be made. If a decision is made to proceed, Step 1B, detailed analysis, defines more precisely the nature of the risk and the problem through:

1. Collection of data on the physical nature and policy implications of possible target buildings
2. Refinement and expansion of the initial understanding,

3. Definition of the specific problems and impacts, and
4. Identification of the people and organizations potentially affected by rehabilitation.

The product of Step 1B is a decision to proceed or not proceed given consideration of alternatives and the impact of the decision.

Step 2, "Develop and Refine Alternatives," involves using the data assembled under Step 1B to develop and refine alternative approaches that address the seismic rehabilitation of existing buildings in light of the risk, the costs, and the social and economic impacts. Thus, Step 2 provides a kind of "menu" delineating seismic rehabilitation options for communities in various risk situations. Step 2 usually is a very long and involved process, but the key variables always are the desired performance levels, the scope of the approach, and an estimate of the costs. The first determines how much rehabilitation needs to be accomplished; the second determines how many buildings of what type and use are to be subject to rehabilitation; and the third estimates the cost of each alternative. The outcome of Step 2 is a recommendation, usually from a facilities manager or building official, to the next-level decision-maker(s) on a particular approach to seismic rehabilitation. For public entities, an environmental impact report may be required as part of this step.

Step 3, "Adopt an Approach and Implementation Strategy," is the decision point at which the city or county council, chief executive officer, board, building owner, agency director, or whoever is charged with the final responsibility considers the rehabilitation recommendation, receives input from other sources, and weighs the alternatives (not to be ignored is the alternative of doing nothing). Fundamentally, the decision to act on, modify, or reject a seismic rehabilitation plan is a political decision, whether made by government or a private-sector body. It is a decision that allocates scarce resources, costs, and benefits. It determines who benefits, who pays how much and when, and who bears the indirect costs (e.g., employees, tenants, suppliers,). Finally, the decision to act sets in motion the necessary organizational routines to actually yield activity, in this case seismic rehabilitation.

Step 4, "Secure Resources and Implement," is the critical process that turns a decision to rehabilitate into its physical result--safer, more seismically resistant buildings. Without resources (personnel, budget) to carry out seismic rehabilitation, the adoption of an approach is simply "a piece of paper." In addition, even when the necessary resources are allocated, implementation may be quite extended depending upon the number of buildings slated for

rehabilitation, and feedback is perhaps more important here than in any other step. Whoever is charged with overseeing the seismic rehabilitation must be kept apprized of any new techniques or standards that might alter the approach. In addition, the program manager must provide for quality control and must monitor and mitigate, to the extent possible, both the anticipated and the unanticipated socioeconomic and political side effects of seismically rehabilitating buildings.