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PB-281 970

**Seismic Safety of Existing Buildings and
Incentives for Hazard Mitigation in
San Francisco: An Exploratory Study**

California Univ, Berkeley Earthquake Engineering Research Ctr

Prepared for

National Science Foundation, Washington, D C

Dec 77

PB 281 970

REPORT NO.
UCB/EERC-77/28
DECEMBER 1977

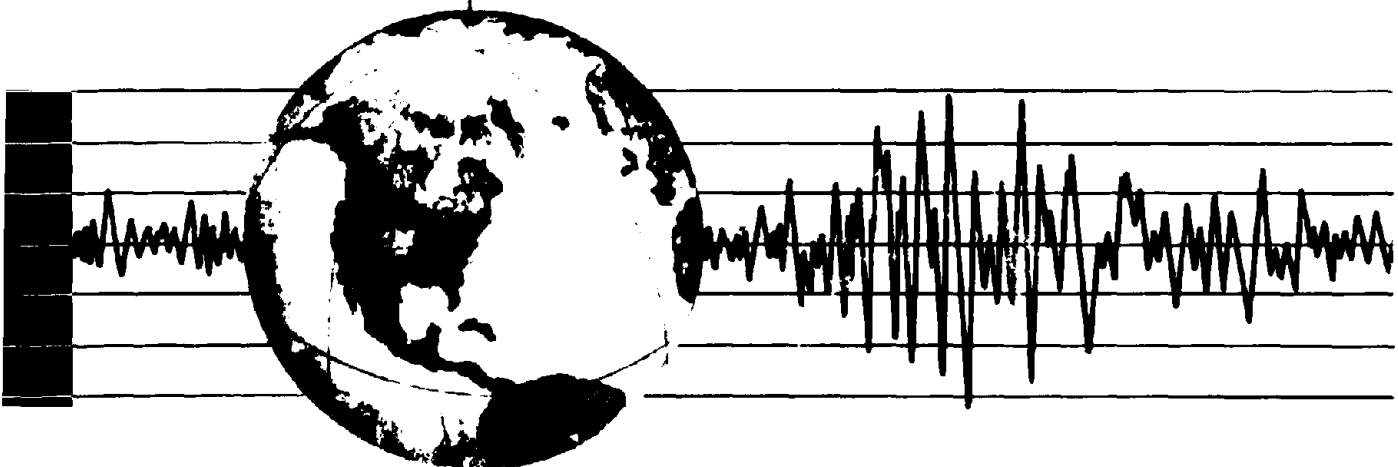
EARTHQUAKE ENGINEERING RESEARCH CENTER

**SEISMIC SAFETY OF EXISTING BUILDINGS
AND INCENTIVES FOR HAZARD MITIGATION
IN SAN FRANCISCO: AN EXPLORATORY STUDY**

by

A. J. MELTSNER

Report to National Science Foundation



COLLEGE OF ENGINEERING

UNIVERSITY OF CALIFORNIA · Berkeley, California

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INFORMATION SERVICE

BIBLIOGRAPHIC DATA SHEET		1. Report No. UCB/EERC-77/23	2.	3. File Designation / Accession No. PB281970	
4. Title and Subtitle Seismic Safety of Existing Buildings and Incentives for Hazard Mitigation in San Francisco: An Exploratory Study				5. Report Date December 1977	
7. Author(s) A. J. Meltsner				6.	
9. Performing Organization Name and Address Earthquake Engineering Research Center University of California, Richmond Field Station 47th Street and Hoffman Boulevard Richmond, California 94804				8. Performing Organization Rept. No. 77/28	
12. Sponsoring Organization Name and Address National Science Foundation 1800 G Street, N.W. Washington, D. C. 20550				10. Project/Task/Work Unit No.	
				11. Contract/Grant No. ENV 76-82384	
15. Supplementary Notes				13. Type of Report & Period Covered	
				14.	
16. Abstracts The seismic safety of existing buildings is not solely a matter of engineering design and assessment of seismological risk. Within any community there are likely to be different perceptions of the public interest. It seems clear that what is needed, in addition to engineering studies to develop appropriate procedures for evaluating and coping with the hazard from existing buildings, is knowledge about the range of appropriate incentives which might prove useful for governments to use to facilitate implementation of these procedures. The main purpose of this report is to document an exploratory study of a number of possible incentives and options which have been discussed in the past by public officials and conceivably might be adopted in the future.					
17b. Identifiers/Open-Ended Terms					
17c. COSATI Field Group					
18. Availability Statement Release Unlimited				19. Security Class (This Report) UNCLASSIFIED	
				21. No. of Pages 86	
				20. Security Class (This Page) UNCLASSIFIED	
				22. Price PCARD \$ ME: 88/	

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ACKNOWLEDGMENTS

I wish to express sincere appreciation to my two research assistants. Marilyn McCabe helped develop the questionnaire, tested it, and conducted half of the San Francisco interviews. She was also responsible for coding and developing most of the quantitative data and for writing preliminary drafts on the methodology, hazard awareness, and government responsibility sections. David Richman also helped develop the questionnaire, tested it, and conducted the other half of the interviews. He was responsible for the preliminary analysis and drafts of some parts of the incentive section.

Professor Boris Bresler gave encouragement and advice throughout the project. Professor Joseph Penzien provided the facilities of the Earthquake Engineering Research Center and his own personal support for this project.

In addition, I want to thank the citizens and officials of San Francisco who gave so generously of their time in trying to educate us about this problem.

Finally, the financial support of the National Science Foundation, Grant No. ENV76-82384, must also be acknowledged.

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INTRODUCTION

The seismic safety of existing buildings is not solely a matter of engineering design and assessment of seismological risk. Even after scientific, engineering, and other experts determine what to do, there is no guarantee that property owners and other members of the community will do it. Within any community there are likely to be different perceptions of the public interest. Moreover, courses of action which are desirable from a community viewpoint may not be economical from the perspective of the individual. This conflict between self-interest and the interest of the public or the community appears when government attempts to increase the safety of its citizens by passing ordinances or adopting building codes which represent a marked departure from prevailing practice. The essence of such regulation is that its benefits will be spread among a large number of such people while its costs will be paid for by a few. Recognizing that these few, mainly government and private property owners, will be put at a disadvantage perhaps even undergoing severe hardship, incentives or various forms of compensation are suggested to facilitate implementation. It seems clear that what is needed, in addition to engineering studies to develop appropriate procedures for evaluating and coping with the hazard from existing buildings, is knowledge about the range of appropriate incentives which might prove useful for governments to use. Thus the main purpose of this report is to document an exploratory study of a number of possible incentives and options which have been discussed in the past by public officials and conceivably might be adopted in the future.

In order to approach the complex question of appropriate incentives, it was decided that it is important to examine in a tentative way the political feasibility of a large number of possible economic, legal, and informational incentives before undertaking a detailed cost-effectiveness analysis of the most promising choices. For example, while there is much talk about the use of property tax in some way to provide an incentive, there has not been any investigation of whether informed community leaders and elected and administrative officials would support such an approach. A great many public agencies live fiscally off property tax, and it is not likely that a diversion of this source of revenue to improve seismic safety of communities would be met with unqualified joy and support. What will become apparent from this study is that some mix of incentives combined with concerted public and private action is necessary to bring about implementation of a hazard abatement program.

In order to get the most out of the available research resources, it was decided to concentrate on the City and County of San Francisco. Why pick San Francisco? Besides being close and easily accessible, San Francisco is typical of many urban centers that are exposed to some degree of seismic risk. If one expects that after the 1906 earthquake the citizens of San Francisco always built with future earthquakes in mind, one would be sadly disappointed. As a city report observes: "It was not until 1948 that comprehensive lateral force design criteria, specifically considering seismic forces, were added" to the building code.¹

¹ City and County of San Francisco, Department of City Planning, Community Safety: A Proposal for Citizen Review, July 1974, p. 15. See also State of California, Joint Committee on Seismic Safety, Meeting the Earthquake Challenge, January 1974, pp. 197-198, for brief history of lateral force requirements in San Francisco.

While of course not all of the post-1906 buildings should be considered hazardous, it is still important to note that a 1972 report estimated that an 8.3 magnitude earthquake stemming from the San Andreas Fault could cause approximately 10,000 deaths with another 40,000 injuries in the San Francisco Bay Area.²

For the more than 700,000 citizens of the San Francisco region, the City and County of San Francisco appear to be unique. Certainly in the Bay Area, San Francisco is known as the City. In some ways, of course, San Francisco is not unique. Like other urban areas it has fiscal problems, a fragmented political system, and a host of social and economic problems. Its population is mainly middle class and mostly white. It has a strong ethnic base composed of Italians, Germans, Irish and Poles. About one-third of the population is composed of minorities, including about 100,000 blacks, about 100,000 Spanish-speaking or Spanish-surname people, and about 50,000 Chinese-Americans. The city also has large numbers of young and old people. Twenty-two percent of the population is sixty-five years of age or older and thirty-six percent is under twenty-five. It is an attractive place for the young to start their professional lives and for the old to retire, while the middle-aged tend to move out to the suburbs. The city thrives on tourism and real estate, and is a financial and insurance center in the west. San Francisco is sustained primarily by a white-collar economy.

²U.S. Department of Commerce, National Oceanic and Atmospheric Administration, A Study of Earthquake Losses in the San Francisco Bay Area: Data and Analysis, A report prepared for the Office of Emergency Services, 1972, p. 121.

The government is a product of the reform movements of the 1930s and, therefore, is highly fragmented with no single focus of authority and political influence. The mayor, for example, shares his authority with a board of supervisors, with a chief administrative officer, with a controller, and with numerous boards and commissions. In addition, both business and organized labor play an active role in political life. This combination of political fragmentation and the use of nonpartisan elections, makes it difficult to get concerted action out of San Francisco's political system. As one observer put it:

San Francisco has such a multitude of complex and elaborate institutions and mechanisms for distributing authority that it is remarkable that anything ever gets done by its³ government. Very often, in fact, nothing does get done...

It should be clear that if anything is done in a political system such as that of San Francisco, it will require action by policy makers and an issue which is timely and reflects some urgency for resolution. This does not mean that every policy problem must assume crisis proportions before something is done about it, but it does mean that policy makers have to do a great deal to convince the public that something should be done. A policy area such as seismic safety is likely to be ignored or not given its due attention. There does not seem to be much urgency about a potential earthquake which may occur some time in the future.

³Sharon Perlman Krefetz, Welfare Policy Making and City Politics (New York: Praeger Publishers, 1976), pp. 54-55. This brief discussion of San Francisco's political system is mainly based on Krefetz, pp. 51-81; see also Fred Wirt, Power in the City (Berkeley: University of California Press, 1974) for general background.

Nor does it help the situation when public officials make light of the potential hazard. In 1969, for example, Mayor Joseph L. Alioto held a party to commemorate the anniversary of the 1906 earthquake. It was during that same year that the Board of Supervisors passed San Francisco's parapet ordinance (Article 2.5 San Francisco Building Code, Sections 251-254). Although Mayor Alioto signed the ordinance, he did not support it, and when no longer in office, he commented on "the mentality of the doomsday crowd who rally around the earthquake banner." He then went on to conclude that "the parapet ordinance if enforced would cost millions and deprive San Francisco of its priceless exterior beauty."⁴ His reluctance to take seriously the potential hazard from earthquakes may partially explain the delay in the enforcement of the ordinance. It was not until 1975 that San Francisco's Bureau of Building Inspection obtained sufficient resources to hire staff to undertake the inspection of buildings. With only a handful of inspectors relatively few buildings have been inspected. As of Spring 1977, building permits had been issued to correct the hazards in about seventy buildings. When one considers that there may be roughly ten to twenty thousand buildings that require such corrective action, it is clear that it will take, given the current level of resources, many years to complete the process of enforcing the 1969 parapet ordinance.

No doubt it will be quite expensive to repair San Francisco's buildings so that they comply with the ordinance, and in many cases it may not be technically or economically feasible to do so, but that is not the lesson to be learned from the parapet ordinance. What the

⁴ Joseph L. Alioto, "Parapets, Earthquakes and Manics," San Francisco Examiner, June 9, 1976, p. 35.

parapet ordinance situation tells is that a seismic safety program will have a great amount of difficulty if not in passing legislation then, certainly, in being implemented. Thus, while this study addresses the question of which incentives ease the process of implementation, the study is made against a background of the difficulties of doing so. The point is amply illustrated by the fact that it took outside money "from the 1973 Federal Revenue Sharing program to provide the Bureau of Buildings Inspection with the necessary manpower to inspect parapets and appendages."⁵ Evidently, the officials did not think that the issue of seismic safety had a high enough priority to use the city's own fiscal resources.

METHODOLOGY

Before proceeding to discuss what was learned from interviews in San Francisco, a brief summary of what was done is in order. During the summer months of 1977 ninety-eight respondents were interviewed in San Francisco; and it is important to have some understanding about the people who were interviewed, how they were selected, and what they were asked.

People Who Were Interviewed

Since the political and implementation feasibility of a range of incentives to fix existing buildings is of concern, it was desirable to talk to people who might be directly involved either in the choice of particular incentives (e.g. a city planner) or who would be affected by that choice (e.g. a representative of hotel interests). This is a

⁵ City and County of San Francisco, Department of City Planning, "The San Francisco Parapet Ordinance," Background Paper No. 2, January 1974.

situation in which a random sample of citizen opinion on earthquakes would not be appropriate. Instead what was wanted were the opinions and predispositions of those people, the elites, who might enter the political arena or have something to say if an incentive program were suggested.

In American politics most people do not worry about most issues most of the time. The usual situation is one of relatively few people paying attention to an issue at a particular moment in time. Given the general citizen indifference about earthquake hazards, it did not seem that the issue of incentives would prove an exception to the rule.⁶ Thus, the opinions were sought of that small segment of San Francisco's public who either were concerned about the general issue of seismic safety or might be concerned about the effect of a specific incentive in the future. These people were called earthquake influentials.

How the Selection Was Made

What gets on the public agenda and what happens afterward is a complex product of the behavior of institutions, groups, and organized interests. Ideally the sample for this study should reflect this diversity of interests: government, business, labor, experts and laymen. The breakdown of the influentials, as independently coded by two of the researchers, is shown in Table 1. Members of the expert group (22 percent) include engineers, architects, city planning and public works officials, as well as government and private professionals whose

⁶For evidence of this indifference see Edgar L. Jackson and Tapan Mukerjee, "Human Adjustment to the Earthquake Hazard of San Francisco, California" in Gilbert F. White, ed., Natural Hazards: Local, National, Global (New York: Oxford University Press, 1974), pp. 160-166. Also see Arnold J. Meltsner, "Citizens and Earthquakes," Working Paper No. 64 (Berkeley: Graduate School of Public Policy, University of California, January 1977).

TABLE 1

BREAKDOWN OF SURVEY INFLUENTIALS

	<u>Number</u>	<u>Percent</u>
<u>Expert</u>		
Government	9	9
Private		
Business	10	10
Community	<u>3</u>	<u>3</u>
Subtotal	22	22
<u>Laymen</u>		
Government	16	16
Private		
Business	46	47
Community	<u>14</u>	<u>14</u>
Subtotal	<u>76</u>	<u>77</u>
Total	98	99*

*Percent does not total to 100% because of rounding.

occupations involve earthquake and emergency preparedness. Twenty-six percent of our respondents work in local government agencies. Influentials from the private sector include representatives of both business and community interests. Those with a business orientation (57 percent) include bankers, merchants, and property managers; as well as people in real estate, insurance, tax, and labor associations. Respondents with a community orientation (17 percent) include individuals in positions concerned with consumer, conservation, or environmental issues, and those in tenant or neighborhood associations.

Initially the influentials were selected from various lists of government agencies, private sector groups provided by the Chamber of Commerce, and well-known experts and members of relevant committees. As it progressed, the selection was modified by including other people who were referred by the respondents. Of course not everybody wanted to be interviewed; about 25 percent of the people called for appointments refused with such comments as: "It would be a waste of time"; "I don't want to get involved with earthquakes"; and "It's God's will; nothing is going to stop it from happening". In addition, a common reason for refusing to be interviewed was the reluctance of middle management, particularly in government, to voice its own opinions. Thus, "talk to my boss" became another source of referral. Ultimately, the sample consisted of ninety-eight usable interviews.

The representativeness of the sample, of course, is open to question. For an exploratory study the sample is adequate, given the uncertainty of the universe from which it was taken. Political responses to issues are usually so fluid that one is never certain who will care about what. The respondents were associated with eighty-nine different

organizations. Although the individuals interviewed did not officially represent these organizations, their opinions are likely to be representative of groups within these organizations. A complete list of the organizations is given in Appendix A.

What Was Asked

An open-ended questionnaire was devised and pretested in Alameda, San Mateo and Santa Clara counties for two months prior to its use in San Francisco. The final questions are listed in Appendix B. The questionnaire provided the means of obtaining an indication of the respondents' involvement with earthquakes, their awareness of earthquake hazards, their views regarding the role of government in mitigating these hazards, their opinions about their roles in reducing earthquake hazards, and their predisposition to support or to oppose various incentives to improve the seismic safety of existing buildings.

The interviews were conducted in a non-directive and conversational manner, frequently using probes to elicit responses without putting words into the mouth of the respondent. The interviews typically took about thirty minutes with some taking as long as one and one-half hours. Most of them were recorded on tape and later transcribed. Ten percent of the respondents, while willing to be interviewed, refused to be taped. With few exceptions, the interview took place in the office of the respondent.

After this brief overview of the methods, the question of whether the influentials are aware of the potential hazards from earthquakes is considered.

HAZARD AWARENESS

A concerted effort toward the abatement of earthquake-related hazards is unlikely unless a group such as the earthquake influentials recognizes the hazards and sees the need to mitigate them. It was expected that the influentials would be aware of the hazard even if they were not inclined to do something about it. But to what extent do these individuals perceive the hazards of earthquakes in San Francisco? Do they see these hazards as a problem that can be solved, or one that is incapable of solution and thus better left to fate? What is the extent of their concern regarding the consequences of a major earthquake? It will be seen that, for some, the hazard of earthquakes is a non-problem. It will also be seen that many of the influentials are aware of the hazard because of their jobs and past experience.

High and Low Awareness

When the responses were analyzed, it was quite clear that most of the sample are aware of the hazard. As can be seen in Table 2, 81 percent of the influentials have at least moderate awareness, and 53 percent have high awareness. Experts, as would be expected, are highly aware (82 percent) as contrasted with laymen (45 percent). A majority (64 percent) of the respondents in government and 59 percent of individuals with community alliances have a high awareness. The percentages decline to 46 percent for those with business, labor or taxpayer interests.

Only 19 percent of the respondents rated low on hazard awareness. One way to view these respondents is that they have a high propensity to avoid the hazards associated with earthquakes. Several of these

TABLE 2

SAN FRANCISCO'S EARTHQUAKE INFLUENTIALS
ARE AWARE OF THE HAZARDS

Level of Awareness	Government	Private			Expert	Layman	Total
	No. %	Business No. %	Community No. %	Total No. %	No. %	No. %	No. %
High	16 64	26 46	10 59	36 49	18 82	34 45	52 53
Moderate	3 12	19 34	5 29	24 33	3 14	24 31	27 28
Low	6 24	11 20	2 12	13 18	1 4	18 24	19 19
Total	25 100	56 100	17 100	73 100	22 100	76 100	98 100

Source: Questions 1, 2, and 4. See Appendix B.

respondents do not see the hazards; or if they do, they were determined to deny their importance. "I know of nothing," announced a board of realtors spokesman, "that I would consider to be a great problem." A trust officer similarly stated:

I was born and raised in San Francisco and I haven't seen anything of a hazardous nature develop as a result of an earthquake here. The parapet problem we faced was more of an erosion problem. Probably an '06 earthquake would create some havoc here. But buildings are built a lot differently now than they were then.

This confidence in the safety of San Francisco's buildings was also expressed by a government finance officer, who firmly believes that: "All buildings in San Francisco, built after 1906, are earthquake resistant. If people want to admit it or not, all buildings in San Francisco are earthquake resistant above one story, including school buildings."

The "ostrich position" also accounts for the low awareness of several respondents, including a Board of Supervisors aide who stated: "I don't believe in worrying about those kinds of things." When asked if he thought there were any important hazards associated with earthquakes, a housing development official replied: "I try not to think about it. Most people I know don't give it much thought." This view is also displayed by the comment of a chamber of commerce official who stated in a fatalistic tone: "We're just not going to dwell on the earthquake thing. If it happens, it happens."

Predictably, there are a few respondents who feel they possess a special immunity, as does an insurance association official, who said: "I don't think it's going to happen to me." One of the respondents, a tenants association member, offered an explanation for the tendency,

shown above, to avoid thinking about the potential hazard: "People really don't think about it. Because if they did, there wouldn't be any people here. We'd all go somewhere else to live."

It is clear that most earthquake influentials are aware of the hazard and some prefer to ignore it; attention is now directed to the sources of awareness--jobs, experience, and knowledge.

Occupational Involvement with Earthquakes

Involvement with earthquakes in the various jobs and associations of the respondents contributes to their awareness of earthquake-related hazards. As previously mentioned, the respondents were selected because it seemed that they would be instrumental in the formation and execution of policies aimed at abating these hazards. The sample included individuals who are likely to be called upon to participate because of their expertise in the subject area and also individuals who will want to participate because their interests might be affected. Consequently, it was not surprising to find that 96 percent of the group of experts are involved with earthquakes in their jobs, and a high percentage (55 percent) of laymen are also involved with earthquakes in their various occupations. Seventy-six percent of the government employees and 60 percent of the private sector influentials are involved with earthquakes. For the sample, 64 percent of the respondents deal with earthquakes in their occupations or associations.

These figures, however, do not reflect the extent of their involvement. In some cases the involvement could be infrequent and trivial. In other cases, the involvement is a central part of the influential's job. Several of these individuals are required by law

to include seismic safety on their agenda. For example, as a result of 1971 legislation, each city and county in California is mandated to incorporate seismic safety elements into its general plan.⁷ This law essentially requires local agencies to identify all geologic hazards within their boundaries. According to one of the respondents in the Planning Department of San Francisco:

When seismic safety elements were required to be added to the general plan...we developed a map called the Special Geologic Study Area. [This map] delineates areas within the city that are potentially subject to seismic disturbance. Any proposal for construction within one of those special geologic study areas starts off a special review process in this office.

In addition to its effect on planners, the impact of seismic safety legislation has also been felt by realtors. The realtor must obtain copies of the appropriate elements of the general plan of the city or county in which a property is situated.⁸ "If the property is within a zone which has been identified as geologically hazardous... this information should be disclosed to the potential buyer of the land if it is material to the transaction."⁹ It is not necessary for the buyer to inquire about potential geologic hazards in order to create the need for disclosure.¹⁰ Thus, according to one real estate broker, the subject of earthquakes comes up, "any time you're talking with an owner of property or a prospective owner."

Apart from legal considerations, other interests require the attention of the respondents to the potential impact of earthquakes. Bankers, for example, deal with earthquakes in their appraisals of property:

⁷ California Government Code, Section 65302.

⁸ Dugald Gillies and Jack Shelby, Disclosure of Geologic Hazards (Los Angeles: California Association of Realtors, 1977), p. 30.

⁹ Ibid., p. 32.

¹⁰ Ibid., p. 33.

When we appraise property, if we feel the property we're appraising is prone to damage by earthquake because of the type of construction, brick buildings, for example, then we have to include it in our report. We would recommend earthquake insurance and possibly an inspection by engineers--some sort of report by engineers attesting to the soundness of the structure.

A museum official stated that he has to deal with earthquakes "all the time". Earthquakes are taken into consideration "in terms of the way we design our storage facilities for the art work and how we install our exhibitions, both temporary and permanent". An officer and manager of a large complex of retail shops and restaurants is involved with earthquakes:

We're a public facility; therefore, we have to be conscious that if something major occurred in this area, we're going to have to respond to that emergency. We're going to have to evacuate tenants, patrons. We have earthquake procedures, fire procedures. Our staff is kept up to date on this.

An author of numerous environmental publications is currently concerned with the seismic safety factor as it relates to the siting of dams and nuclear power plants; and an officer of a public interest group often responds to questions people have about what they should do to reduce their vulnerability in the event of an earthquake:

Every once in a while there's a scare in the media about (earthquakes), but people aren't really trained to know exactly what to do. It's something that you have to remind them to think about, because there is nothing quite as panicky as an earthquake. People, at least if they have enough knowledge, even in the face of hysteria, they'll know what to do.

For many of the respondents the extent of their involvement with earthquakes is incidental to their occupations. Many of these individuals regularly represent their government departments or private organizations on emergency planning or earthquake advisory committees, or they are spokesmen for their special interests at various state and local hearings on seismic safety issues.

A few of the respondents have only rare occasions where they are required to deal with earthquakes, such as those faced by an official of the tourist industry, to whom earthquakes are "kiddingly mentioned by travel agencies".

Over one-third (36 percent) of the respondents indicated that they did not deal with earthquakes in their jobs. This group includes members of hotel and apartment house associations, representatives of tenant interests, spokesmen for neighborhood merchants; and officers of businessmen federations. Although these influentials did not perceive the impact of earthquakes in their jobs, their interests are likely to be affected by a policy aimed at abating hazardous buildings.

Recent Earthquake Experience

Certainly experiencing a major earthquake would be a factor in the development of hazard awareness and, indeed, several of the respondents voluntarily mentioned actually experiencing an earthquake apart from the mild tremors that are occasionally felt in San Francisco.

During the Bakersfield quake of 1952 an apartment house industry official happened to be in Santa Maria (over 100 miles from the epicenter): "I drove up and stayed in one of those new motels... And believe it or not, I was right careful about it; I stood in the doorway...I really knew it was an earthquake!" This earthquake was also felt by a civil engineer who at the time was working with a railroad's field survey crew:

I was deeply involved personally with the Tehachapi earthquake. [The railroad has] a number of tunnels in the area and the fault line ran through these tunnels. These tunnels suffered immense damage and, of course, stopped railroad operation at the time. It took us twenty-nine days to

restore that line. We experienced some 300 aftershocks in a thirty-day period. Needless to say, I am sensitive to earthquakes.

Several respondents experienced the 1957 San Francisco-Daly City earthquake. One Board of Supervisors aide was working in one of the financial district's high-rise buildings at the time, and recalled glancing out the window and viewing the sway of the towering buildings. Another respondent and member of a tenants association recalled: "I was working on the ninth floor of the Mark Hopkins Hotel when the building began to shake." When she returned home to "one of the oldest public housing buildings in the city," she found, "the walls cracked all the way across." Her co-worker, who had been eight years old in April of 1906, had been particularly upset. A finance officer, employed by the city, also remembers the 1957 quake: "I looked out the window and the City Hall was moving around like a big barge."

Earthquake Experience: Memories of 1906

For the most part, the earthquake experience of the respondents is, at best, secondhand. For many of these individuals, tales of the 1906 earthquake are a source of hazard awareness. For example, an emergency services official related:

My mother and father were living here in the 1906 earthquake. Over the years I've heard many stories about that earthquake. My own personal view is if we had an earthquake that is 8.3 on the scale, it would be very devastating. Everything would be disrupted. I do mean everything--completely disrupted. Definitely affects all utilities; damages a great number of buildings; reservoir flooding, fire, many casualties. It will be an exceedingly bad situation.

Many memories of 1906 still focus on the fire. As one structural engineer observed: "You talk to any of the old-timers; they don't talk about the earthquake; they talk about the fire. And the propaganda

then was--we had a helluva bad fire." Several of the respondents adopt the views of these "old-timers". A representative comment was made by a real estate board spokesman: "The 1906 business was more fire than earthquake." These respondents do not believe that San Francisco would experience the "conflagration of 1906 because, as a city civil engineer points out: "The Fire Department has cisterns all around the city."

However, these reservoirs of water are not all around the city; and despite the fact that San Francisco has good fire protection, a museum official questions "whether or not the Fire Department will be able to respond" in the event of a major earthquake. This concern is not without cause. Several officials in the emergency services departments of the city believe that fire is still a hazard and that the possibility is greater now than it was in 1906 that there will be a major fire following an earthquake. As one of these officials pointed out: "We did have building density then, but nothing like what it is now. It's not very likely that gas service would be shut off in time to prevent fires." In the highly congested areas of the city, "streets may be inaccessible to fire equipment due to buildings collapsing". In the residential areas, "we have wall-to-wall wood-frame buildings; (with few exceptions), every one of these buildings has at least one car in the garage with a tank of gasoline". Thus, for many respondents, including a merchants association official, "the same dangers sit around today so that the city could be leveled".

Knowledge of the Hazard

Besides jobs and experience, knowledge about the probable consequences of earthquakes also affects awareness. When the respondents

were asked to identify the important hazards associated with earthquakes, virtually all of these individuals directed their responses to the consequences of a major earthquake even though we did not specify magnitude nor intensity in our question. For example, an economist replied: "In any major earthquake there is going to be considerable damage to property and consequently to people;" and a neighborhood association official mentioned "buildings falling down on people's heads; fire and explosion".

In addition, many of the respondents commented on the probable effects of a major earthquake on their own community. For these individuals the hazards are not at all remote, but rather they are seen to be a product of their immediate environment. A member of a regional conservation group pointed out the soil characteristics of this environment:

We have a very high seismicity--a couple of very important faults that are capable of generating very large earthquakes with very severe motions. We have very soft mud soils, saturated with water. When development consists of dry solid fill on top of the soft mud, you end up with foundation conditions that are quite different from what might be on dry land.

An emergency services official identified some of the hazards associated with these environmental and man-made conditions: "I would say that perhaps liquifaction and ground collapse, the unstable ground areas, would probably be one of our greatest hazards." Several of the laymen are also aware of these conditions. For example a community representative discussed the inherent dangers in his area:

For Chinatown we understand that this is mostly land fill. In the event of an earthquake one of the major sources of damage and loss of life will be due to collapsing buildings--whether they are new or old buildings. Probably more so with old buildings because they are made out of bricks. A lot of these brick buildings are subject to total collapse.

In addition, the density of the buildings compacted in fifty square miles is seen as a factor contributing to the hazard. As another emergency official pointed out: "Here an earthquake would affect the total city", and a board of supervisors aide observed that: "The hazards in San Francisco are so obvious. You have so many buildings crowded into such a small area, falling objects are probably the greatest concern."

For a tenant association member, the height of buildings is another source of hazard: "You know, you ride over the bridge and see all those tall buildings in San Francisco. They look like chessmen on a board, and you say: 'I sure hope I'm not in one of those buildings when the ground starts shaking.'" The danger of falling glass from these high-rise buildings is one of the major concerns of a consumer advocate, who predicts that "the scope of a disaster here could be monumental; thousands of people could be killed or injured just from falling glass". This hazard was also mentioned by an emergency services official: "We hope there's not a lot of glass that flies out of the high-rise buildings during a shake. We do know that glass from that height will kite if it's broken and will travel three or four, maybe five, blocks. It will kite down and cut people's hands off."

Consistent Priorities

It is clear that the earthquake influentials have an awareness of the hazard, and that it is often based on something more than watching old earthquake movies on television, but this does not mean that they necessarily share a common definition of what to do. If, for example, a program could be devised to increase the safety of buildings from the hazards of earthquakes, it would still be necessary to determine which

buildings to start with. Although the respondents have various notions about the vulnerable structures, these notions are quite consistent from one group of influentials to another.

This consistency is evident from Table 3. Taking the total sample as illustrative of the ordering of priorities, it can be seen that the first 67 percent of the respondents focus on various structural considerations, such as age of buildings, construction materials and building height. Then 52 percent indicate their concern for buildings with high occupancy. Critical facilities come next (such as those that must be operative in the event of a disaster) and are mentioned by 26 percent of the influentials. Only 17 percent indicate that buildings housing vulnerable populations (schools, orphanages, etc.) should be considered. Undoubtedly, this latter area is relatively ignored because of the Field Act in the State of California, which requires that all school facilities meet seismic safety standards. Only a few respondents mention location. Those who do often relate this factor with other concerns. For example, an emergency services official stated: "The San Francisco Planning Commission has maps that show what parts of our city would be subject to the heaviest earth movements and what parts of the city have precode buildings. It's obvious that's the place to start."

With the exception of influentials from government, the highest number of responses across all groups focuses on structure and building construction. This factor is viewed as a priority item for several reasons. For example, according to a civil engineer: "This would be strictly a structural question. It would be multi-story buildings that do not have a steel frame or are not composed of reinforced concrete,

TABLE 3

EARTHQUAKE INFLUENTIALS
HAVE CONSISTENT PRIORITIES

<u>Priorities</u>	<u>Government</u> No. %	<u>Private</u>			<u>Expert</u> No. %	<u>Layman</u> No. %	<u>Total</u> No. %
		<u>Business</u> No. %	<u>Community</u> No. %	<u>Total</u> No. %			
Which buildings should we start with? ^a							
Structural considerations	13 52	43 77	10 59	53 73	20 91	46 61	66 67
High occupancy	14 56	28 50	9 53	37 51	14 64	37 49	51 52
Critical facilities	8 32	13 23	4 24	17 23	5 23	20 26	25 26
Vulnerable populations	5 20	7 13	5 29	12 16	4 18	13 17	17 17
Location	3 12	4 7	1 6	5 7	3 14	5 7	8 8

^a Multiple responses possible.

Source: Question 4. See Appendix B.

and this would tend to be primarily an old-style brick building." An architect holds a similar view: "Unreinforced brick is, of course, the most dangerous material because it has no lateral strength." Many of the earthquake influentials are concerned about the quality of construction in various areas of the city. An insurance company executive, for example, expressed his concern about Chinatown:

I don't think the one-family dwelling is really the target. Rather, the multi-family, old structures, which are built with antiquated design. Mortar of lime-type which deteriorates; the kind of structures that are brittle and have no resiliency. The biggest example probably is Chinatown.

Then there is the structural engineer who feels that: "In San Francisco the worst residential area is the so-called tenderloin district--mostly Type C buildings. They are built mostly in the twenties, prior to any seismic code."¹¹ Some of these precode Type C buildings, according to an emergency services official, "have brick running up the walls, no reinforcement, generally four or five stories. They're real 'flop-house' hotels."

A few individuals are concerned with the height of buildings in San Francisco. "You have to consider tall buildings," replied a real estate board spokesman, "because obviously they can do more damage in case of an earthquake." And, of course, the parapets, as was noted by an electrical contractors' association executive, are still considered a factor despite the city's attempts to abate this hazard: "All those parapets that overhang on buildings--knocking those off will eliminate the hazard of their dropping on people."

¹¹"Precode, Type C buildings can be generally defined as those buildings constructed before 1948 that have masonry or concrete exterior bearing walls with wood floor and wood roof construction." This definition is from: City and County of San Francisco, Department of City Planning, Community Safety: A Proposal for Citizen Review, July, 1974, p. 19.

For the most part, the respondents have a complex view of the problem, as demonstrated by one engineer, a member of a regional conservation agency, who is concerned about structure and occupancy: "In San Francisco there are a lot of old buildings predating the Long Beach earthquake, some of which have been weakened severely because of sediment, modified uses, and minor earthquakes that have occurred. Some of them are of fairly high occupancy. I think that's probably where we should be starting." A community representative also believes that "the priorities will have to be based on many variables...not even looking at the physical structure, but saying where are the people, and at what time". And then there are those who are concerned about economic implications. A real estate management association executive stated: "We have an economic base to protect," and he asked: "What types of businesses are more important to the economy of our area? What types of organizations are considered to be the most important to our well-being?" A spokesman for a regional group with business interests suggested that:

In principle, priority would have to lie with buildings that get the greatest use. Or the buildings that are proximate to the heaviest traffic load--high-rise buildings next to a street that's heavily traveled. I would do it based on the quantification of the amount and frequency of use.

A city planner pointed out that "priority has to do with the level of risk acceptable to the public":

If you based it on some level based upon use and importance to the general public, the first buildings would have to be those which are vital immediately after the disaster, as hospitals. Critical community facilities, not just emergency services. Second, right after those, you would have to consider density of population. High concentrations of residential buildings made of unreinforced masonry--San Francisco's old hotels, brick hotels, like in the tenderloin district, which are essentially elderly housing in the city and have some of the densest population in the city.

From these various shades of opinion on priorities, it should be clear that the public is not a monolith with a single preference or complete agreement on which buildings should be fixed first. What saves the situation is that the ordering of priorities within a group is quite consistent for all the groups of influentials.

A Link to Action

Awareness of hazards from earthquakes is obviously a necessary condition for action. From a coding of the interviews it is clear that the more the influentials are aware of the hazard, the more likely it is that they will be supportive of a possible hazard reduction program. Even if there is skepticism about the numbers in Table 4, at least the direction is consistent with this generalization. With awareness of the hazard can come the motivation and will to do something. Without it, it is ridiculous to talk about incentive programs; people will not accept these programs without believing that there is a need for them. Incentives work best when the donkey is hungry and wants to eat the carrot. Now it is true that a large number of the earthquake influentials are aware of the hazard and have some basis for that awareness. What is troubling is that the percentages for the experts and governmental influentials drop by no small amount from those for the private sector and laymen. This may be just an artifact of the coding, but it may also indicate that the experts have not done an adequate job of making the other influentials aware of the hazards in San Francisco. A counterweight to the lack of awareness is the fairly consistent ordering of priorities from one group of influentials to another. While there will always be some who would argue that a hotel should be fixed before a hospital, in general if those who are aware of the hazard can convince

TABLE 4

INFLUENTIALS WITH HIGH AWARENESS OF HAZARD ARE
MORE LIKELY TO SUPPORT
HAZARD REDUCTION PROGRAM

<u>Response to Program</u>	Earthquake Hazard Awareness					
	<u>High</u>		<u>Moderate</u>		<u>Low</u>	
	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>
Support	28	54	5	19	0	0
Neutral	15	29	10	37	6	32
Oppose	<u>9</u>	<u>17</u>	<u>12</u>	<u>44</u>	<u>13</u>	<u>68</u>
Totals	52	100	27	100	19	100

those who are not that the hazard exists, then, at least, they will agree on priorities. The possibility of such convincing increasing the general level of awareness among the private sector argues for considering some form of informational incentives.

INCENTIVES

Because the problem of abating the earthquake hazard for existing buildings is costly, the notion of using economic incentives to encourage property owners is a commonplace policy suggestion. If property owners have little self-interest in fixing their buildings, then one obviously moves to make it worthwhile for them to do so. Government in the past

has attempted to do just that. There have been a number of state and federal programs which have concerned themselves with the repair of existing buildings. There was, for example, the Federal Assisted Code Enforcement (FACE) program which provided 3 percent loans to bring designated areas up to code.¹² When this federal program was changed in the early 1970s, the California state government passed the Marks/Foran Act, which enabled local government agencies to sell revenue bonds and to make loans to residential property owners so that their buildings could be brought up to code. A related and recent state act is the Marks Historical Rehabilitation Act of 1976, which became effective in January, 1977, and which aims at preserving ornamentation and restoring buildings of historic importance. Local legislation is currently being drafted in San Francisco to implement this state act.

Now some of these previous programs did not directly focus on the issue of safety, but it is clear that in the process of bringing a neighborhood up to code or preserving an important and beautiful building, safety is also enhanced. Thus it is reasonable to think in terms of economic incentives. But given the state of awareness among our

¹²Generally the U.S. Department of Housing and Urban Development has continued to provide loans and block grants for community development and rehabilitation of neighborhoods. While a great deal of this financial assistance has been for residential property, under Section 312 of the Housing Act of 1964 (as amended) loans have also been made available to commercial property owners. For example, \$50,000 loans were made available to restore some historic brick buildings in Sacramento. This amount, as one informant put it, "was not enough to get out of the basement." Although the federal government put a limit of \$50,000 on these loans, its participation did make it easier for property owners to secure loans from local banks which could cover the extensive costs (e.g. \$250,000) of rehabilitation. See U.S. Department of Housing and Urban Development, Programs of HUD, March, 1977, and Digest of Insurable Loans: A HUD Handbook, 4000.1, September, 1975.

earthquake influentials, it does not make much sense to restrict our attention solely to economic incentives. Some attention should also be paid to informational programs and to the use of legal action and enforcement. Although some of our respondents themselves recognize the importance of going beyond economic incentives, for example, with the suggestion of using "the carrot and the stick," economic incentives are still dominant in their thinking, as is apparent in Table 5.

The responses of the influentials are to an open, general question on incentives. Even so, 45 percent of those interviewed suggested some kind of financial inducement for property owners to fix their buildings.

For example, a merchant stated:

Owners need an incentive...Obviously, when you make an investment, it takes away from the profitability of an enterprise. Don't think there's a property owner from an investment standpoint that isn't going to make some periodic improvement on his property when he sees that there are benefits and he has the availability of depreciation that will enhance the value of his property. Incentives would have to be developed that make it as attractive as possible to do a renovation like that...that has no other direct benefit.

And a property manager restated the same theme: "The basic reasons and objectives of an owner is reasonable profit on investment...The only way of motivating a building owner is to reflect some advantages to him financially." But it is not just businessmen who feel this way; people in government have the same view. For example, a city planner observed: "I think there is only one solution...it has to be an economic one. In some fashion you have to give people tax or financial advantages.

However, many influentials in the private sector voice suspicion and resistance to government involvement in the managing of private property, clearly reflecting the time-honored tenet of laissez-faire

TABLE 5

EARTHQUAKE INFLUENTIALS FAVOR
ECONOMIC INCENTIVES

<u>First Impression of Incentive</u>	<u>Number</u>	<u>Percent</u>
Economic	44	45
Economic and information	13	13
Economic and legal (carrot and stick)	10	10
Information	9	9
Legal	7	7
"Nothing"	6	6
Don't know	6	6
No answer	3	3
Totals	98	99*

*Percent does not total 100 because of rounding.

Source: Question 5. See Appendix B.

capitalism--the distrust of government intrusion into private enterprise. A utility representative, for example, stated: "I'm sort of against subsidizing. Every time you subsidize, it seems to me there is a hook in it. If the government is going to help pay for something, they expect something in return, and they want to dictate the terms." A downtown spokesman declared, reaffirming this suspicion of government:

If you say to them [property owners] we have a renovation program for your area, the government's going to give you funds for renovating, and at the same time we will give you matching funds for seismic safety...they won't accept it. It means nothing to them to be required to fix up the property to seismic standards. No matter in what language you couch it, they will be suspicious and will refuse it.

In short, government and its money are not to be trusted. "Every time property owners deal with government," according to one businessman, "they are given certain assurances, certain standards, and none of them hold."

Earthquake influentials generally consider a program of information by itself to be ineffective. In response to the general question on incentives, only 9 percent of the total sample suggested such a proposal. For these influentials, information evidently is great because it is cheap as one building inspector suggested: "Information is great... then people could do it. You've made progress. And it doesn't cost you that much."

Yet for many, information is not so great because it will not work as an insurance broker made clear: "Who would get 'em to read it? Who would read it to them? Unless it's something very close to you, you're not going to bother about it." A city administrator believes people will read but that an informational program will still not work: "You might tell people what's happening; but I think in the long run, it

would not be effective. People know--they've been around; they see; they read. It wouldn't help to raise their consciousness."

Evidently, information and knowledge by themselves are not sufficient incentives to counter the economic motives of property owners. For example, a bank vice-president in an appraisal department stated:

I don't think information would be effective. The reason is the kind of buildings you're talking about are income-producing property...not just used by an owner like a home but normally owned for profit. He wants a return on his investment. And you won't find him voluntarily doing that if it'll cut down on his return. If you force them into doing it, then it's almost like confiscation. You're telling him: "You must take a loss on this building."

Instead, economic incentives and informational programs have to be used together if one can judge by the responses of the influentials who want to be told what they should do to their buildings. As one apartment owner observed:

Capital is needed to defray the costs that a property owner must bear. He certainly cannot hold on to the building otherwise. It would probably be a good idea to let him know what he's got to do and the methods available for getting it done.

A building contractor added:

Anyone who owns an investment property will first want to know what he is expected to do to the structure. Following that, an easy and low-cost method to provide funding must be made available. These two features together might work.

In response to the general question on incentives, only 7 percent think it is appropriate to utilize the law to compel property owners to retrofit their buildings. It seems likely that government influentials are more apt to suggest some sort of legal device or sanction than those in the private sector, but the numbers in each category are too small to substantiate this conjecture. Here is how a city planner put the case for legal action:

Yes, we should use legal action to force owners to fix their buildings. They have taken on a certain responsibility in being a landlord, certainly to a multi-unit building. I have a harder time in single-family homes, to say to a person he can or can't do this or that. He's taking the risk himself. But with multiple dwellings, the responsibility really falls on the owner. The other people can't do the work, nor are they allowed to. Seems like the building code is something that should be considered retroactive.

In contrast, an insurance spokesman stated:

I don't think legal action will force anybody to do anything. Even if it does, it shouldn't be done. Obviously, they will be doing it against their will and they'd find a million ways to circumvent that law.

A merchant added:

The government cannot just come down from Olympus and start telling me to shell out sizable amounts of capital because there might be an earthquake.

Having seen the dominance of economic incentives in the initial responses of the influentials, let us now turn to some of the specific economic, informational, and legal actions which influentials might support or oppose.

Economic Incentive: Use of Property Tax

Of all the incentives discussed by earthquake influentials in San Francisco, property tax relief is the most salient. With some variations, a property tax program would reward a property owner with a tax deduction for fixing his buildings to appropriate seismic standards. Several features of the present local revenue system, however, work counter to its use for earthquake hazard abatement. As of now, for example, a property owner is likely to resist making abatement improvements because his assessment will increase. As a realtor put it: "You're going to have to do something to give the owner a tax relief...Once he does this to his home, it will be reassessed for a higher tax...That's

why a lot of them are not getting remodeled--because it's taxable to the owner."

But suppose local governments were allowed to give property owners a break on their assessments. What then? Without some outside financial help from the state, such a local government would have to raise its tax rates. With its higher tax rate, that local government might turn away large industry and commercial investment to jurisdictions with lower rates and perhaps fewer seismic hazards. Moreover, property tax is not a popular tax and there is much talk about reform, by which is meant relief. Citizens, in general, would not want to support a program that might increase their property tax burden. According to a recent poll conducted by the Field Institute, a high proportion of the public (63 percent statewide) believe that property taxes should be reduced first if any tax reduction is considered. The Field poll reports that public tolerance of this tax is at its breaking point.¹³ Therefore, any tinkering with property tax for seismic safety purposes implies considerable state or federal financial assistance.

Since the property tax incentive has high interest, it is important to understand the nature of its support. Both government and private-sector influentials seem predisposed to using the property tax. But the responses as expected are quite uneven and qualified. Some responses from the private-sector influentials demonstrate little awareness of the constraints involved in manipulating the property tax base, as: "Everybody is property conscious now...that would get their attention.

¹³Mervin D. Field, "Property Taxes are No. 1 Gripe in Poll," San Francisco Chronicle, Sept. 30, 1977, p. 12.

Good idea!" Other private-sector influentials provided strong critiques about shifting local tax bases: "I think it's just a plain old arithmetic game...If the cost is still prohibitive with incentives, your incentive is lost. And if you say you're going to give me \$100,000; then I say you're going to bankrupt my government! The political mandate to spend that kind of money isn't there."

The influentials also suggested several methods for using the property tax. These include temporary moratoria on the tax, lower assessments on the seismic safety work done, and using rebates with percentage deductions over time. The underlying idea is to make building rehabilitation for earthquake hazard abatement as economically palatable as possible. A businessman commented:

I think property owners need an incentive. Obviously, when you make an investment, it takes away from the profitability of an enterprise. Don't think there's any property owner from an investment standpoint...the old prudent man...that isn't going to make some periodic improvement on his property when he sees that there are benefits and that he has availability of depreciation that will enhance the value of his property or make it more efficient. So incentives would have to be developed that make it attractive to do a superficial renovation...that has no direct benefit.

This same businessman continued: "I think that the property tax would be a big incentive; I really do. That's one of the biggest bites in running a business."

Yet knowledgeable respondents are also suspicious of using the property tax. They want to know how it will work and what the consequences are likely to be. A realtor asked, for example:

If financing is available--the big "if"--and I'm assuming it is, obviously, we'd have to have specifications established. What things are required? If this becomes legislation, which it's going to be, who does the inspection? How is it done? To what degree is compliance going to be required? Who inspects the final work? Who, indeed, establishes the specifications?

A similar concern about the problem of administering such a program was expressed by one business leader:

The question is: Will it work? I'd tell you, yes, on one end; and, no, on the other. Now, I'm a practical guy. The local assessor will pay no attention to that. He has another goal and another problem that does not relate to seismic safety in any shape or form. So it doesn't work in practice; it works in theory.

Other responses were concerned about the possibility of decreased municipal services creating a less attractive environment for commercial interests. A housing executive, for example, stated:

We always talk about the property tax and that incentives should be made available to reduce taxes or defer taxes. In the long run and immediately when you start talking about lowering people's tax rates, the very first thing that happens is that services that are needed in communities are left wanting because cities don't have the option of saying, well, our tax revenues are down as a result of tax exemptions.

Some voiced strong opposition against the use of the property tax:

"That would work, or at least encourage some owners; but it's a waste... It'll ruin our tax base; and for what? Something so far down the line!" These comments reflect some of the concerns of businessmen in San Francisco and they also represent possible sources of resistance or erosion of support for using the property tax as an incentive.

On examining the responses from influentials in the public sector, one finds about the same support for using the property tax incentive as one finds in the private sector; but it is also heavily qualified. Concern over where these monies would be diverted from was a constant focus of the discussions. Moreover, one notices the additional attitude that public funds not be used to better commercial enterprise, as expressed, for example, by a planning executive: "Using the property tax would be more appropriate, I would think, in a private residential

section. It seems to me that property tax for a corporation is passed on to the consumer..." In addition, an awareness of the difficulties with manipulating the property tax was obvious among those public influentials. A major change of property tax procedures would require state action--it is not a matter of local government deciding it wants a change. State involvement then adds considerable complexity to the idea. Would all Californians want San Francisco or their own communities to play with the property tax? Where would the money come from?

Public officials voiced concern over manipulating tax laws, as they fear changes to be permanent, institutionalized, and discriminatory. One official, involved with economic development, remarked:

For one thing, a tax on property consists of two portions-- a tax on land and a tax on improvements. And they're not really separated that well...It is incorrect to argue that giving some kind of tax reduction benefits will change the use of that land in any way. Because those taxes are capitalizing the value of the land...You know you'll have to pay an annual payment in taxes related to that land. Tax on improvements is a little bit different...If the taxes on improvements become too high, it will be difficult to supply future improvements at a construction cost plus taxes that will offset the demand for those facilities. The taxes will reduce the supply of improvements. So you can talk about...you know, making adjustments to property taxes on the basis of improvements, but our tax laws are such that the division between land and improvements is not done well. That's one reason. Another reason is tax credits often become a permanent institutionalized thing in the tax structure, for temporary kinds of problems.

Thus it seems that it is knowledge about taxes rather than earthquakes that influences opinions on the use of the property tax. Consider this statement from a city planner: "It could probably be done through tax assessment if there were a written or unwritten law that when you did something to preserve an old building, your assessment didn't go sky high." It is likely that such a person would initially

support the use of the property tax as an incentive, but one wonders what would happen to his support once other influentials with tax expertise talked with him about the problems associated with making these assessment adjustments. There is, however, no doubt that property tax mechanisms can be a powerful tool for encouraging the remodeling of buildings to present seismic standards. Supporters of using the property tax argue that they need financial assistance and this incentive can ease the pain of the high costs involved. Opponents of the property tax ask the nagging question: Where does this money come from and who is paying for what? Although there is considerable support for using the property tax from the earthquake influentials, such support is likely to wither away once the complexities of implementing its use are faced.

Economic Incentive: Low-interest Loans

The introduction of a low-interest loan program to encourage property owners to rehabilitate their buildings in order to increase their seismic safety receives considerable support from the earthquake influentials. Future funding utilizing low-cost loans was often discussed throughout the interviews in terms of past and present programs. Federal Housing Administration (FHA) loans and the Federal Assisted Code Enforcement (FACE) program, for example, provided models of possible financial mechanisms for influentials to examine. The underlying notion was that seismic standards could be included along with other programs of code enforcement, or at least prior efforts such as the FACE program were a precedent for federal subsidy or perhaps state assistance. A city administrator, for example, suggested:

I think one good way, from what we've seen in San Francisco with the FACE program, which is a program for residential

modernization, is to provide low-cost loans. Low-cost loans are a very equal device to get people to make improvements, and I think that there are hazards to the public, so we should give some real financial incentive--low-cost loans are one means.

And a planner advised:

The best thing would be similar to the rehabilitation assistance programs done in other cities and San Francisco where you map, you designate an area of the city as having code enforcement requiring every building in that area to come up to code, saying that access to the low-interest loan is voluntary. Some people may want to do it with their own money. But it would be better to systematically go through the area rather than having a voluntary program-- I just can't see a voluntary program working sufficiently.

Many of the influentials have specific knowledge of and experience with the administration of such loans from prior programs. As a result, they are concerned about the administration. For example, a merchant advised: "One of the problems with a program like that is getting the work out. So damn many government loan programs available at low interest--so few people know about them. A lot of the money goes unclaimed." Most of those influentials who support the use of low-interest loans do so with the idea that external sources of revenue can be tapped. As in many public construction projects, some combination of cost-sharing mechanisms among city, state and federal governments could be developed as a loan package similar to small business loans now available to merchants. A city official stated:

In many cases there are all different kinds of loan programs. The Small Business Administration has small loans, some of which are funded totally by the government; some are guaranteed by the government, Others use loan packaging, where a portion of it comes from the private source, and a portion comes from local sources. So you can develop a loan program that has all those aspects in it.

One central problem which usually came up in the discussion of loans is the uncertainty over the possible costs of rehabilitation and the size

of loans required to meet these costs. A city planner commenting on identifying the hazard in San Francisco's plan expressed his concern for costs indirectly:

One of the things...is a mapping of the location in the city of buildings that are pre-seismic code. The number of buildings is unbelievable. It's one of the provisions that the city has really not done anything about because the number of buildings is so great; there are no resources with the program at that magnitude. Politically it's a very touchy question...where do you start?

Another city official is more direct in his concern: "We can't very well talk about what we can undertake unless we know how much it's going to cost."

Uncertainty over costs and the impression that abating earthquake hazards would involve astronomical costs encourages the influentials to adopt a long-term perspective with respect to low-interest loans. Many cautioned that a necessary feature of any loan program would involve a long-term repayment period so as not to create additional financial burdens on owners. A commercial property spokesman added: "The only way you can do it would be a long-term idea. In other words, allow the money on a low rate of interest. Because to borrow money-- building today is almost prohibitive." Another long-term perspective expressed by the influentials but not related to costs is that whether buildings were "tested" in a future earthquake, or not, is not ultimately crucial because a loan program would nevertheless promote stronger and safer buildings in San Francisco.

Generally, earthquake influentials in the private sector, while voicing support for the availability of low-interest loans, do so with caution. This group, as one expects, articulates the interests and

concerns of the businessman. Specifically, they focus on capital gains and protection of profit margins. This concern is demonstrated by apprehension regarding any activity that would mean an increase in operating costs and would result in the realization of lower profits. A business community representative stated: "The property owner says, 'If I have to put out so much money and it doesn't show in income, and I cannot amortize it, I don't want to do it!' And it would be the same with any seismic safety--no added income by fixing it up to seismic standards." And a real estate manager added: "As far as I'm concerned, if you can work up some kind of formula whereby the owners of the building can get a fairly decent return on their investment, I think it would be feasible."

Private-sector influentials, particularly those concerned with real estate management, would not be encouraged solely by low-cost loans to rehabilitate their buildings. A property manager asserted: "[The owner] still has to pay back the loan. It doesn't help any. Even with a no-interest loan, it would still not be enough. It's probably not going to be any more marketable, and it's not going to get any more tenants...not be able to raise rents to pay that off...I'm just guessing at the economics--that the costs you'd have to spend could not possibly be recaptured in the consumer market." Another real estate representative has similar sentiments: "It's important to keep in mind that where you're involved with investments, the monies that are used to do certain things to a building are done so with a view to receiving a return on the investment. It's doubtful that revising a building's structure for earthquake protection yields any additional income."

Influentials from both government and business who support a low-interest loan program also feel that such a program needs to be closely regulated so it can be easily evaluated and held accountable to the taxpayer. This concern for accountability points to a program in which those supervising the loan would have knowledge of what funds are going out and coming in. A city official stated:

Any kind of subsidizing of programs...I think should be done on a direct basis, not on an indirect taxation basis. It can be done...through subsidized loans--low-cost loans, at lower interest rates, lower terms, below market-rate loans. Then you have a way of evaluating the effectiveness of your program. Because any time you're putting money into that kind of plan, you know exactly how much money is going into that program. How much is it costing the public. What are your results.

And he continued:

You deal with it directly as a direct loan in earthquake kinds of improvements. You can set up a certain fund, do it on a subsidized loan basis, and you know exactly how much is going out to be used for that purpose. You know what it's costing you because you know what the market-rate loans can be, how much the government is subsidizing it for. Therefore, you can determine how much earthquake-proofing was done, how much public cost was involved, and you can evaluate your program.

This attitude reflects a suspicion that these low-cost loans could result in a boondoggle and fraud. "It's hard to determine where structural reinforcement ends and cosmetic renovation begins."

An additional concern that private-sector influentials, particularly, offer is that seismic rehabilitation, once completed, goes unseen. Such work and resulting loans increase an owner's operating costs without possibly any increase in revenues. A manufacturer therefore commented on the need to share these costs:

He has a social obligation to maintain his building to seismic standards; the society should help with the cost of such improvements. We must be careful that the costs of

these improvements don't fall only on the shoulders of the property owner and that the means will exist to spread the expense over several groups.

On what basis can such improvements or should such improvements be passed on to the tenant? And can the tenant population in San Francisco assume such costs? These are questions of high salience to the business community.

Private sector influentials maintain, however, that if a mandate exists to compel owners to rehabilitate their properties up to present seismic standards, they will require financial assistance. In their view, present low-interest loan programs administered by the government are mainly directed at residential property owners or small business. Those influentials representing large commercial interests assert that they will need relief to mitigate the expense of abating earthquake hazards, and they perceive that a low-interest loan program is probably the least objectionable financial mechanism to accomplish this.

In summary, some form of low-interest loan program seems a good prospect. It has support from most of the groups which are represented by these earthquake influentials. There are close precedents from both prior and existing federal and state programs. It is clear, however, that the availability of such loans by themselves would not be a sufficient incentive. There does not seem, at least to spokesmen of the private sector, to be much visible "credit" in making buildings safe. In any event, a low-interest loan program would have to be designed so that it truly acts as an incentive and does not disturb the profit picture of business and commercial interests. To do so could involve a long-term repayment schedule. Moreover, it would have to be closely regulated and accountable so that loans are made for appropriate

purposes. Finally, much more information on costs for the individual property owner and the city as a whole will have to be available before the feasibility and necessity of such a program becomes apparent.

Informational Incentive: The Importance of Technical Data

Specific questioning about informational incentives indicated that some respondents feel that seismic information as incentive would probably be "a waste of time," but an encouraging sixty-one (62 percent) influentials, expert and laymen from the private sector and government, feel that some type of informational program would be appropriate. They are particularly interested in reliable technical information. There is a great deal of interest especially in costs: for example, a contractor said: "If I was a building owner, I'd want to know what I could do and what it would cost me." And a representative of a community planning association feels that property owners could use "a directory of services that they can investigate for help in analyzing, the exact costs and the exact conditions of the building".

Scientists and engineers working in the area of seismic safety probably feel that they have already made considerable effort to communicate technical information; but for at least some property owners the message has not been received, as is evident from this comment by a property association executive: "What's truly needed in this area is harder information about what is to be done. The professionals differ greatly, so how is a businessman going to put out capital on shoddy information." An engineer working for the city pointed out some of the technical data which would be useful for the property owner to have: "Type of building--what are the general deficiencies? What is the

effect in time of an earthquake? What might happen? What generally the costs might be." Besides information on the structural safety of a building, a city planner asserted the need for geological information: "I think it's important that people generally recognize that they ought to have a little bit of geologic information; that it doesn't require a perceptible earthquake to cause problems at some sites. A tremor or a wet winter is enough to cause a geologic problem."

The earthquake influentials have different notions about the audience for information. For some, such as one movie theater owner, information should be directed to large numbers of citizens: "There's got to be a much broader education program than just property owners... something where the public at large are aware of the problems and want something done about them." Others do not agree and feel that "people are a lot more informed right now than they have been in the past". Or as an aide to an elected official put it: "I think most Californians are pretty aware of the dangers of living in earthquake country." For some, the main target for information is not the general public but the professionals who advise property owners. A soils engineer feels that information should be directed to engineers who need to increase their competence: "In the Bay Area, a sure-fire way to fill a lecture hall is to have a discussion on earthquakes--engineers would come out of the woodwork to attend that. Even so, there are probably thousands of engineers who don't know as much about it as they should--they don't know the weaknesses in the code."

Besides different notions of audience, the earthquake influentials also have different tactics for how to reach that audience. With respect to informational programs for property owners and the general public,

two tactics were advanced: a hard-sell campaign and a soft-sell one.

Many of those who support a hard-sell campaign are unacquainted with the specifics of the earthquake issue. For these influentials, the effectiveness of a hard sell is judged on the basis of "shaking up" the constituency in order to move them to act. For example, this attitude is portrayed by a consumer action representative:

In order for property owners to see the value of bringing their building up to code, you first have to get them to believe that the quake can happen, what it can do; and what they need to do. They should see buildings toppling down like dominoes.

A merchant concurred: "What we need is a good realistic documentary showing the pain and suffering of people...that might wake someone up." Granted a documentary might in fact "wake someone up", but who? Probably not those who would decide to fix or not to fix their buildings.

"The purpose is not to scare people," according to another merchant, "There's no point to that." Expanding on this theme, a city official expressed the idea of the soft sell:

I think we have frightened and confused the public too much already...it's a matter of informing them to make them more knowledgeable...to provide information that will increase their depth of knowledge. It should be done in such a way that we don't induce fear; because when we do that, we get a variety of reactions that could be negative.

The soft-sell tactic for many influentials needs an advertising mode. As one official put it: "...You really have to go into a Madison Avenue approach...if you want to get to the people. You're not selling soap, but you have to take that same kind of package...otherwise you are accused of being scaremongers." Another city representative suggested: "...a full media blitz on radio and T.V. You're selling a product, and this is public safety!" Such proposals also have supporters among the

private sector. A merchant, for example, observed: "It's wise to assume an ignorant public--one that is resistant to bad news. The idea is to grab their attention and make them listen...the catch is you probably have to be entertaining too!"

In general, those advocating a soft-sell tactic have had considerable experience not only with earthquakes but also in dealing with the public. As one influential expressed the essence of the soft sell: "The idea is not to turn people off, but to make them receptive to what you have to say about this hazard. No nightmare tactics. Just approach the public with rational considerations." A consulting engineer who is wise to the ways of politics affirmed this view and also pointed out the importance of participation: "It has to be a soft approach...and you have to make the people, building owners, and renters feel like they're part of the act. Tell them the whole story; let them participate. If the government comes in with a shotgun instead of a beebee gun, I think they're in for trouble."

While it is clear that our influentials feel that providing information in certain ways and to particular audiences is quite important, it is also evident to them that information by itself will not be a sufficient incentive. An engineer, for example, pointed out once again the importance of the cost factor as well: "If you carry on an educational program, will the owner do it? I say it all hinges on how much the cost is of strengthening compared to replacement cost." And the same point is made more generally by a public official:

Information programs are only good if people accept them. This has been the solution for many seminars I've been involved in. Let's get an educational program, and everybody says: 'Fine, that's a good idea.' Except, the guy out there

isn't buying them. He's only going to listen to you as much as he wants to.

The need for additional incentives is particularly evident in the comments of influentials from the private sector. A banker argued against information programs: "...I don't think it will be effective. The reason is the kind of buildings you're talking about are income-producing property...normally owned for profit, and an investor wants a return on his investment. He won't do anything that will cut down his profits." A representative of the apartment house industry supports this: "Information won't make a difference...Reason is, I know how people are, and they hate like hell to spend a nickel on something that doesn't show." And another member of the business community concurs: "That kind of information just rolls off people's backs, and they won't listen...because the earthquake is an abstraction to many."

Since the property owner may be asked to bear the costs for improving seismic safety, it makes sense that such owners and their representatives would feel that information by itself is an inadequate incentive. They want the hard data on what is involved--assessment of risk, costs, and the choice of modest repair or replacement alternatives--but they also seem to require additional incentives to undertake seismic safety improvements.

Judging from the responses of the earthquake influentials, the use of information as an incentive has to be tailored to a particular audience. Dispensing technical information on costs, soil conditions, and the earthquake resistance of buildings to property owners and their experts is certainly essential. Such data are intended to reach a small audience and to provide the conditions for further action. Such

technical data, however, may not be completely useful when the audience is the general public and the objectives of communicating are to increase awareness of the hazard and, possibly, to inculcate preparedness and strategies for coping with it. Perhaps, a little hard sell would not hurt the property owners, but it is not a sensible tactic when one is trying to increase the general public's depth of understanding about the hazard and its ability to make a realistic assessment. Such assessments are not possible in a climate of fear.

Legal Incentives: Enforcement of Building Codes

When the influentials were asked generally about incentives, there was not much interest in legal incentives (see Table 5). However, when the question was put directly as to whether legal action should be used to force property owners to fix their buildings, fifty (51 percent) of the ninety-eight influentials thought that it should. Code enforcement was a frequent legal suggestion from public and private experts and laymen. For example, a realtor said: "I think the best way to go about it is...in code enforcement. You can create liability for the property owner for any damage done as a result of his property not being up to earthquake safety standards." Or as a government health official put it: "When you have legal options, it oftentimes is a matter of local government through the enactment of codes. I think codes are the starting point."

Why is there this interest in codes? One reason is that building codes already exist and as such they represent institutionalized legal machinery. In San Francisco there already is a system of inspections, notifications of violations, summonses, due process proceedings, fines, and other legal sanctions. Influentials suggested codes, in part, from

their experience with other hazards; for example, one public official feels that the earthquake situation could be handled as is done with other hazards such as fire: "We have a program that is analogous... We have retroactive provisions in the housing code governing apartment houses for fire, etc. We go into a thousand buildings a year and they are required to bring it up to code. We compel the owners to do it." Another reason for the interest in codes is the recent enforcement of San Francisco's parapet ordinance; this is evident from the comments of a government engineer: "I think we should also enforce building codes... like San Francisco is finally starting to enforce the parapet ordinance. They should enforce it. Can't stand by just waiting for it to fall off in the next big quake. They took care of it in Los Angeles twenty years ago." Finally, there are those influentials who realize that when property is extensively renovated, it will have to be brought up to code, including those provisions for seismic safety: "One thing that's very commonly used, even in the code, before you can remodel a portion, you have to bring the whole building up to code. That's a slow way to affect a large number of buildings."

Perhaps one of the reasons for support for code enforcement from the private sector is that such influentials know the process and how to adjust to it. Building codes have been around for some time, resulting in few procedural uncertainties. They have become accepted constraints of property ownership with few surprises. A business representative pointed out: "There are millions of ways to circumvent the codes, and large property owners know them all." While another businessman commented: "Building inspectors could cite owners for weak buildings, but inspections don't occur with regular frequency...they capitalize on

this situation." Rather than interpret these findings as high support of code enforcement, one might more accurately see them as evidence of low resistance to the code program.

The building code is a standardization of minimal structural and life-safety requirements. "It represents a consensus of what basic regulations should be," an entrepreneur stated. No further laws are seen as necessary by the private sector. "We have too many laws and lawyers now!" In other words, the code represents a balance between public safety and restrictions acceptable to the community property owners. "After all," an attorney pointed out: "You find a building not meeting code; what do you do? Throw people out in the street? There is that dilemma."

For many of the influentials, interest in enforcement of building codes wanes when the subject of retroactive seismic safety provisions is mentioned. Some business influentials point to the parapet ordinance as a retroactive program and criticize its arbitrary enforcement, while some public officials look to it as a precedent to broaden the jurisdiction of the building code. A planner, for example, suggested that: "The building code is something that should be retroactive...It's supposedly based on new discoveries and knowledge concerning life safety. This should be retroactive." In contrast there is the typical view among private-sector influentials that "there is no ordinance that says you have to bring your old building up to earthquake standards. Don't think it would be translated into public policy because every owner would be on [Mayor] George Moscone's doorstep saying, you better get rid of that damn thing. That's going to cost billions of dollars."

A few respondents who are aware of warning signs being used in the state capitol building or that Los Angeles is considering such a procedure suggested using signs as a legal action. For example, a disaster planning official observed:

From a legal standpoint I would require buildings to be inspected...and not meeting that inspection, I would post a sign stating: This building does not meet earthquake standards. This may be a "danger to your health" type of sign. It does get attention, and it'll make people think twice about entering that building. Or you may keep a lot of people out that would have given a business to that type of building...whatever it is.

An engineer doubts whether a sign would be effective:

If you post a notice on a building, say in the lobby, which says: "This building is unsafe, as determined by such and such board of supervisors." It's not going to help the guy any. I think most people will tend to ignore it after a while--it's not going to do any good.

In general, the suggestions of the influentials for legal action were not particularly sophisticated, nor novel. The reliance on building codes reflects a triumph of tradition. For the experts the building code is the usual way for the introduction of new standards and the application of old standards in the everyday practice of design and construction. For the business people and property owners, codes are the typical vehicle for adjusting the community's concern with safety and their own interests. Such businessmen are used to coping with the enforcement of codes and they know that the process is lengthy and that, often, time and delay can work to their advantage. Even if codes were made retroactive to handle other hazards besides parapets, the standards would have to be modest in order to be acceptable. Moreover, it is quite clear that enforcement would have to proceed slowly and selectively. As we have seen in the discussion of hazard awareness, most influentials would start with buildings in which there is some structural problem.

But, even with this priority, there will be choices to be made. Should government start with its own buildings and set an example for the private sector? Should the city start in the private sector with the most flagrant cases or the simple ones? The case for selectivity in code enforcement is made best in this comment by an astute observer from the private sector:

Los Angeles set up a parapet ordinance twenty years ago taking blocks of the city and starting an enforcement program one block at a time. Now the people that got hit first, claim that's selective enforcement...The idea is that selective enforcement eventually will be total enforcement. In any enforcement program, there is some problem. And one with the enforcement of the parapet ordinance is they want to make the Fairmont Hotel look like a [modern, plain] hotel. And the Fairmont Hotel is a lovely old structure that has a lot of unsafe parapets, doodads and sculpture on it. So does the Pacific Union Club. If you take selective enforcement and you take those kinds of places and enforce it first, you can stop the enforcement program because you're going to get a public outcry: No, we don't want to do that. Now, if you want to stop a program, take the most dramatic case and try it first; then you lose all your momentum.

A Promising Package

It should be evident from the previous discussion that the design of an incentive program is not just a simple matter of finding some source of financial assistance after which everything will fall in place. Economic incentives do dominate the thinking of the influentials, but it is clear that they will not work by themselves. In Table 6, the various incentives which were discussed in the course of the interviews are ranked in terms of rough estimates of the influentials' likely support and opposition. The numbers themselves are not to be taken seriously, but the ranking itself is useful for understanding which incentives should be further explored.

TABLE 6

EARTHQUAKE INFLUENTIALS SUPPORT
PROPERTY TAX INCENTIVES

<u>Incentive</u>	<u>Type of Incentive</u>	<u>Estimate of Political Feasibility^a</u>		
		<u>Support No.</u>	<u>Neutral No.</u>	<u>Oppose No.</u>
Use the property tax	Economic	54	8	14
Enforce building codes	Legal	47	13	4
Use low-interest loans	Economic	42	8	17
Provide technical data	Information	42	7	11
Use income tax rebates	Economic	35	13	10
Soft-sell information	Information	32	15	20
Use government matching funds	Economic	30	11	12
Grants	Economic	26	12	13
Redevelopment programs	Economic	24	10	4
Court action	Legal	23	10	15
Legislative action	Legal	18	18	11
Encourage insurance company activity	Economic	16	10	3
Hard-sell information	Information	13	14	31
Posting warning signs	Legal	5	5	27
Presale inspection	Legal	4	11	34

^a Multiple responses possible.

Source: Questions 5, 6, 7 and 8. See Appendix B.

Incentives at the bottom of the table probably are not worth much further effort because of the opposition. Some of them are really not incentives. For example, the mention of insurance is actually in the context of the possibility of lower rates if buildings were brought up to seismic standards, or sometimes insurance is suggested as a substitute for fixing up a building or for coping with possible liability problems. Others, such as legislative and court action, are not sufficiently delineated, and represent feelings about the need for state support or for legal sanctions in general.

It is the incentives at the top which warrant attention. Here can be seen property tax, loans, code enforcement, and technical data. Although there is considerable support among the influentials for some use of property tax rebates or assessment adjustments, factors outside San Francisco make it less promising than it appears. Current unhappiness throughout the state with the tax, together with the interest of elected state officials in making significant adjustments for relief, make it unlikely that the state would agree to a considerable erosion of the property tax base for a special, localized purpose such as seismic safety.

A more likely candidate is the use of low-interest loans. There are past and present precedents for such loans. The use of loans would be particularly appealing if federal money could be used to augment local loan programs. Usually federal money for such purposes as code rehabilitation has been at the rate of 3 percent. This rate would help considerably to lower a property owner's interest costs, which under the local programs are usually pegged at municipal bond rates which are roughly about twice the federal interest rate. Such a loan program would

have to be flexible, capable of being used for a variety of public and private buildings, and not just restricted to certain neighborhoods or historical landmarks.

In addition to these loans, the codes would have to be modified to make retroactive a modest set of seismic safety standards. San Francisco's experience with its parapet ordinance provides a weak but at least some kind of foundation for doing so. Before such a code change would be possible, a program of technical information would have to be developed so that the property owners will know realistically what hazards their buildings present and what sensibly can be done about them. The technical data will present the costs. The code will provide the standards and the legal means for compliance. And the loans will ease the financial burden of that compliance. The total package of loans, technical data, and enforcement of seismic safety provisions could be augmented by a soft-sell public education campaign to provide citizen support for the overall hazard reduction program.

NEXT STEPS: WHO?

Designing a promising package of incentives is relatively easy; implementing them, however, may be difficult. Who will make sure that these incentives become operational and then that they actually change the behavior of the owners of property? Although not always the case, there is recently the assumption that seismic safety is a public problem and that government as a regulator of public safety is responsible for ensuring safety from earthquake hazards.

Many of the solutions proposed by earthquake scientists, engineers, and planners assume that it is logical for government to do something

about the hazard. They may disagree about the scope of government responsibility and the appropriate level at which to act, but they do agree that government does have a role. What is the situation in San Francisco? Do the earthquake influentials agree with the scientific community that seismic safety is a job for government? Which level of government is believed to be responsible for mitigating the hazards of earthquakes? What is the likelihood that government will lead or be a central part of a coalition to implement a program of incentives? Who else will be involved in such a concerted effort?

Should Government Intervene?

Few would dispute the fact that government has a role in relieving the social and economic disruption that follows a devastating earthquake. The view expressed by one of the consumer advocates reflects the common recognition of this government role: "National disasters--that's the place for government to be." But what do the influentials think about government intervention prior to disastrous events? Does the government have a responsibility to reduce the vulnerability of a community known to be at risk?

One emergency services official believes that the responsibility to keep people safe from the hazards of earthquakes is

Inherent in the oath of office of every chief administrator in the land. When he takes that oath, he says that he'll do everything in his power to protect people--that includes crime in the streets as well as disasters.

Several of the respondents offered the same justification for intervention into the affairs of a community. One of the earthquake engineers expressed this common opinion: "It's the responsibility of government, I think, to do things that the individual cannot do by himself."

Even though several of the respondents in business favored a laissez faire approach, few disputed government intervention in the area of seismic safety. "I'm not a believer in the government's tentacles extending too far into society," exclaimed one property manager. Nevertheless, this same individual also believes that "there has to be an organizational structure within government to make the public sector aware of the dangers from earthquakes and a hell of a lot of other hazards". A banker and property appraiser commented: "I'm not one who's in favor of big brother telling everybody how to live, but I think the code requirements are a necessity--the one thing that big brother does have to tell the builders and only for public safety."

There are some from the private sector who particularly feel that government intervention brings problems with it. A chamber of commerce executive, for example, is against government intervention, and stated emphatically that

Government involvement implies problems, wrong decisions, bumbling bureaucracy. The individual still has the right to live in an earthquake area...or in a congested area where the likelihood of injury during an earthquake is high.

A housing development executive believes that "we take a chance wherever we live...The more we authorize government to legislate or regulate, the more we reach a point of never wanting to do anything for ourselves."

A decided majority of the respondents perhaps would ask if there is a difference between wanting to do something for oneself and being able to do it. Even one respondent who believes that people have a right to live in earthquake country admitted that "a lot of people don't have a choice about where they live".

Several of the respondents believe that the community should not rely entirely on government for protection from the hazards of earthquakes. They believe that the responsibility for community safety should be shared. A public utilities engineer stated: "I don't believe anyone can divorce himself and say it's entirely government's problem and the private citizen has absolutely nothing to do with it." An emergency services official stressed that "people have to work together... to keep (their community) safe. It's everybody's problem." This belief was echoed by a real estate management executive: "I think it's everybody's responsibility. It's everybody's problem--legislators, owners, professional managers, and the tenants themselves."

Certainly there are things that an individual cannot do for himself. However, there is one thing that virtually everybody can do. According to another emergency services official, "citizens should insist that they do get the very, very best protection possible from earthquakes".

Eighty-two percent of the sample of earthquake influentials believes that seismic safety is an area which requires government attention (see Table 7). Among the various groups of individuals who take a firm position on this issue, the government employees and experts are unanimous in their view. All of these individuals see that government has a responsibility to keep people safe from earthquake-related hazards. Less than 20 percent of the respondents in each of the remaining groups believe that government is not responsible in the area of earthquake safety.

Evidently, the respondents not only believe that government responsibility exists in relieving the losses that follow a disastrous earthquake;

TABLE 7

EARTHQUAKE INFLUENTIALS BELIEVE THAT
GOVERNMENT HAS A RESPONSIBILITY TO
KEEP PEOPLE SAFE FROM EARTHQUAKE HAZARDS

Is Government Responsible?	<u>Government</u> No. %	<u>Private</u>			<u>Expert</u> No. %	<u>Layman</u> No. %	<u>Total</u> No. %
		<u>Business</u> No. %	<u>Community</u> No. %	<u>Total</u> No. %			
Yes	24 96	42 75	14 82	56 77	22 100	58 76	80 82
No	0 0	9 16	2 12	11 15	0 0	11 14	11 11
Don't Know	0 0	4 7	1 6	5 7	0 0	5 7	5 5
No answer	1 4	1 2	0 0	1 1	0 0	2 3	2 2
Totals	25 100	56 100	17 100	73 100	22 100	76 100	98 100

Source: Question 3a. See Appendix B.

they also believe that this responsibility extends to prevention before the occurrence of such an event.

How should government accomplish this latter objective? The following discussion explores what the respondents consider to be appropriate government action in the area of seismic safety.

Which Level of Government Should be Responsible?

Many earthquake influentials believe that all levels of government share the responsibility for keeping people safe from the hazards of earthquakes. As illustrated in Table 8, 43 percent of individuals who responded to this issue feel that all three levels of government-- federal, state, and local--are jointly responsible. "I feel that each major level of government has a strong responsibility", commented an emergency services official. "They all have to participate and they all have a strong responsibility and accountability." One structural engineer believes that "it takes a combined effort of all levels to pull off dealing with something like earthquakes". A member of a regional planning and conservation group elaborated further:

I think all levels of government should share in that responsibility. I think that each part will overlap. In some cases you can clearly define what the roles might be. I think land-use planning in a very detailed sense should be done by local governments, but they're not the wealthiest levels of government and they're not able to have the broad expertise that the state government has in some cases and that the federal government has in other cases. There should be some place for local governments to go to be supplemented. Not necessarily with the idea of somebody telling them what to do but having that information available. I think all levels of government carry a responsibility to share that information.

Nine individuals, including a city planner, pointed to local government as the most appropriate level responsible for alleviating some of the problems involved in earthquake-hazard mitigation:

TABLE 8

ALL LEVELS OF GOVERNMENT SHARE
RESPONSIBILITY FOR EARTHQUAKE SAFETY

Level(s) of Government	Government		Private			Expert	Layman	Total						
	No.	%	Business	Community	Total									
	No.	%	No.	%	No.	%	No.	%						
Federal, state and local	11	52	10	31	8	57	18	39	10	56	19	39	29	43
Federal and state	2	10	9	28	2	14	11	24	4	22	9	18	13	19
Local	3	14	5	16	1	7	6	13	3	17	6	12	9	13
State	2	10	4	13	2	14	6	13	0	0	8	16	8	12
Federal	2	10	2	6	0	0	2	4	0	0	4	8	4	6
Federal and local	1	5	1	3	1	7	2	4	1	6	2	4	3	5
State and local	0	0	1	3	0	0	1	2	0	0	1	2	1	2
Totals	21	101*	32	100	14	99	46	99	18	101	49	99	67	100

*Percent does not total to 100 because of rounding.
Source: Question 3b. See Appendix B.

In terms of educating people and getting people concerned about dealing with the problem, I think that there's a lot of people-to-people contact needed. That's best [accomplished] on a local level.

This he believes is logical because, as he stated, "The further the genesis of the program from the people who are supposed to be affected [by the program], the less likely that they are going to be really affected."

Several respondents look to the state for protection from earthquake hazards, as does one real estate broker, who said, "I think the state is big enough to do something about it; maybe because in California a lot of earthquakes occur". However, some respondents have a wider view and relegate this responsibility to the federal government.

According to a museum executive:

It's more than a state problem. California is not the only state that has earthquakes. I would say it's a national problem because of the fact that if there is a major earthquake, it becomes a national crisis--it affects our economy and our ability to function.

Respondents Assess Government Performance

How do the actions of the government reflect its concern for seismic safety? Is government performing the functions which our respondents believe are necessary in order to keep people safe from seismic hazards? Many of the respondents feel that government is not doing its job.

A city planner believes that government has a responsibility to keep people safe from the hazards of earthquakes, but adds: "I don't think they're living up to that responsibility." What are some of the reasons for this nonaction? An emergency services official observed that "motivating government into action is where a great part of our problem lies". He further stated:

If the local government had a greater inducement from the federal and state government, this would help convey to the general public the importance of preparedness. The fact that there has been so much inaction in this respect conveys a feeling of apathy on the part of the public. Government on all levels has to take some action to serve as an example.

Several of the respondents focused on how the attitudes and actions of their local government serve as an example to the general public. Another emergency services official contended: "We're dealing with what the top public officials call 'trivia'. It's trivia until they need it [disaster planning], and then it becomes the most important thing on the agenda." An executive of a private urban planning group expressed a similar view:

As far as I know, there's been only one major trial of an earthquake-preparedness plan. And that was really done at the initiative of Golden Gate University. San Francisco is the most earthquake-prone city in California, and has been perhaps the most delinquent of the major cities in California in pursuing earthquake preparedness.

"Part of the problem," according to an emergency services executive from a privately-funded agency, "is the reluctance on the part of government to enforce the parapet ordinance. The overhanging parapets, signs, sculpture, and gingerbread provides some of the charm of San Francisco. Yet it is this very 'gingerbread' that is going to kill people."

Understandably, this ordinance has provoked the wrath of many citizens and property owners who, aside from economic considerations, believe that such an ordinance threatens the character and beauty of San Francisco. According to an aide in the mayor's office, these individuals "have a strong feeling for the historic facade" of their city. A community representative hears these protests; yet he questions their intrinsic value, particularly as they apply to one area of the city:

It's a very sensitive issue when it's brought out because a lot of people will say that if you take away a lot of the ornaments, and the things that make Chinatown architecture unique or different, you essentially don't have a Chinatown. You can look on the other side and say, what is a Chinatown? Is it the physical appearance or the people?

Who Will Lead?

It is one thing to believe that government is responsible for the safety of its citizens and to be a little unhappy with its performance, but it is quite another thing to set conditions under which that performance can be effective. After all, the government, regardless of level, is mainly a reflection of its constituents, of their interests and concerns. If citizens are concerned about the earthquake hazard in a community, then with enough time and energy something can be done about the hazard. Generally, citizens avoid the hazard because of ignorance, indifference, and more pressing concerns. Thus, effective action depends on elites, in and out of government, who are aware of the hazard and who have sufficient energy and other resources to seek viable solutions.

The selection of the earthquake influentials was predicated on the fact that these people would be concerned about the problem--either in support of or opposition to hazard mitigation measures. In order to gauge the depth of that concern and whether they would be willing to do something about the hazard, the influentials were asked this question: Do you see your office or profession doing something about the earthquake hazard? As was anticipated, almost all of the experts responded positively and the numbers were somewhat lower for other groups. In the overall sample seventy influentials (71 percent) responded positively. But this large positive response is deceptive because many of the "yes"

answers had a "yes, but..." quality to them, as if to indicate a low intensity of concern. Few, apart from some experts, were deeply concerned about the issue.

Here, for example, is the response of an engineer who works for a government agency and feels deeply about the issue:

It's an overwhelming responsibility to keep the profession current so that individuals are knowledgeable about the problems. The profession has the responsibility to raise these issues--express them every time they come up. I think we have to be very much involved in the political process.

At the same time, there is an insurance executive who also made a "positive" response; but note how limited his response is: "I think the insurance business has the responsibility to inform people. Let the people decide for themselves, whether they will take one course of action or another. I don't believe in forcing people. We all have decisions we have to make all our lives for protection; sometimes we overprotect others."

As one expects, such limited responses come about in part because of the dominance of organizational perspectives: "Our responsibility is to keep water supplied to the people during an earthquake"; or "We investigate complaints and where necessary impose sanctions on realtors". Some influentials simply see their responsibility as limited to attending meetings or being a passive conduit for information. Other influentials will probably support someone else's program--"...if a program can be developed where we are convinced that the people are not being led down the primrose path, we will support it"--but such influentials are not likely to initiate such a proposal. All too often the influentials interpret "responsibility" to mean what they are doing now. For example,

a representative of a public utility stated: "All our buildings are made to withstand a certain seismic load. We do comply with the law." It is not out of such a business-as-usual mentality that leaders usually emerge.

Even an expert whose job is concerned with the earthquake safety issue has other things to worry about, as this government official makes clear:

I'm not doing anything, unfortunately, and this is not right. I have to worry about the day-to-day problems. And this is not a day-to-day problem. It goes on the back burner. We know it exists and that we have to do something about it-- hopefully before there is an earthquake.

One may ask: Why is it important that people should feel deeply about an issue? Isn't it enough that they are positively inclined even though they may be somewhat passive? Unfortunately for those concerned about the earthquake issue, passive concern is not enough in politics. Politics in the United States is coalition politics; one of the prerequisites for the formation of any coalition is that it have leaders. Such leaders usually have sufficient concern to be willing to devote considerable resources to seeking effective policies.

Probably a coalition could be built around those experts who care. Some experts would not want to participate because such participation might appear to be unprofessional or self-serving. In any event, a coalition would still require leaders from other nonexpert groups because a hazard-reduction program involves a significant allocation of the resources of the community. Whether leaders could be taken from these groups is an open question.

In response to San Francisco's parapet ordinance, leaders did emerge, such as those from the Foundation For San Francisco's Architectural Heritage. But in that situation, such leaders came into the political arena because of a concern for preserving the beauty and aesthetic quality of San Francisco. One wonders whether leaders will emerge to respond to what many have called an invisible hazard.

CONCLUSIONS

Some obvious lessons have been learned from this exploratory study. First, it is important to pursue a package of incentives. Part of the success of the Field Act in California in making public school buildings resistant to earthquakes is due to the use of a variety of economic, legal, and informational incentives over many years since its enactment in 1933. It is clear from the interviews described here that although economic incentives are essential, they must be supplemented by legal means to encourage compliance and informational programs to provide technical data and to increase the general level of awareness and support for hazard mitigation programs. Second, it is critical that an implementation assessment be conducted to ascertain the political viability of any proposed package of incentives. This assessment would not just involve a distant research effort but would encompass working with community and government influentials to design an institutional structure for using a preferred package of incentives. Research is needed to refine the incentives, and field research is needed to ensure their use.

APPENDIX A

LIST OF
ORGANIZATIONS OF RESPONDENTS ^a

American Institute of Architects (2) *
 American Insurance Association
 American National Red Cross, Golden Gate Chapter
 Apartment House Associations Consolidated
 Apartment House Industry of San Francisco, Inc.
 Associated Building Industry
 Associated General Contractors of California, Inc.
 California Bankers Association
 California Builders Council
 California Club of California
 California Manufacturers Association
 Chamber of Commerce of San Francisco
 Chinese Affirmative Action Program
 City and County of San Francisco
 Airports Commission
 Board of Supervisors (4)
 Bureau of Building Inspection
 Electricity Department
 Fire Department
 Health Department
 Office of Controller
 Office of Emergency Services
 Office of Mayor (3)
 Planning Department (2)
 Police Department
 Port of San Francisco
 Public Utilities Commission
 Hetch Hetchy Water and Power Department
 Water Department
 Recreation and Park Department
 Coldwell Banker Commercial Brokerage Company
 Commercial Property Owners of San Francisco
 Commonwealth Club of California
Cry California
 Fine Arts Museums of San Francisco
 Fireman's Fund American Life Insurance Company
 Fisherman's Wharf Merchants Association
 Foundation for San Francisco's Architectural Heritage
 Ghiradelli Square
 H. J. Brunner Associates
 Hospital Council of Northern California
 Independent Insurance Agents Association of California
 Institute of Real Estate Management
 Insurance Information Institute

*Numbers in parentheses indicate number of interviews.

^aEach respondent was expressing his personal opinions and was not representing any official position or view of the organization for which he worked.

John A. Blume and Associates
 Market Street Development Project, Inc.
 Mission Community Legal Defense Firm
 Mission Housing Development Corporation
 Mission Merchants Association
 National Association of Theater Owners of California
 National Federation of Independent Businessmen
 Native Sons of the Golden West
 Noe Valley Merchants Association
 Northern California Concrete Masonry Association
 Pacific Gas and Electric Company
 Pacific Heights Merchants and Property Owners Association
 Polk Street Merchants Association
 SAFE (Safety Awareness for Everyone)
 San Francisco Apartments Association
 San Francisco Bay Area Council
 San Francisco Bay Conservation and Development Commission
 San Francisco Beautiful
 San Francisco Board of Realtors
 San Francisco Building and Construction Trades Council
 San Francisco Consumer Action
 San Francisco Convention and Visitors Bureau
 San Francisco Council of District Merchants Associations
 San Francisco Downtown Association
 San Francisco Electrical Contractors Association, Inc.
 San Francisco Hotel Association, Inc.
 San Francisco International Airport Office of Police Chief
 San Francisco Labor Council AFL-CIO (2)*
 San Francisco Medical Society
 San Francisco Neighborhood Legal Assistance Foundation
 San Francisco Planning and Urban Renewal Association (SPUR)
 San Francisco Property Owners Association
 San Francisco Public Housing Tenants Association
 San Francisco Real Estate Board
 San Francisco Tenants Association
 San Francisco Tenants Union
 Security National Bank
 Southern Pacific Transportation Company
 State of California Real Estate Department
 Tax Associates
 Telegraph Hill Neighborhood Association
 Union Street Association
 United California Bank
 U.S. Department of Housing and Urban Development (HUD)
 Wells Fargo Bank
 Western Association of Insurance Brokers
 Western Pacific Railroad Company (2)

*Numbers in parentheses indicate number of interviews.

APPENDIX B

QUESTIONNAIRE

1. In your job do you have to deal with earthquakes in any way?
2. Do you think there are really important hazards associated with earthquakes?
3. (a) Do you think it is the responsibility of government to make sure that we are safe from the hazards of earthquakes?

(b) Which level, or levels, of government do you see having this responsibility?
4. Suppose we were to have a program to fix up old buildings to increase their safety from the hazards of earthquakes; which buildings should we start with?
5. In your opinion, what could be done to encourage the owners of these old buildings to fix them up?

(If respondent mentions an economic incentive, go to Question 6 (b); if not, ask Question 6 (a))
6. (a) If we wanted to provide financial assistance, how should we do it?

(b) If we wanted to provide financial assistance, such as _____, how should we do it?

(c) Can you think of any other ways?
7. (a) Should we provide information to a property owner so he would fix his buildings voluntarily?

(b) What kind of information would be useful?
8. (a) Should we use legal action to force property owners to fix their buildings?

(b) What actions are likely to be effective?
9. Are there any other ways we can get property owners to cooperate and fix their buildings?
10. Do you see your office or profession doing something about the earthquake hazard? If so, what?
11. Who else should I talk to about these matters?

EARTHQUAKE ENGINEERING RESEARCH CENTER REPORTS

NOTE: Numbers in parenthesis are Accession Numbers assigned by the National Technical Information Service. The number followed by a price code. Copies of the reports may be ordered from the National Technical Information Service, 5200 Port Royal Road, Springfield, Virginia, 22161. Accession Numbers should be quoted on orders for reports. (U.S. dollars) and remittance must accompany each order. Reports without this information were not available at time of printing. Upon request, EERC will mail inquirers this information when it becomes available.

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