

**Investigating Incentives to Improve the  
Implementation of Performance-Based Seismic  
Design in  
New and Existing Buildings**

**Report of a Workshop**

*September 22 and 23, 1999*  
Seattle, Washington

**Earthquake Engineering Research Institute  
Oakland, California  
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The objective of the Earthquake Engineering Research Institute shall be to reduce earthquake risk by advancing the science and practice of earthquake engineering, by improving understanding of the impact of earthquakes on the physical, social, economic, political and cultural environment, and by advocating comprehensive and realistic measures for reducing the harmful effects of earthquakes.

### **Disclaimer**

Any opinions, findings, conclusions, or recommendations expressed herein do not necessarily reflect the views of the Federal Emergency Management Agency, EERI, or the workshop participants' organizations.

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## Introduction

The Earthquake Engineering Research Institute (EERI) held a two-day workshop focusing on the role and nature of incentives that might be applied to encourage the implementation of “Performance-based Seismic Design” as a means to achieve safer new and existing buildings. The workshop was held in Seattle, Washington on September 22-23, 1999. This summary report has been prepared to capture the main points discussed and the ideas and the recommendations resulting from the meeting. (See *Appendix A* for the workshop Agenda.)

The workshop brought together a diverse community of professionals interested in the possible development of financial incentives. This included representatives from insurance companies, lending and mortgage institutions, insurance regulators, professional associations, private businesses, elected officials, taxing agencies, federal, state and local agencies, the Federal Emergency Management Agency’s (FEMA’s) Project Impact communities, and earthquake engineering firms. (See *Appendix B* for a listing of participants.) Rarely has such a diverse group come together to discuss seismic issues, and for many, the opportunity to meet and interact with different professions was a highlight of the meeting. The discussions made it apparent that each of the various communities represented (earthquake professions, banking, insurance, regulatory) evaluate and approach earthquake risks differently. Some communities pay more attention than others; there are many valid reasons for these differing levels of attention to evaluating and reducing earthquake risk, and understanding these reasons is key to bringing more attention to earthquake risk reduction in the future. This workshop should be viewed as a first step in what should be an ongoing effort to improve communication among all the disciplines that can be involved in creating and using financial incentives to promote seismic mitigation for new and existing buildings.

In 1998, EERI prepared the report ***Incentives and Impediments to Improving the Seismic Performance of Buildings*** for the California Governor’s Office of Emergency Services and FEMA. One of the conclusions is to “encourage lenders to accept greater responsibility in promoting the improved seismic performance of buildings,” and “encourage insurers to support the improved seismic performance of buildings.” This now seems too simplistic. This workshop clearly illustrated the complexity of the problem and that no one incentive or actions by one stakeholder group can adequately address the problem. The various stakeholder groups, including earthquake professionals, mortgage bankers, insurers, tax regulators and government administrators all have a different perspective on the problem. These various disciplines need to communicate often to gain a better understanding of how each influences the other by their day-to-day decisions, and how working together can result in the development and use of workable incentives. The workshop also clearly illustrated that the different professions have different and potentially competing priorities. For example, mortgage banks work in a very competitive environment to make loans; providing incentives for seismic mitigation only makes sense in that environment if such incentives increase the banks’ ability to make loans. Similarly, insurance companies do not speak with a single voice and in fact compete for each other’s business. On the other hand, this

natural competitiveness could also be seen as potentially working to encourage the creation of a wide range of financial incentives by making information and the results of insurer-related benefit-to-cost analyses available to the fullest spectrum of the insurance marketplace. The natural competitive nature of the market would then take over to encourage creative kinds and applications of financial incentives. The need to understand how each stakeholder group does business and how this could be used to encourage financial incentives was a major theme running through the workshop.

Financial support for the workshop was provided by the FEMA. The workshop was an extension of EERI's related earlier work accomplished in 1998:

- ***An Action Plan for Performance-based Seismic Design***, prepared for FEMA (FEMA 349)
- ***Incentives and Impediments to Improving the Seismic Performance of Buildings*** (EERI Special Report), and
- ***Plan 2005 for the Seismic Rehabilitation of Buildings***, also prepared for FEMA (FEMA 315.)

By the conclusion of the workshop many recommendations had been suggested. (A full discussion of each recommendation is in the Summary that follows.)

## **Recommendations**

- ✓ **Establish special purpose loan programs.**
- ✓ **Provide incentives to homebuyers at the time of purchase.**
- ✓ **Reduce or waive local fees and taxes as an incentive.**
- ✓ **Increase local taxes and fees on unmitigated properties.**
- ✓ **Develop incentives that are feasible within the business environment for each stakeholder group.**
- ✓ **Work with insurance regulators to allow insurers to place requirements on at-risk properties as a condition of insurance.**
- ✓ **Develop a continuing education outreach program.**
- ✓ **Evaluate the incentive/reward relationship and create mechanisms that recognize both.**
- ✓ **Explore the evaluation practices of commercial property insurers for possible adaptation and application to residential properties.**
- ✓ **Expand structural pest and related inspections to include seismic safety elements.**
- ✓ **Develop a building rating system.**

- ✓ **Graphically illustrate how simple retrofit methods prevented damage in recent earthquakes.**
- ✓ **Create incentive advocacy committees to influence state and local mitigation in earthquake risk areas.**
- ✓ **Evaluate the effectiveness of existing laws designed to encourage mitigation.**
- ✓ **Create a public/private partnership to provide loans for low-income homeowners.**

# Workshop Summary

## Workshop Goal and Objectives

Within the context set by EERI's earlier work and this workshop's theme, the meeting was **"...intended to provide an opportunity for a frank exchange about possible incentives that could be developed to encourage owners to improve the performance of their buildings in earthquakes."** The goal of the workshop was to generate:

a set of recommendations for incentives...that could encourage building owners to incorporate performance-based engineering in building new buildings or rehabilitating existing buildings<sup>1</sup>.

The workshop had three specific objectives, to:

help representatives of the broadly defined "financial" and the "earthquake engineering" communities better understand the contexts in which they work and how these differing settings might contribute to or inhibit the development and implementation of incentives.

reach a mutual understanding of the limitations of current building codes (i.e., minimum life safety and the ways the expected performance of buildings in earthquakes can be improved to minimize future economic losses.)

define practical incentives, capable of being implemented, that could help reduce future earthquake losses.

To help focus group deliberations, a representative from local government, mortgage lending, building ownership, property insurance, the federal government, state insurance regulation, state tax policy, and the state legislature were asked to comment on three questions:

1. What each has at stake should an earthquake occur
2. How each stakeholder deals with potential earthquake losses
3. What each would like to see done differently to improve the earthquake performance of buildings.

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<sup>1</sup> The concept of Performance-based Seismic Design (PBSD) is to provide engineers with the capability to design buildings that have a predictable and reliable performance and permit owners to quantify the expected risks to their buildings and select a level of performance that meets their needs while maintaining a basic level of safety. PBSD uses the concept of performance objectives, allowing the owner to specify an acceptable level of damage to a building if it experiences an earthquake of a given severity. This creates a "sliding scale" whereby a building can be designed to perform in a manner that meets the owner's economic and safety goals (FEMA 349, 2000).

Participants were assigned to one of five small groups, which were intentionally mixed by discipline and profession, to work on the implications of creating incentives for new and existing buildings. Each group had the opportunity to focus its discussions by selecting one or two buildings, with the task of identifying “a package of incentives to improve the performance of a building that satisfies all the various stakeholders.” The choices included:

### **Existing Buildings**

- single family residential
- multi-family residential
- commercial/industrial owned by a developer
- commercial/industrial occupied by the owner.

### **New Buildings**

- single family residential
- multi family residential
- commercial/industrial owned by a developer
- commercial/industrial occupied by the owner

## **Group Discussion and Conclusions**

The discussions that followed the work by the five small groups resulted in greater understanding of each stakeholder’s interest in building safety, including a better understanding of the potential as well as the constraints impeding greater implementation of performance-based engineering and other mitigation strategies that could be adopted to improve building performance. Participants were reminded that some stakeholders have a very limited and short-term interest (e.g., real estate, mortgage banking), while others take a much longer-term view (e.g., owners, property insurers), and that some stakeholders are constrained by federal and state regulations (insurers and mortgage lenders) that strictly define their procedures.

Following are summaries of several issues that were discussed, and their relationship to the future success of incentive development and implementation.

### **Incentives in a Larger Context**

Incentives are part of a large mosaic of transactions involving buildings. Except in the unlikely event full grants or subsidies are available, there is no single incentive that could be provided universally to achieve greater earthquake safety. However, it was clear from the discussions that ***multiple incentives, packaged in various ways***, would be necessary to meet the needs of specific stakeholders.

It was within this context that the closely related concepts of ***incentives and rewards*** emerged. Incentives are generally provided in order to change behavior while rewards are bestowed on those who initiate action because they were inclined and had the resources to do so. Further consideration needs to be given to this relationship in the broader context of incentives for improved building performance. For example, might it be more effective in terms of promoting

improved building performance to REWARD a chosen behavior, such as a voluntary strengthening, rather than to try and change a behavior through the use of incentive(s)?

### **Need to Better Understand the Risk**

There was substantial agreement that there is a need for greatly improved earthquake risk information to support decision-making. While recognizing the limitations of current knowledge and abilities to provide reliable loss estimates, good risk information is central to decisions about buying, extending loans, and insuring buildings. Such information includes better understanding of the earthquake risk at a particular site and for a particular type of building, better understanding of the effect of retrofit schemes on reducing a building's risk, and better understanding of probabilities, among other issues

### **Need for Further Education on PBSD**

It was apparent throughout the workshop that many participants remained somewhat unclear about the difference between Performance-based Seismic Design (PBSD) and earthquake retrofit in general. PBSD offers the tools to help owners more specifically define their acceptable level of damage and loss, and to understand what level of performance they will get for a certain level of investment. While engineers are familiar with this new concept and understand its applicability, owners, insurers, lenders and regulators need more education to help them understand the relevance of PBSD to their decision making.

### **Benefits Must Exceed Costs**

It has to be clear to the various stakeholders involved in this problem that the likely benefits—broadly defined to include avoided future direct damages as well as avoided injuries and fatalities, business interruption losses, relocation expenses, inventory and equipment replacement costs—will exceed the costs of the improvements. This includes those required or willing to spend money to improve existing buildings (the owner), as well as other stakeholders. If owners are not convinced that benefits exceed costs, they will invest only the minimum amount necessary to comply with minimum mandates. As one insurance participant noted, insurance companies also need to understand the benefit-to-cost relationship as they can only consider passing along the net of the benefit above the insurer's cost. The same benefit analysis could be used and allocated to the owner and to those to whom he or she has transferred some of the risk of loss. Costs, however, would be quite different for the owner than for the owner's insurer.

### **Some Regulatory Practices Discourage Mitigation**

Some regulations or regulatory practices discourage the development and use of incentives. While this is of interest primarily to state or federally regulated businesses, the regulatory agencies must balance the need for consumer protection with the need to ensure a fair competitive environment (i.e., level playing field) for members of the regulated industries. This is a topic that calls for more careful

and focused attention by appropriate stakeholders so that recommendations for changes to regulations and practices can be made. For example, national tax law discourages property insurers from accruing large catastrophe funds that are drawn upon only occasionally. Such reserves are taxed at a very high rate as excess profits. As a result, the property insurance industry is concerned about the adequacy of its capacity to cover insured losses should multiple large and costly catastrophic events occur, as happened during a short span of years from 1993 to 1995 due to Hurricanes Andrew and Iniki and the Northridge earthquake. Thus, insurers try to shift a portion of the risk to policyholders and the broader market by increasing deductibles, restricting or lowering coverage, seeking excess risk insurance, refusing to cover “unsuitable” properties and using risk management mechanisms. The Policyholder Disaster Protection Act, H.R.2749, introduced in Congress in August 1999, would allow insurers to establish tax-deferred catastrophe reserves. Should this eventually become law, it could theoretically give insurers more latitude to provide policyholders with rewards (lower premiums or deductibles) for mitigation actions.

### **Other Policies Encourage Mitigation**

A number of existing laws at the federal, state and local levels have been promulgated to promote mitigation, including the Hazard Mitigation Grant Program that is a component of the federal disaster assistance law (the Stafford Act). As an example of policy that would explicitly encourage mitigation as part of an insurance program, another federal bill currently under consideration, H. R. 21, introduced in January, 1999, would require mitigation as part of a federal program to provide reinsurance for state disaster insurance programs. To be eligible to purchase reinsurance, a state insurance or reinsurance program would set aside no less than ten percent of its net investment income to mitigate the natural disaster losses for which the program was established. (Five percent would be allowed if ten percent would jeopardize the actuarial soundness of the program).

### **Policies, Code Adoption and Enforcement are Critical**

The larger financial community depends on state and local governments to exercise responsibility and diligence to assure that proper hazard avoidance or mitigation measures are applied. This requires that the level of risk is known, that buildings are located and designed to be earthquake resistant, and that land use planning and building code requirements are effectively enforced. In some states, such as California, increased due diligence and real estate disclosure requirements are helping to inform all stakeholders about conditions that could affect their respective decisions regarding properties and the associated risk.

### **Who Pays?**

Earthquake exposure and damages are local and affect local interests (e.g., owners, insurers, and local governments), but the question of who pays is generally broader. Of course the property owners pay (including those with insurance who pay through premiums and deductibles). Taxpayers pay for large disasters through disaster assistance provided by the federal government. Insurers

pay, although as good business practice expected losses and expected expenses are passed on to the owner or the insured. It is against the backdrop of potential local, individual owner losses and shared public and private sector costs, that the question of “who pays” must be examined further. It appears that much attention is given to ways to shift and spread the costs (and responsibilities) but not enough to the potential benefits and shared responsibility for hazard mitigation.

### **Need to Clearly Understand How Each Stakeholder Group Conducts Business**

Each stakeholder group has a unique function and perspective. Understanding one another’s way of conducting business is a critical factor in proposing and developing incentives that are most likely to be effective. One insurer offered his perspective on insurance as a business, which he defined as essentially a pooling and risk transfer. “It is not ‘insurance’ unless there is a transference of risk for value exchanged; in ‘insurance’ there is a contract between the ‘insurer’ and the ‘insured’, with a transfer of all or part of the risk or loss from the latter to the former party, for a ‘reward’ for taking on that risk, i.e., the insurance ‘premium’.”

Insurance can essentially be thought of as a pass-through mechanism. The insurance company collects premiums from all of its insureds, from which the company must pay the expected future losses and expenses for the period covered by the policies. There is an expectation that there will be a reasonable amount left over as profit for their taking on the risk of losing all or part of the capital they have at risk.

Assuming that the premiums are adequate to pay the future expected losses and expenses and to provide for a reasonable profit to the owners, then any further net reduction on the future expected losses and expenses from owners who build more damage-resistant homes and businesses should be passed back to those insureds who chose to do so as a financial incentive. Competitive pressures over those relatively better risks could force this to happen.

### **Need for Information and Education**

A major component of any incentives program is the need to initiate and sustain a major informational and educational effort. For individuals, the intent is to motivate people to take actions akin to their interests and capabilities by understanding the risk and understanding how to reduce it, i.e., making earthquake safety of their home a personal value that successfully competes with other values for time and money. The commitment to taking actions could lead to demands for incentives or rewards. Workshop participants focused on this need for education, noting particularly that corporations and businesses need to provide education programs for their employees.

### **Build in Hazard Disclosure**

It is clear that the long-term effectiveness of earthquake-related incentives would be enhanced if they were “built into” existing programs and procedures, much like

disclosure requirements are included in real estate transactions in some locations today. Seismic safety would become one more item to be considered, benefit to be gained, or penalty to be avoided when the multitude of decisions are being made about constructing new or improving existing buildings, or selling or buying them. It may be appropriate to investigate an idea that first surfaced in the hurricane arena: assigning a relative hazard potential score to each structure, analogous to the energy-consumption score assigned to refrigerators and other appliances.

## **Building Ownership Patterns**

There are millions of *residential* owners, but they fall into many different groups or “markets,” depending on their demographic, geographic, and socioeconomic status. To be effective, incentives must be designed and targeted for specific segments of the home-owning population. Otherwise, the incentives will be seen as irrelevant to many homeowners.

*Multi-family residential* buildings are almost never owner-occupied. More commonly, they are owned by a wide variety of partnerships, individual investors, corporations, syndicates, local housing authorities, or other entities. They may or may not have on-site property managers, and many are managed by a property management organization. These buildings were disproportionately seriously damaged during the Loma Prieta and Northridge earthquakes.

The unique aspects of *commercial and industrial* property ownership makes it somewhat difficult to generalize, but the participants assumed that interests in incentives would vary depending on whether such properties are held by a long-term owner or by a developer/commercial property investor with a shorter risk horizon.

## **Recommendations**

This section synthesizes principal themes that emerged from the plenary and the five small group discussions into specific recommendations. Carrying out these recommendations will require genuine partnerships and sustained communications among representatives from all levels of government, members of the insurance and financial communities, local and state government, and members of the professional earthquake community.

### **✓ Establish special purpose loan programs.**

There is a need to create a varied array of loan programs aimed at reducing potential earthquake losses. Some possibilities include below-market interest rate loans, loans targeted for use by high-risk populations or in high-risk areas of the country, and loans for committed but economically disadvantaged owners.

People usually borrow money to finance the purchase of and to make major improvements to buildings. Unless part of a major renovation project, earthquake risk reduction is not usually considered unless, in rare situations, it

is mandated or somehow otherwise required. However, by capitalizing on the widespread use of lending to finance purchases and building improvement activities, it might be possible to encourage lending specifically for risk reduction. This would require coordination with lending institutions.

✓ **Provide incentives to homebuyers at the time of purchase.**

Several types of incentives could be provided at the time of purchase to encourage or fund seismic mitigation actions. Adequately seismically retrofitted buildings, or commitments made to do so, should be rewarded when properties change ownership. One way of recognizing the value of such an investment or the commitment to make it as a condition of purchase is by adjusting the costs associated with borrowing money. This could be done by reducing the “points” (i.e., fees) charged at the time of loan origination, decreasing the interest rate for the loan’s term, increasing the loan amount to provide funds to improve the building as it changes ownership, or by some combination of these incentives.

✓ **Reduce or waive local fees and taxes as an incentive.**

More attention needs to be given to modifying local tax and fee structures to serve earthquake hazard mitigation. Several local governments have adopted incentives to promote risk reduction, especially to modify usual and customary fees associated with real estate transactions or building improvements. If proper standards or criteria are met, examples include refunding property transfer fees, waiving permit and inspection fees, including properties in redevelopment project and other defined areas that receive benefits for the public good, and exempting improvements from increased property taxes.

✓ **Increase local fees or taxes on unmitigated properties.**

The relationship between incentives and disincentives is a close one. Increases in local taxes and fees on properties if new or current owners are unwilling to improve the earthquake resistance of their buildings could be a motivating disincentive. Such a policy recognizes that unmitigated properties are of higher risk, and that their failure will demand a considerable share of community resources after an earthquake. By increasing costs (“charging”) for high risk buildings, otherwise reluctant owners may be “persuaded” to take appropriate mitigation actions to further their own and community safety interests.

✓ **Develop incentives that are feasible within the business environment for each stakeholder group.**

Each stakeholder group needs a clear understanding of what is feasible for other stakeholders. For example, the insurance industry is an extremely competitive industry and one that is highly regulated. One insurance participant identified a number of barriers to developing financial incentives. Understanding these barriers is very useful in terms of developing feasible alternatives. His list of barriers included:

- Adequacy of the underlying rate level—if the underlying rates are not adequate to cover the expected losses and expenses, including a reasonable profit potential, then incentives are less likely.

- Lack of information or data—needed to justify that there is a net expected benefit over expected cost that can be passed back to the policyholder in the form of a measurable rate incentive. Included in this is information on the way existing and new structures are built and what steps can be taken to lower their expected future losses from natural disasters.
- Lack of understanding—the expected benefit and cost of pre- and post-disaster mitigation action is needed so competitors can rely upon it to compete for the less risky structures.
- Political process—insurance is a heavily regulated industry, with the perception on the part of the industry that this regulation is often too immersed in the political process.

Another insurance participant, in commenting on what is feasible from that industry’s perspective, noted that the economic forces that lead insurers toward adopting actuarial pricing create incentives for property owners to mitigate their risk. Actuarial prices inform a property owner about the long run cost of transferring a portion of exposure to an insurer, whether or not that property owner chooses to insure. Actuarial information motivates property owners to manage their exposure, particularly if the price to insure is greater than dictated by the property owner’s intuition. For those who decide not to insure, the incentive is all the stronger. For those who insure, a meaningful deductible not only protects the insurer but motivates the property owner to prevent the first dollars of loss. He argues that it is not incompatible to think both that a deductible could provide an incentive to property owners to mitigate, and that insurers could reward property owners who have completed mitigation with a reduced deductible. As with retrofitting discounts, however, an insurer would need actuarial data to meet regulatory standards, and would have to undertake policy-by-policy administration of the plan. The kinds of insights provided above by the insurers are helpful in understanding their industry and the financial incentives that might be feasible from their perspective. Encouraging such frank and productive dialogue from all stakeholders is an important part of this process.

✓ **Work with insurance regulators to allow insurers to place requirements on at-risk properties as a condition of insurance.**

State insurance regulators should be encouraged to enable insurance companies to place requirements to mitigate the risks of their buildings on at-risk property owners as a condition of receiving insurance. While this would have to be done on an industry-wide basis to maintain competitiveness, the companies’ exposure would be reduced, and if accompanied by even a small premium reduction “reward”, owners might more readily accept these requirements from their risk management “partners.” Serving as an “incentive” to meet the insurers’ requirements, premium surcharges to recognize higher risk also could be levied on properties whose owners are unwilling to mitigate their buildings. This would involve working not only with state regulators, but

with insurance organizations such as the Institute for Building and Home Safety and the Insurance Information Institute.

✓ **Develop a continuing education outreach program.**

Throughout the workshop mention was made repeatedly of the need for more information and understanding of subjects important to the development of incentives. These needs ranged from better technical risk information, public or insurance policyholder information, materials for different “owner markets,” documentation and dissemination of examples, and evaluations of the effectiveness of existing incentives in this field and in others where incentives have been used. The appropriate stakeholders need to be reached through multiple channels appropriate to their processes and activities.

✓ **Evaluate the incentive/reward relationship and create mechanisms that recognize both.**

Incentives are about changing behavior. In addition to providing incentives so people will take actions they might not otherwise take, the workshop disclosed the need to reinforce (“reward”) those who take actions on their own. These positive behaviors are at the opposite extreme from “compliance,” wherein the owner, usually grudgingly, does the minimum to meet some externally imposed requirement, such as the provisions of a local ordinance requiring building improvements to be made.

✓ **Explore the evaluation practices of commercial property insurers for possible adaptation and application to residential properties.**

High value (and high premium) commercial properties commonly are required as a condition of insurance to undergo underwriting and rate-setting evaluations. From revenue and statistical viewpoints, evaluations of residential properties may not be “worth it,” but the aggregate losses to these properties, simply because of their sheer numbers, suggests more should be done to prevent such losses. The results of these evaluations inform insurers about the properties’ conditions. There may be some techniques, methods, and processes used on commercial properties that could be feasibly transferred to evaluating residential properties.

✓ **Expand structural pest and related inspections to include seismic safety elements.**

Many states require various inspections and disclosures at the time properties change ownership, and the practice of securing independent inspections as part of the sales process is increasing. These processes should be modified to include checking to see that basic earthquake hazard mitigation steps have been taken, or would need to be before a new title is granted. Examples include ensuring that walls are bolted to their foundations, cripple walls are properly braced, and water heaters are properly anchored. A minimal amount of training of inspectors would be required.

✓ **Develop a building rating system.**

Publicly available ratings would provide information of importance to lending and insurance policies and practices. The idea is to comparatively evaluate the potential earthquake performance of less vulnerable buildings with other buildings in the same class (e.g., newer wood frame residences compared to older ones). The ratings could provide a logical and defensible system for establishing rate or premium differentials that could act as incentives. Knowing a building's rating might lead some people to buy a newer home, upgrade an existing one, or accept the risk and pay higher insurance premiums, taxes, and fees as the price for doing nothing to prevent future losses.

In *Plan 2005 for the Seismic Rehabilitation of Buildings*, FEMA noted the importance of creating a building rating system. This concept and the feasibility of establishing such a method for comparatively evaluating buildings should be explored among members of the financial, engineering, research, and insurance communities. Great care will have to be given to the intended purposes of the ratings so that the system can be constructed to achieve the desired results.

✓ **Graphically illustrate how simple retrofit methods prevented damage in recent earthquakes.**

Use a range of media to show how such techniques as bolting foundations to walls, bracing cripple walls, and anchoring water heaters actually prevented damage in recent earthquakes. Use these “success stories” to show that damages have been avoided. The demonstration of benefits (and comparable damages to unmitigated structures) could help convince public officials to support the adoption and implementation of stronger mitigation efforts, especially when decision-makers are considering specific proposals.

✓ **Create incentives-advocacy committees to influence state and local mitigation in earthquake risk areas.**

State and local officials in very high, high, and moderate earthquake risk states, with “encouragement” by selected federal government measures such as training and education programs and support to create seismic safety commissions, have in the past and could again sponsor a wider variety of measures to promote mitigation. States regulate insurance companies that do business in their states, and state and local governments administer their own often complicated tax and financial other programs. For these reasons, mitigation is most successfully accomplished by these levels of government. While approaches would vary with each state, one possible mechanism is to create an advocacy committee to work on state-specific incentives. These special committees need to include representatives from a range of stakeholder organizations and interests, including government, the financial, insurance and regulatory communities, and building owners. These committees might be established under the auspices of existing committees or commissions, such as Oregon's State Seismic Policy Advisory Commission; through professional groups, such as structural engineers associations or local members of the Earthquake Engineering Research Institute; or by integrating earthquake hazard mitigation into programs of many other existing groups.

✓ **Evaluate the effectiveness of the existing laws designed to encourage mitigation.**

For some years there has been a law in California exempting seismic safety improvements from increased property taxes. Experience with this program indicates some problems appear to be associated with lack of awareness of the incentive, administrative difficulties in applying for it, and concern by tax authorities (county assessors) about what kinds of work qualify for the exclusion. An evaluation of this and other tax incentive/rebate programs would be important to designing and implementing other tax-related incentives, especially those affecting implementation and administrative processes.

✓ **Create a public/private partnership to provide loans for low-income homeowners.**

It is clear that some segments of the population understand the risk, but do not have the financial resources to take the necessary steps to strengthen their buildings. Building upon the interest in the mortgage loan community in selling loans, suggestions emerged for a public/private partnership between the government and the lending industry to increase the availability of loans for lower income property owners. This segment of the population most often depends on government disaster assistance when they incur losses. The resulting offset of future costs to the government could be a substantial incentive to establish grant or subsidized programs for eligible recipients. Experience has shown repeatedly that the initial outlay for mitigation is smaller than that required after a disaster to repair damage.

## **Implementation**

In order to transfer many of these recommendations from paper to reality, activity has to take place on many different fronts. The types of organizations that were represented at this workshop need to continue to come together to share their diverse perspectives and to learn from each other. Individuals need to be energized to become champions in their own industries. The kinds of observations and suggestions resulting from this workshop need to be incorporated into a variety of professional meetings and organizations, including the professional associations for insurance, banking, tax and regulatory industries.

It was apparent at this workshop that the issues involved in developing financial incentives for performance-based design in particular and seismic retrofit more generally are very complex. One meeting with various stakeholders is not enough to resolve these complex issues. Sustained commitment and strong leadership is required. The Federal Emergency Management Agency (FEMA) in particular can play a leadership role in bringing together diverse organizations and individuals to continue the dialogue started at this workshop. As the lead federal agency for the National Earthquake Hazard Reduction Program, FEMA is positioned to work with Congress, other federal agencies, professional associations, and leaders of

business and industry to provide a forum to promote the development of a workable slate of incentives. Society's financial exposure to earthquake risk is a national problem that requires strong leadership.

## **Areas Needing More Consideration**

The following specific considerations are drawn directly from the work group reports. More attention was given to existing and new single-family residential buildings than other building types, due to their sheer numbers, the interests of workshop participants, and because seismic safety decisions for large commercial/industrial properties appear to follow a more individualized process.

### **Tax Reductions**

Governments raise revenues for their programs and functions from a wide variety of taxes and fees. Many exclusions already exist that reduce payments made by taxpayers, technically reducing income to government. Probably the best known is the federal allowable income tax deductions for mortgage interest payments and property taxes. Buildings considered to be of historic value have been able to take advantage of substantial federal tax benefits.

One workshop speaker from California noted that:

California's Sales and Use Tax Law does not currently contain any general provision or exclusion from the tax, or any other tax incentive, for the express purpose of making modifications related to earthquake safety. California's more significant sales tax incentive programs are primarily industry-driven, for the purpose of attracting and retaining business in California.

Discussion indicated that several proposed tax-related incentives failed to be passed into law during the past decade. For example, three modest income tax credit measures related to retrofitting introduced in the California legislature after the Loma Prieta and Northridge earthquakes to allow accelerated depreciation for costs associated with improving existing older buildings failed to become law.

However, in 1999 the California legislature permanently exempted from property tax increases work done to seismically strengthen existing buildings. The original law would have expired on July 1, 2000. Background research for this workshop showed, however, that use of this incentive varied significantly. No analysis has been done to assemble information about the values or nature of work excluded from the tax, the type of buildings or ownership involved, nor how much tax revenue local governments failed to realize because of this law.

Tax credits alone typically are not in themselves sufficient to influence behavior to spend money on better buildings. However, combined with other incentives, such as federal tax incentives, education programs, and multi-media materials, a

package may be sufficiently attractive to encourage improved seismic safety. Work by local groups has led to several kinds of initiatives to foster earthquake hazard mitigation. The California communities of Hayward, San Leandro, Berkeley, and Richmond have instituted a mixture of property transfer fee and building permit and inspection waivers, classes and educational materials for homeowners, and tool lending programs.

Many ideas were discussed, including property tax exemptions, personal and corporate income tax credits, allowance for accelerated depreciation for improvements, sales tax reductions on construction materials, and refundable income tax credits for non-taxable entities. These recommendations deserve greater attention, and will be greatly influenced by local earthquake risk and economic conditions.

## Property Insurance Considerations

The building owner is not, from the insurance industry's perspective, a passive partner in managing risk. One participant from the insurance industry noted:

...we need to clarify that our focus is to help our policyholders manage the risks they face. It **is not** to take on all of their risk. It **is not** to manage that risk for them. It **is** to help them manage their own risk by providing various and reliable risk transfer methods and to help them understand that there are some things they can and should do to reduce that risk. However, that assumes our customers understand that they are responsible for managing their risk and are willing to pay either way.

There remains a desire to explore how property insurance can play a greater role in reducing earthquake risk. Several ideas have been mentioned elsewhere in this summary report. For years, people have suggested that health, medical, and automobile insurance programs that encourage policyholders to reduce their risks, and thereby, reduce costs to their insurance carriers are models that can be applied to reduce risks from natural hazards. This has never been systematically studied, but deserves to be.

## Mortgage Lending Practices

In 1998, EERI carried out a project for the California Office of Emergency Services to identify incentives and impediments to improving the seismic performance of buildings. The project steering committee noted that the potential role of lenders is critical to motivating owners to take steps to seismically rehabilitate their properties, but *“we must encourage lenders to accept greater responsibility in promoting improved performance.”*

Discussion concerning the potential role of the mortgage lending community was perhaps the most enlightening part of the workshop. Participants learned that the average mortgage, on single or multiple family residences, is held for only ten years. During that time the occurrence of the earthquake is a random event. Loans are often spread over a wide geographic area and are packaged or “pooled” for resale on the secondary mortgage market, leaving lenders with minimal loss exposure. This holds true unless the lender retains a substantial proportion of its loans and a large proportion are in a high earthquake risk area. This was the case with one southern California lender who took a substantial loss after the Northridge earthquake.

In light of what we learned in Seattle, it now seems unrealistic to think that we can get “lenders to accept greater responsibility in promoting improved performance.” Nevertheless, there are a number of avenues by which to approach the lending community. Recognizing that they are in business to make loans, programs need to be developed that combine this interest with building safety. Seismic rehabilitation loans are a profitable lending opportunity, for at least two reasons: values of properties involved are typically solid; and conscientious borrowers who seek funds to protect their properties are often low credit risks.

These favorable conditions, in combined with the possibility of increased lending opportunities, may be enough to entice lenders to offer incentives.

Some types of lending-oriented incentives discussed at the workshop include reducing fees (or “points”), offering lower than market interest rates, and structuring home equity loans to promote hazard mitigation to reward mortgage holders for reducing risk. Mitigation could help prevent post-disaster defaults on loans; while not significant to all lenders, this could be important to companies having concentrated numbers of mortgages in high risk areas.

Regulatory agencies could potentially also play a larger role in the mortgage industry’s abilities to design incentives. In an unregulated and competitive market, lenders who unilaterally try to impose seismic safety requirements might lose borrowers to other lenders who do not have such requirements, resulting in a loss of business for the “more responsible” lender. On the other hand, if the regulators provide allowances or standards for seismic safety incentives that can be used by all lenders the playing field remains level as does competition. This potential needs further examination.

Several participants noted the increasing importance of “rating agencies.” These organizations (e.g.: Standard and Poors) have an important affect on the marketability of mortgage portfolios because they establish the criteria on which quality ratings are assigned. These ratings directly influence the pricing of loan portfolios, with higher risk portfolios receiving lower ratings (B vs. AAA+ for example). If raters were to downgrade a lender’s portfolio because of a high proportion of at-risk properties, this might provide an incentive for lenders to encourage prospective loan recipients to take steps to reduce risk to their properties. It will be important to include rating agency representatives in future discussions of incentives to learn how their practices might influence lenders’ abilities to contribute to improving the design of new and the rehabilitation of existing buildings.

## **Property Transfer Incentives**

The exchange of property provides an opportunity, and in some places a requirement, to examine the condition of the property and choose to attach special requirements as a condition of the transfer. Governments also have taxes and fees associated with handling property transfer transactions, especially the recording and issuance of title documents. As noted earlier, seismic rehabilitation incentives have been used in this process, including waiving fees and other costs, to promote mitigation. While only a few examples were discussed, it would very useful to document these examples in more detail, evaluate the impacts they are having on sellers and buyers to determine what is being done to seismically improve the properties, and calculate the rate at which the building stock is being improved.

## **In Conclusion**

The workshop was successful in taking some very important first steps. It gave lenders and insurers an opportunity to discuss their priorities and the financial and regulatory constraints they face in dealing with seismic mitigation. It also provided an opportunity for engineers to address some of the misconceptions that have frustrated communications in the past between design professionals, owners, and financial institutions about the performance that buildings built to modern codes are expected to deliver. Although the workshop did not ask for a commitment from state and local agencies or the insurance and financial industries to provide specific incentives to owners to improve seismic performance of their buildings, it did begin the education and communication necessary to develop and use incentives.

In summary, both the financial representatives as well as the earthquake professionals came away with a better understanding of the potential, as well as the constraints to greater implementation of mitigation, including performance-based design. However, perhaps the most significant finding that emerged from the workshop was the sheer complexity involved in developing incentives that promote mitigation, including the use of performance-based design. This problem is going to require more communication to understand how the various stakeholders conduct business and more appreciation of the unique perspective of each stakeholder. Sustained, high level attention needs to be devoted to the problem by leaders in government, the financial, insurance and regulatory communities, among building owners and community leaders. These leaders need to agree to participate in a series of meetings where attention can be focused on developing effective incentives. Project Impact communities may prove to be useful laboratories for the development of sets of incentives. However, in order to tackle this problem most effectively, activity needs to take place simultaneously on many different fronts: speakers at various meetings of professional organizations; high-level meetings of legislators and industry; empowering the champions in the various stakeholder groups through training and exchanges; workshops and meetings where all stakeholder groups are present and can work through issues together; brainstorming meetings where creative and innovative solutions are encouraged; community level activity that promotes changes in attitudes and behaviors. By working hard together and sustaining interest in and commitment to the problem of developing financial incentives that promote mitigation, the various stakeholders can move closer to the goal of reducing earthquake losses.

## APPENDIX A: AGENDA

### Investigating Incentives to Improve the Implementation of Performance-Based Seismic Design in New and Existing Buildings

September 22 and 23, 1999

Madison Hotel, Seattle,

Washington

#### Wednesday, September 22

	<b>8:30 am</b>	Coffee and continental breakfast		<b>2:00 pm</b>	Introduction to teams: goals, rules, process, expectations
<i>Foyer</i>					
<i>South Room</i>	<b>9:00 am</b>	Welcome, Introductions and Opening Remarks	<i>Break-out rooms</i>	<b>2:15 pm</b>	Break into five teams <i>Team 1 (South); Team 2 (Columbia); Team 3 (James) Team 4 (Marion); Team 5 (West)</i>
		<i>Robert Olson, Robert Olson Associates Inc.</i>	<i>Foyer</i>	<b>3:00 pm</b>	Floating break
	<b>9:30 am</b>	Panel: Stakeholders Share Their Perspectives	<i>South Room</i>	<b>4:30 pm</b>	Team “quick progress reports”
		<i>Michael Mahoney and Elizabeth Lemersal, FEMA Ines Pearce, City of Seattle Kevin Kleen, ARCS Commercial Mortgage Wendy Meador, Wash. Mutual Bank Dennis Fasking, Allstate Insurance</i>	<i>Foyer</i>	<b>5:00 pm</b>	Adjourn for day
	<b>10:45 am</b>	Break		<b>6:00 pm</b>	No-host reception
	<b>11:15 am</b>	Panel: Resource Experts			Dinner (on own; see Concierge for recommendations)
		<i>Assemblymember Ellen Corbett, CA State Assembly Margaret Shedd, CA Board of Equalization Richard Roth, CA Department of Insurance Kevin Kleen, ARCS Commercial Mortgage (rating and regulation)</i>	<i>Foyer</i>	<b>Thursday, September 23</b>	
				<b>8:00 am</b>	Continental breakfast
			<i>Break-out rooms</i>	<b>8:30 am</b>	Reconvene in teams
				<b>10:30 am</b>	Break
			<i>South Room</i>	<b>11:00 am</b>	General Session—teams present recommendations. “Prizes” awarded to team with best set of recommendations
<i>Visions Restaurant 18<sup>th</sup> Floor</i>	<b>12:30 pm</b>	Lunch	<i>Visions Restaurant 28<sup>th</sup> Floor</i>	<b>12 noon</b>	Lunch
<i>South Room</i>	<b>1:30 pm</b>	Performance-based Design	<i>South Room</i>	<b>1:00 pm</b>	General Session
		<i>William Holmes, Rutherford &amp; Chekene</i>	Earthquake Team		Special Presentation on Turkey <i>Brent Woodworth, IBM Crisis Response</i>

*outh Room*

**1:45 pm** General  
Session—moderated  
discussion of recommendations and next  
steps. Floor discussion of how best to  
achieve adoption and implementation.  
Prepare workshop conclusions and  
recommendations.

oom)

Floating Break (refreshments at back of

**4:30 pm** Adjourn

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