



Risk Management Series

# Incremental Seismic Rehabilitation of Retail Buildings

Providing Protection to People and Buildings

June 2004



**FEMA**

FEMA 399



**RISK MANAGEMENT SERIES**

# Incremental Seismic Rehabilitation of Retail Buildings

**PROVIDING PROTECTION TO PEOPLE AND BUILDINGS**



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## Foreword and Scope

*Earthquakes are a serious threat to safety in retail buildings, be they malls or single tenant buildings, and pose a significant potential liability to retail building owners. Retail buildings in 39 states are vulnerable to earthquake damage. Unsafe existing buildings expose retail building owners and tenants to the following risks:*

- *Death and injury to tenants, occupants, shoppers, and visitors*
- *Damage to or collapse of buildings*
- *Damage to and loss of furnishings, equipment, merchandise, and other building contents*
- *Disruption of sales functions and building operations*

The greatest earthquake risk is associated with existing retail buildings that were designed and constructed before the use of modern building codes. For many parts of the United States, this includes buildings built as recently as the early 1990s.

Although vulnerable retail buildings should be replaced with safe, new construction or rehabilitated to correct deficiencies, for many building owners new construction is limited, at times severely, by budgetary constraints, and seismic rehabilitation is expensive and disruptive. However, **incremental seismic rehabilitation**, proposed in this manual, is an innovative approach that phases in a series of discrete rehabilitation actions over a period of several years. It is an effective, affordable, and non-disruptive strategy for responsible mitigation action that can be integrated efficiently into ongoing facility maintenance and capital improvement operations to minimize cost and disruption.

This manual and its companion documents are the products of a Federal Emergency Management Agency (FEMA) project to develop the concept of incremental seismic rehabilitation—that is, building modifications that re-

duce seismic risk by improving seismic performance and that are implemented over an extended period, often in conjunction with other repair, maintenance, or capital improvement activities. It provides owners of Class A, B, or C retail buildings, be they Real Estate Investment Trusts (REITs), pension funds, partnerships, individuals, or other forms of ownership, with the information necessary to assess the seismic vulnerability of their buildings and to implement a program of incremental seismic rehabilitation for those buildings.

The manual consists of three parts:

- **Part A, Critical Decisions for Earthquake Safety in Retail Buildings**, is for owners' senior executives, board members, and policy makers who will decide on allocating resources for earthquake mitigation.
- **Part B, Planning and Managing the Process for Earthquake Risk Reduction in Existing Retail Buildings**, is for facility managers, risk managers, and financial managers, or those responsible for these areas of management, who will initiate and manage mitigation.
- **Part C, Tools for Implementing Incremental Seismic Rehabilitation in Existing Retail Buildings**, is for facility managers, or those responsible for facility management, who will implement incremental seismic rehabilitation programs.

This manual is part of a set of manuals intended for building owners, managers, and their staff:

- *Incremental Seismic Rehabilitation of School Buildings (K-12)*, FEMA 395
- *Incremental Seismic Rehabilitation of Hospital Buildings*, FEMA 396
- *Incremental Seismic Rehabilitation of Office Buildings*, FEMA 397
- *Incremental Seismic Rehabilitation of Multifamily Apartment Buildings*, FEMA 398
- *Incremental Seismic Rehabilitation of Retail Buildings*, FEMA 399

- *Incremental Seismic Rehabilitation of Hotel and Motel Buildings, FEMA 400*
- *Incremental Seismic Rehabilitation of Storage Buildings, FEMA 401*
- *Incremental Seismic Rehabilitation of Emergency Buildings, FEMA 402*

Each manual in this set addresses the specific needs and practices of a particular category of buildings and owners, and guides building owners and managers through a process that will reduce earthquake risk in their building inventory. The manuals answer the question, as specifically as possible: “What is the most affordable, least disruptive, and most effective way to reduce seismic risk in existing buildings?” By using the process outlined in these manuals, building owners and managers will become knowledgeable clients for implementing incremental seismic rehabilitation specifically geared to their building use category.

In addition to this set of manuals, there is a companion manual, *Engineering Guideline for Incremental Seismic Rehabilitation, FEMA 420*. It is intended to assist architects and engineers who provide services to building owners. Architects and engineers using that manual will be effective consultants serving a knowledgeable owner. Together they will be in a position to implement an effective incremental seismic rehabilitation program.

## How to Use This Manual

**Critical Decisions:** Retail building owners' senior executives, board members, and similar policy makers should read Part A. Section A.1 provides a general understanding of the earthquake hazard faced by a retail building owner. Section A.2 provides an overview of how the seismic vulnerability of retail buildings and resultant losses can be estimated. Section A.3 provides an overview of the actions an owner can take to reduce earthquake risk, including incremental seismic rehabilitation. Section A.4 details how to implement the concept of incremental seismic rehabilitation, including the additional benefits of integrating incremental seismic rehabilitation with other maintenance and capital improvement projects. **By understanding these four sections, the retail building owner's top management can establish a policy of seismic risk reduction and initiate a more specific, objective, and cost-effective program of incremental seismic rehabilitation by its technical staff.**

**Program Development:** Those responsible for the retail building owner's facility, risk, and financial management should read Parts A and B, paying particular attention to Part B. Sections B.1 through B.3 provide detailed guidance on **how the initiation of a program of incremental seismic rehabilitation can fit into the ongoing facility management process** used by the owner organization and its retail buildings, and indicate specific activities that can be undertaken. A separate Appendix, Additional Information on Retail Building Facility Management, is provided at the end of this manual for those seeking more information on facility management. It contains a discussion of specific phases of the facility management process and activities for retail building owners seeking further detail.

**Project Implementation:** Owner organization and retail building facility managers should read Part C in addition to Parts A and B. Section C.1 provides guidance on using the consulting services of architects and engineers in implementing a program of incremental seismic rehabilitation. Section C.2 discusses specific opportunities for **combining increments of seismic rehabilitation with other maintenance and capital improvement projects, including tenant work.**

To get the most out of this manual:

- Communicate the importance of assessing your building inventory's risks and pass this manual on to staff members responsible for facility management, risk management, and financial planning. Specify that they develop an analysis of the current seismic risk of your buildings and a strategy for risk reduction.
- Promptly initiate a program of earthquake risk reduction in your buildings located in an earthquake-prone zone that were not designed and constructed to meet modern building codes.
- Consider incremental seismic rehabilitation as a cost-effective means to protect the buildings and, most importantly, the safety of tenants, shoppers, visitors, and staff, because it is a technically and financially manageable strategy that minimizes disruption of retail building operations.