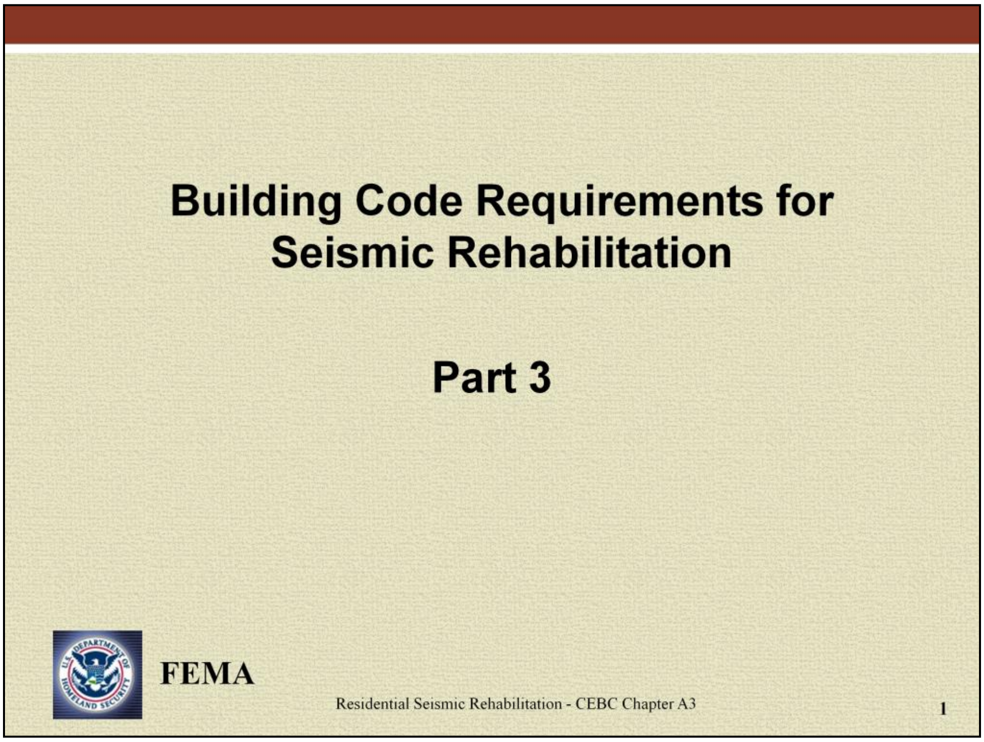
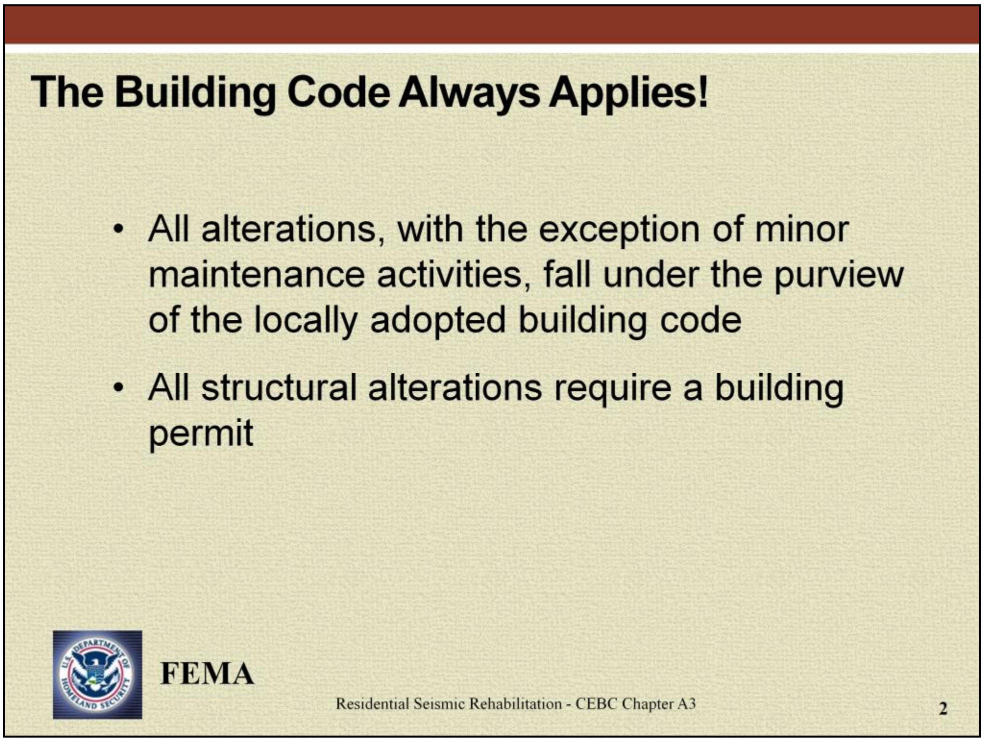
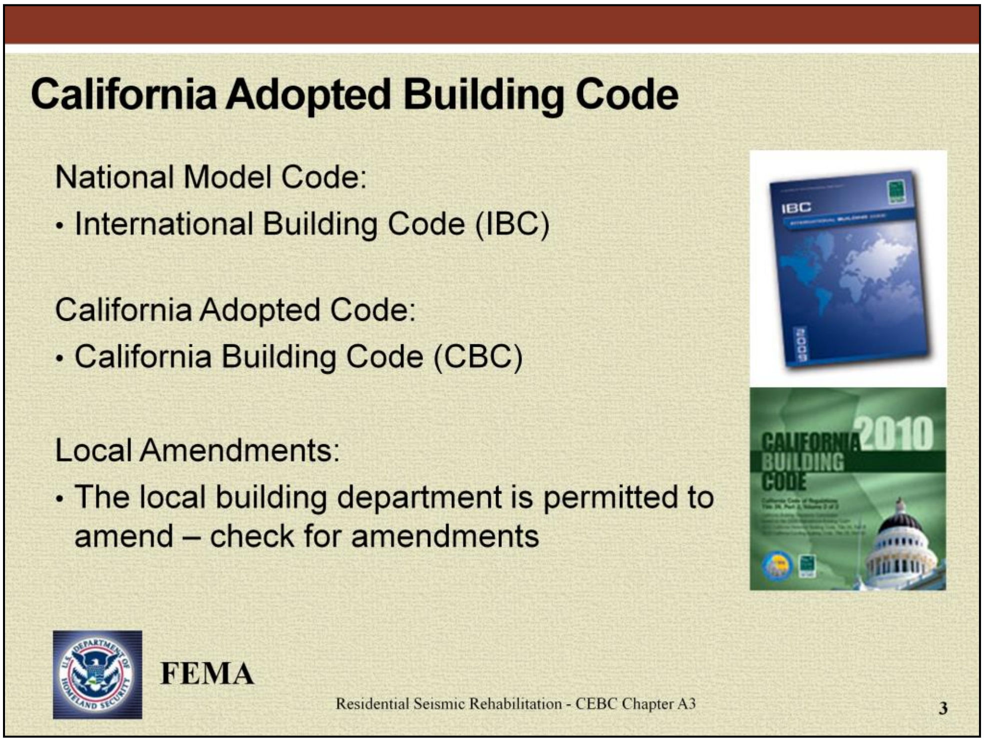


People involved in design or construction services related to seismic rehabilitation need to have a basic understanding of the building code provisions that govern seismic rehabilitation. This section provides a brief overview of that code information, so that participants will be able to look up applicable code sections when necessary. A handout with specific code citations is provided.

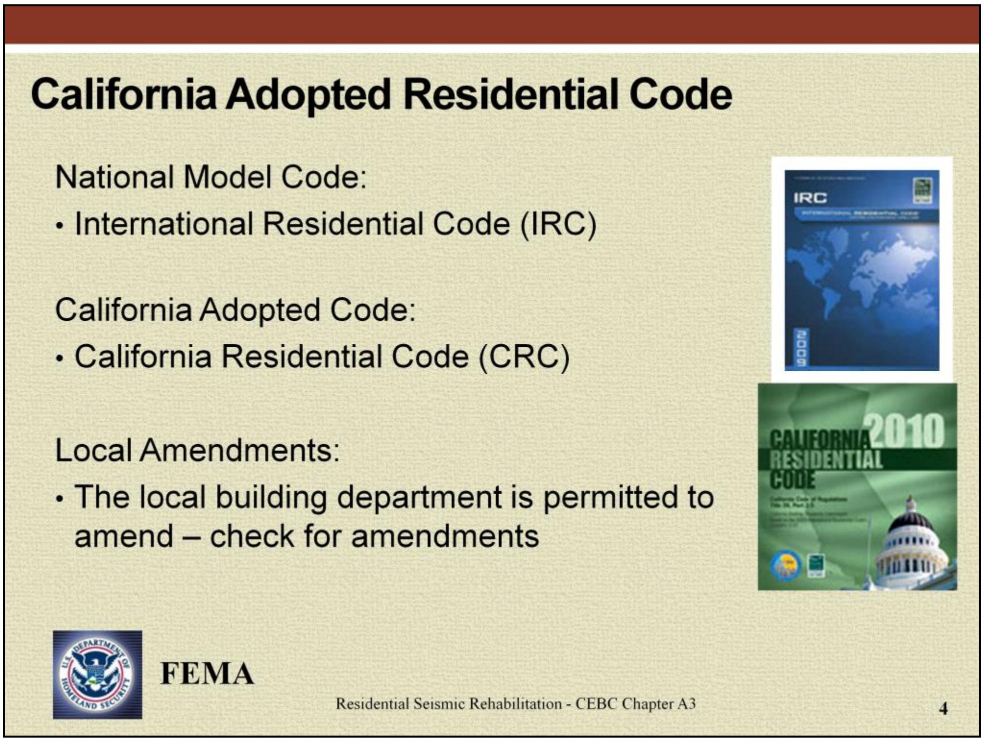


All alterations, with the exception of minor maintenance activities, fall under the purview of the locally adopted building code. All structural alterations require a building permit.

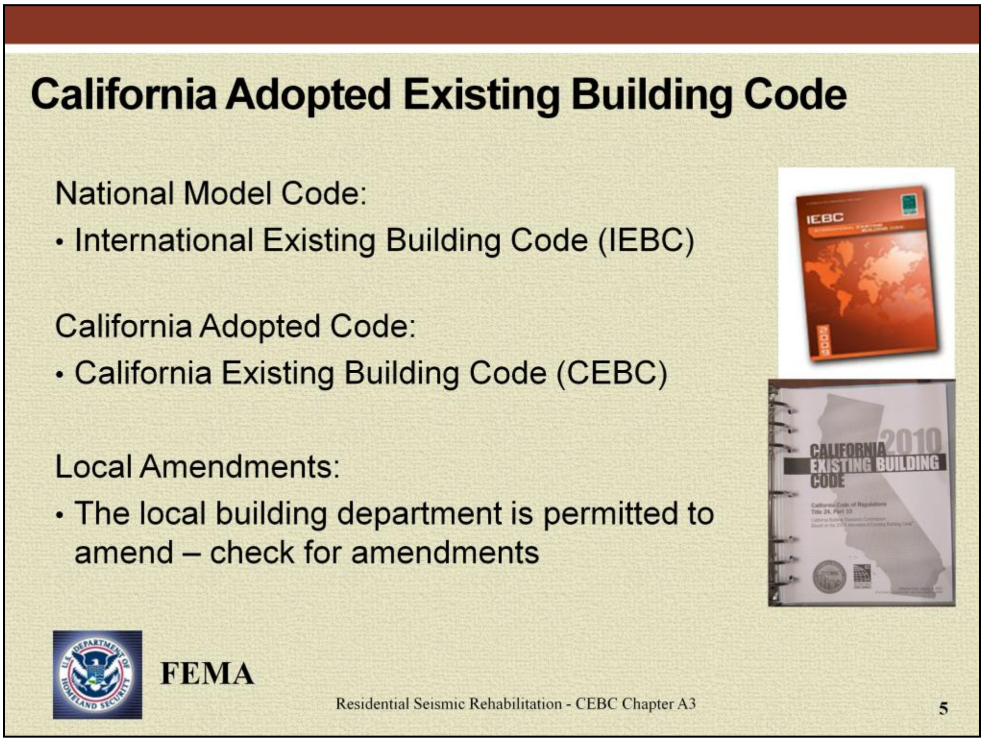


Persons offering design or construction services for seismic rehabilitation need to be aware of which building codes and editions are adopted by the local jurisdiction, and which amendments, if any, have been made to the codes. California adopts and amends the International Building Code (IBC) to create the California Building Code (CBC). Amendments to this code may be adopted at the local city or county level. These amendments could affect seismic rehabilitation work.

Chapter 34 of the CBC addresses alterations to existing buildings and should be the starting point for consideration of seismic rehabilitation activities. Where local amendments apply, start with the amended version of Chapter 34.



California also adopts and amends the International Residential Code (IRC) to create the California Residential Code (CRC). This code may also be amended at the local city or county level. While the IRC does not address voluntary seismic rehabilitation, it does include discussion of alterations and additions. The CRC also can be used for guidance on prescriptive rehabilitation measures.



California also adopts two portions of the International Existing Building Code: Chapter A1 addressing seismic rehabilitation of unreinforced masonry structures, and Chapter A3 addressing dwelling anchorage to foundations and cripple wall bracing. Chapter A3 forms the basis of this training.

Basis for *Voluntary* Rehabilitation

CBC Section 3404.5

Allows discretion regarding type, extent of voluntary rehabilitation, if:

- New work complies with code
- New work does not worsen existing condition ("Do no harm")
- Local jurisdiction has not issued amendments

FEMA

Residential Seismic Rehabilitation - CEBC Chapter A3 6

Seismic rehabilitation work undertaken voluntarily will generally fall under Section 3404.5 of the CBC. This section generally allows the type and extent of seismic rehabilitation work to be determined by the owner, design professional or contractor, provided that two conditions are met:

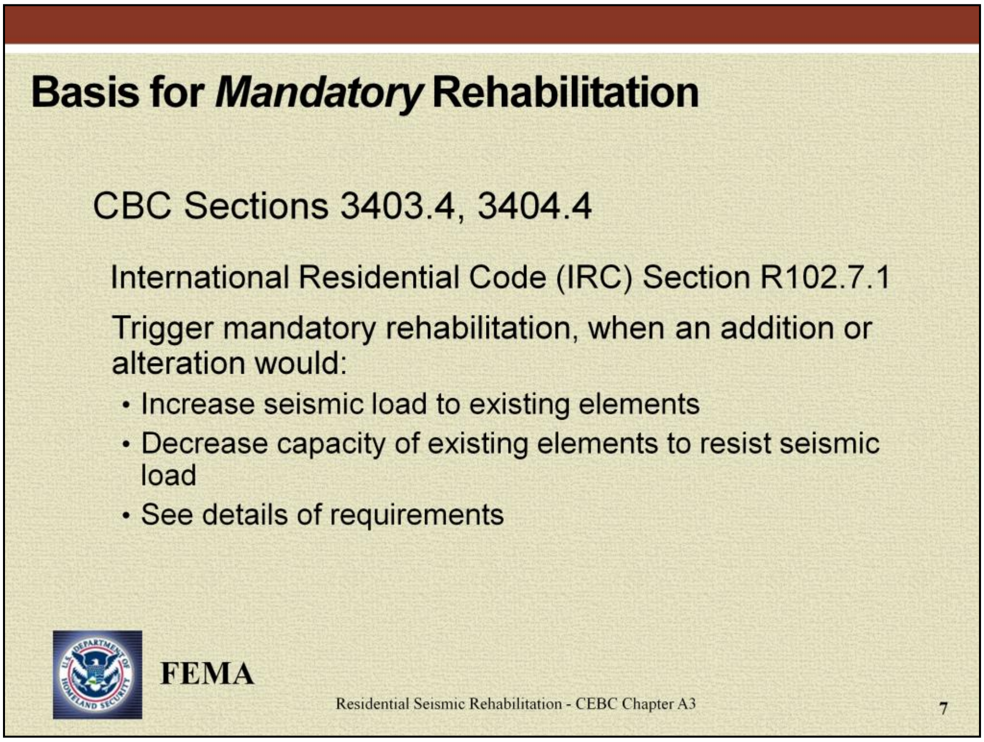
1. All new work installed meets the requirements of the currently enforced building code, and

2. The new work does not create a more critical condition (known as the "do no harm principle")

This approach is beneficial, in that it allows those involved to identify the rehabilitation measures that have the best cost-to-potential-benefit ratio and that make most sense for the individual dwelling and owner.

This approach, however, does not stop the installation of rehabilitation measures that are not appropriate or of little benefit, so misuse is a possibility.

Reminder: check with the local jurisdiction to see if local amendments apply.

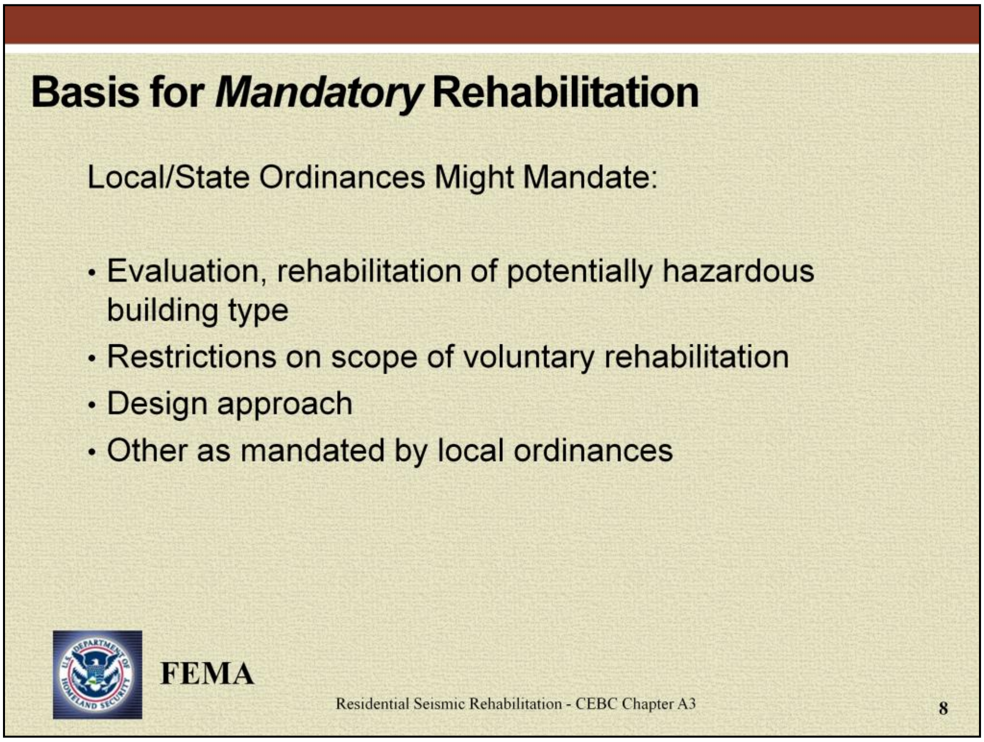


The CBC and CRC include provisions that might trigger mandatory seismic rehabilitation measures. These measures can be triggered by:

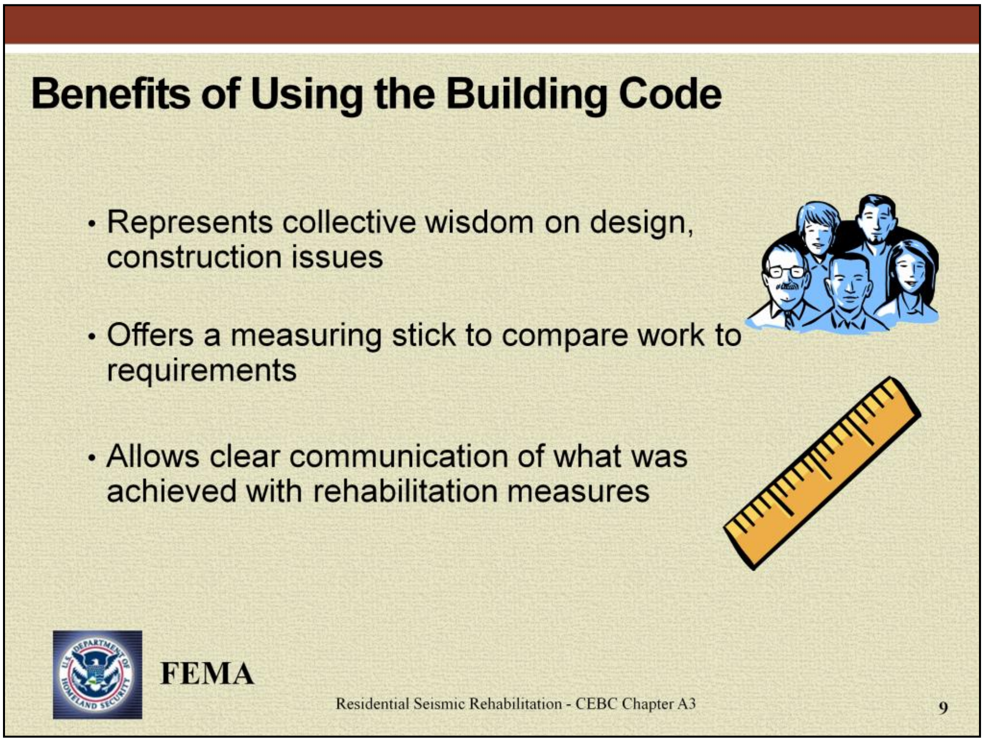
1. An increase in loading to existing elements, such as added weight (roof, wall finish, etc.) or supported area, or

2. A decrease in capacity of existing elements, such as increased openings for doors or windows that lead to reduced bracing wall length, etc.

Whenever mandatory measures are triggered, it is important to discuss the extent of rehabilitation required with the local building department.



Some building departments have adopted local ordinances mandating notification of seismic hazard, seismic evaluation, and/or seismic rehabilitation. Always check to see what local ordinances or code amendments apply.



Whenever possible, it is highly desirable to have voluntary rehabilitation work conform to the minimum requirements of the building code or to other published standards.

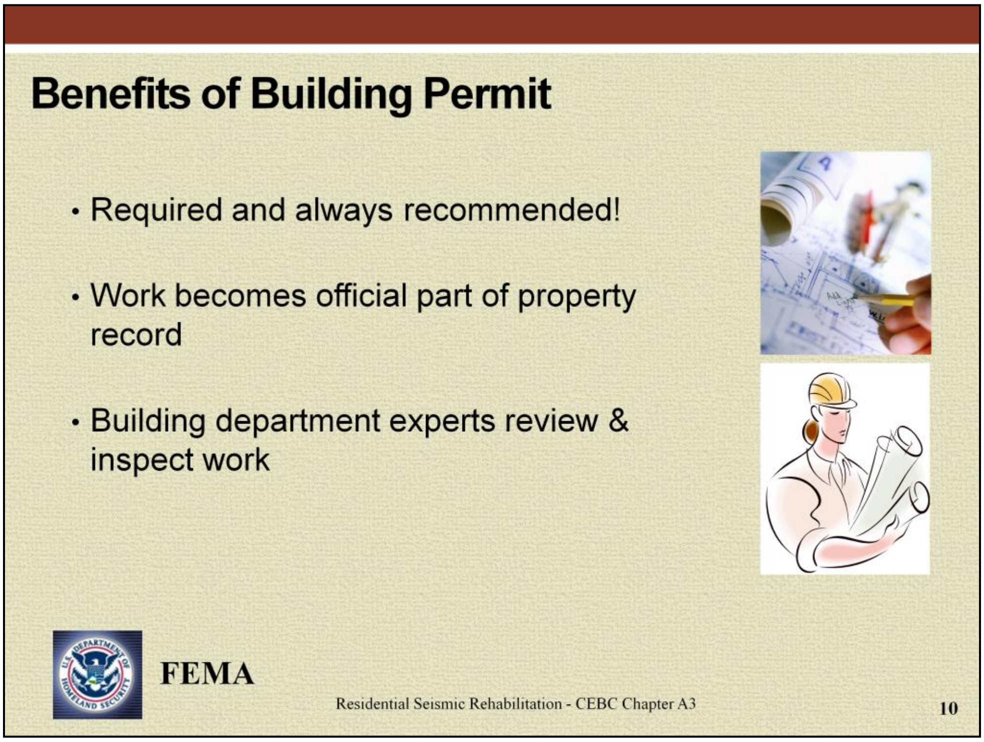
Building codes represent the collective wisdom of building officials, design professionals and industry representatives that has evolved over time in a process of public debate. Building code provisions therefore represent a broad consensus on appropriate minimum design and construction standards and as such, are generally more appropriate guides than decisions based on individual opinion.

Building code provisions also offer a measuring stick, to compare work done to requirements regarding:

-Seismic load level

-Detailing requirements

The prescriptive provisions of CEBC Chapter A3 serve this function, establishing minimum recommended levels of seismic rehabilitation. This was the reason for California adoption of Chapter A3. The provisions of CEBC Chapter A3 are not mandatory, but are highly recommended.



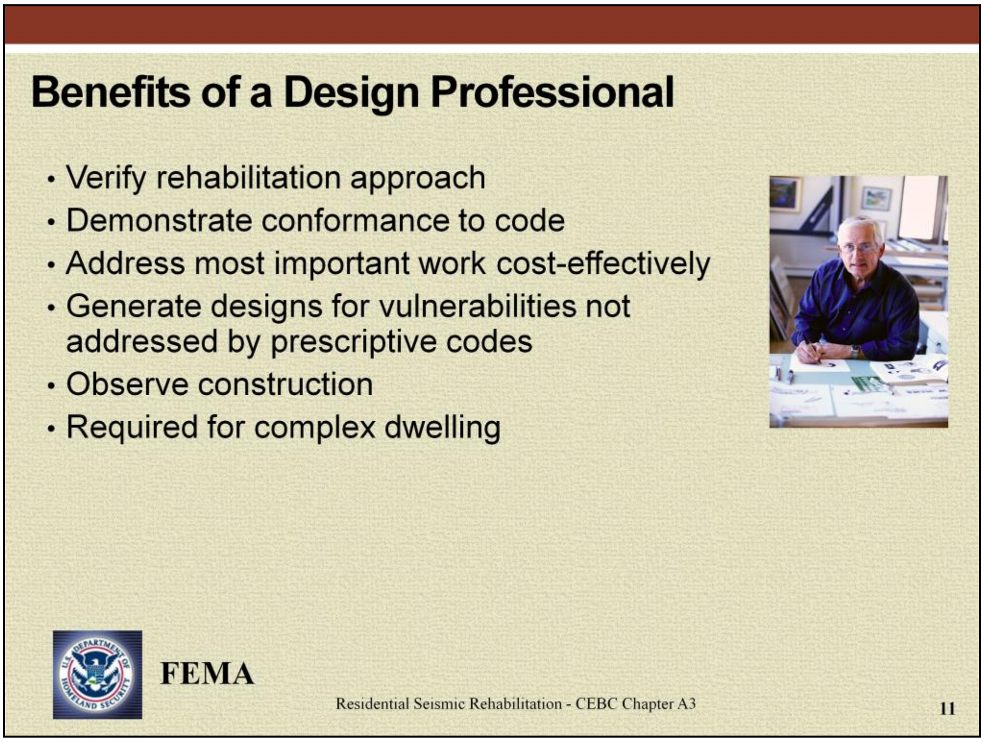
Building permits are required and always recommended for any seismic rehabilitation work. Most work other than maintenance (for example, painting) on existing dwellings requires a building permit. Permits for simple work can often be obtained “over the counter” on the same day, while more complicated work might require a more detailed review.

Benefits of having a building permit include:

-Making the work done part of the official property record

-Having the additional quality assurance of building department review and inspections

This should add value for the current owner and for future owners, when the dwelling is sold.



Involving a design professional is required for some types of rehabilitation work, but may not be for others. Whether or not it is required, the involvement of a design professional can help to:

1. Verify that the rehabilitation approach is appropriate for the dwelling and is an efficient solution

2. Demonstrate conformance with building code earthquake load levels and detailing requirements

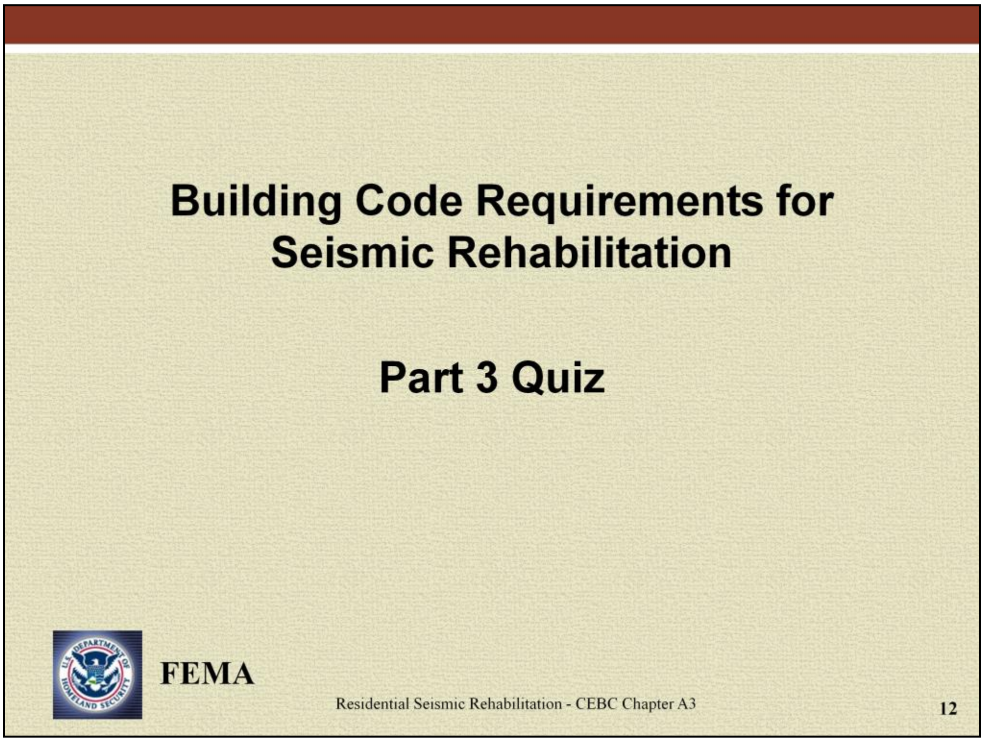
3. Ensure that rehabilitation money is spent wisely, addressing most important work cost-effectively

4. Generate designs for vulnerabilities or conditions that are not addressed by the prescriptive codes – as one example, it is very common to encounter anchorage conditions that require variations on existing details

5. Observe construction to make sure that the contractor understood intent and detailing requirements

Prescriptive provisions are not intended to address more complex building geometries. For these, design professionals are required.

A design professional will usually be a registered (structural or civil) engineer or licensed architect. For soils issues, a registered geotechnical (soils or foundation) engineer is most commonly involved.



You have completed part 3 of the educational module.

Contractor’s please return to the contractor dashboard to take a short quiz.