



It could happen today.

FEMA P-50 and QuakeGrade™

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Chief Mitigation Officer

May 12, 2020

CEA CALIFORNIA
EARTHQUAKE
AUTHORITY™

CALIFORNIA:

MANDATORY OFFER LAW



Earthquake coverage is excluded from homeowners insurance policy

However, insurance companies are required to offer a separate earthquake insurance policy at time of homeowner policy sale.

NORTHRIDGE EARTHQUAKE



January 17, 1994

CEA: PUBLICLY MANAGED AND PRIVATELY FINANCED

A not-for-profit provider of residential earthquake insurance

GOVERNING BOARD:

Governor
Insurance Commissioner
State Treasurer

Non Voting:

Assembly Speaker and Senate Rules Chair

PRIVATELY FINANCED:

1,115,040 Policyholders

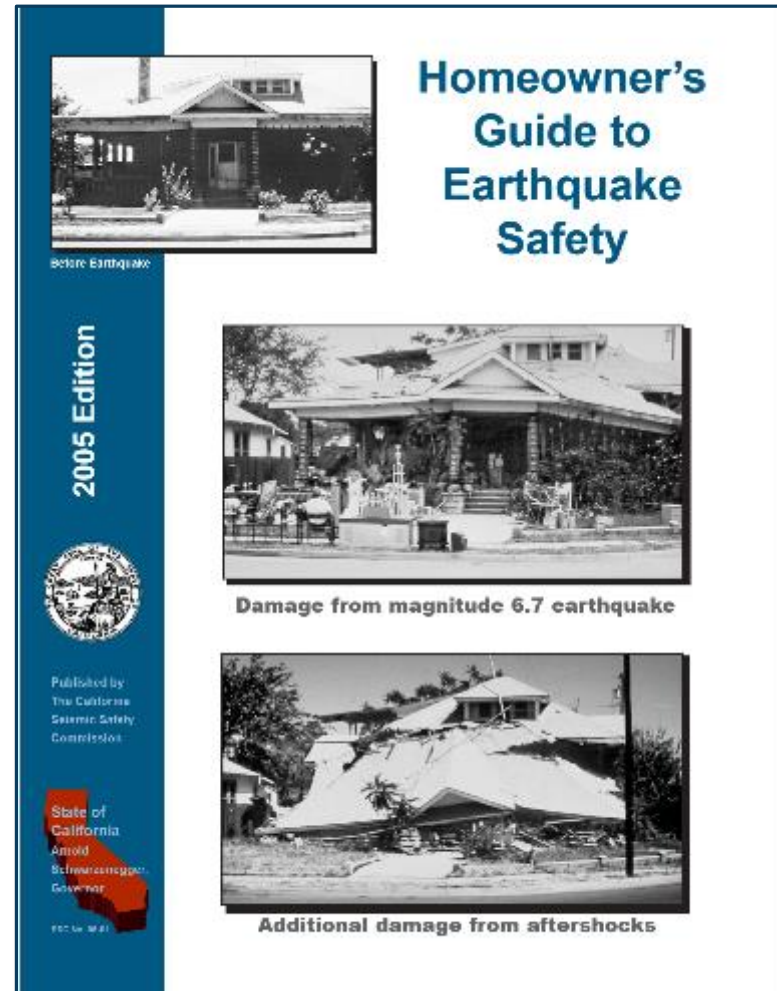
MISSION:

Educate
Mitigate
Insure

CEA: PARTICIPATING INSURERS



Since 1990, CA
State Law
Requires Seller
to Inform Buyer
of Known
Weaknesses



Real Estate agents required to give this book
to a buyer of houses built before 1960

CA REAL ESTATE HAZARD REPORT

Required since 1990

Residential Earthquake Hazards Report (2005 Edition)

Name: _____ Seller's Agent: _____
Street address: _____ Check box: _____
City/County: _____ ZIP Code: _____

Answer these questions to the best of your knowledge. If you do not have actual knowledge as to whether the weakness exists, answer "Don't Know." If your house does not have the feature, answer "Doesn't Apply." The page numbers in the right-hand column indicate where in this guide you can find information on each of these features.

	Yes	No	Doesn't Apply	Don't Know	See Page
1. Is the water heater braced, strapped, or anchored to resist falling during an earthquake?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12
2. Is the house anchored or bolted to the foundation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	14
3. If the house has cripple walls: - Are the exterior cripple walls braced? - If the exterior foundation consists of unreinforced concrete piers and posts, have they been strengthened?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	18
4. If the exterior foundation, or part of it, is made of unreinforced masonry, has it been strengthened?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20
5. If the house is built on a hillside: - Are the exterior hill foundation walls braced? - Does the hill posts or columns either built to resist earthquakes or have they been strengthened?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	22
6. If the exterior walls of the house, or part of them, are made of unreinforced masonry, have they been strengthened?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	24
7. If the house has a living area over the garage, was the wall around the garage door opening either built to resist earthquakes or has it been strengthened?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	26
8. Is the house outside an Alquist-Petris Earthquake Fault Zone (areas immediately surrounding known earthquake faults)?	To be reported on the Natural Hazards Disclosure Report				36
9. Is the house outside a Seismic Hazard Zone (zone identified as susceptible to liquefaction or landsliding)?	To be reported on the Natural Hazards Disclosure Report				36

Keep your copy of this form for future reference

If any of the questions are answered "Yes," the house is likely to have an earthquake weakness. Questions answered "Don't Know" may indicate a need for further evaluation. If you corrected one or more of these weaknesses, describe the work on a separate page.
As seller of the property described herein, I have answered the questions above to the best of my knowledge in an effort to disclose fully any potential earthquake weaknesses it may have.

EXECUTED BY

Seller: _____ (Date) _____
Buyer: _____ (Date) _____

I acknowledge receipt of this form, completed and signed by the seller. I understand that if the seller has answered "Yes" to one or more questions, or if seller has indicated a lack of knowledge, there may be one or more earthquake weaknesses in this house.

This earthquake disclosure is made in addition to the standard real estate transfer disclosure statement also required by law.

The Homeowner's Guide to Earthquake Safety 47

Seller must provide hazard (fault rupture, liquefaction, landslide) information

But...

Can check "don't know" about structural weaknesses

EARTHQUAKE WEAKNESSES

Some houses may have more than one weakness



Crawlspace (Cripple wall)



Living-space-over garage



Hillside house

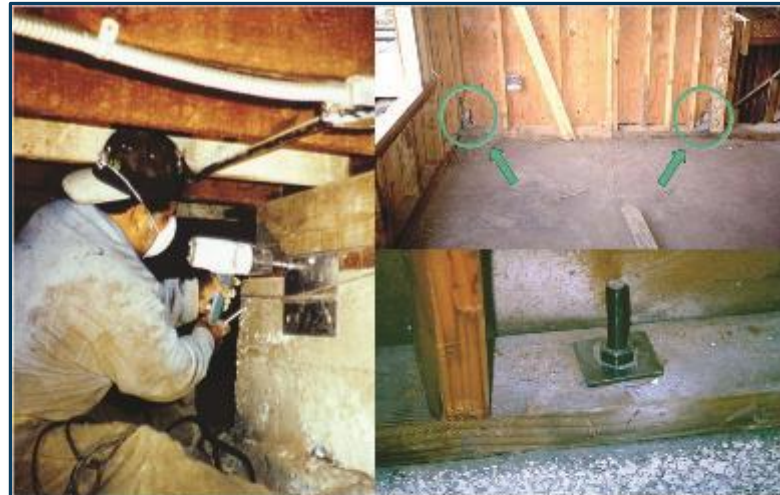


Chimney



Water Heater

FEMA P-50



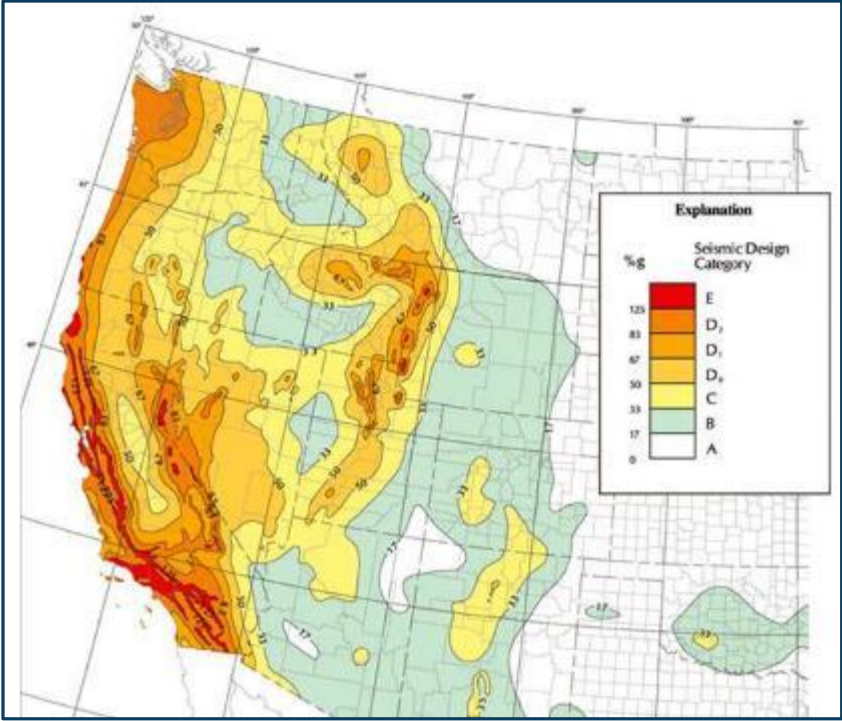
Simplified Seismic Assessment of Detached, Single-Family, Wood-Frame Dwellings

FEMA P-50 / May 2012



SEISMIC PERFORMANCE GRADE

Combination of hazard and structural scores



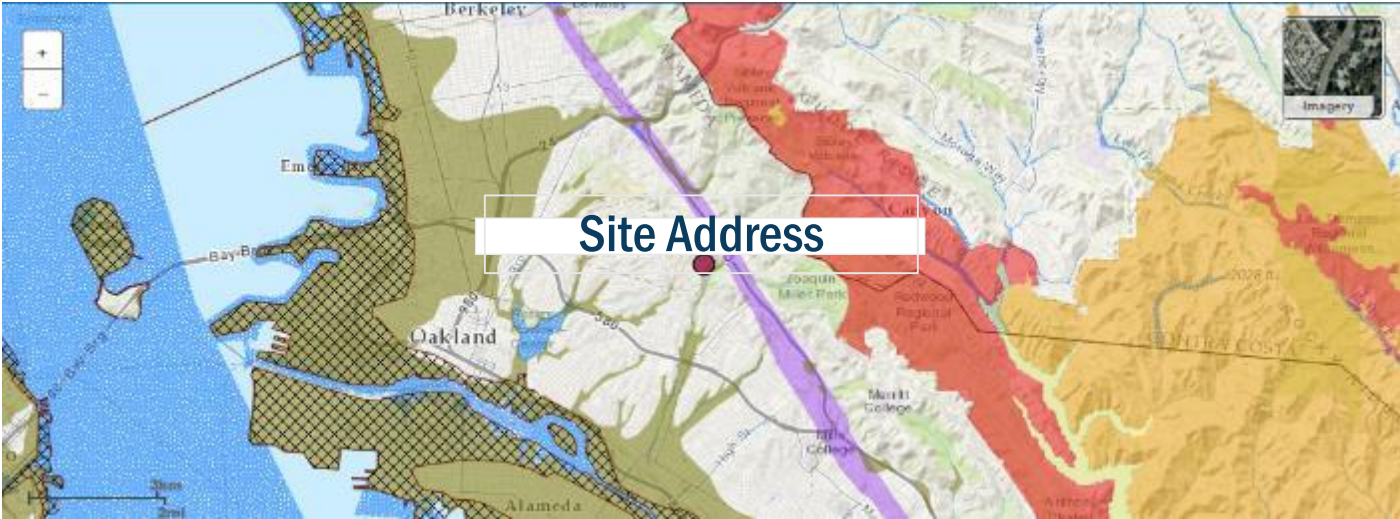
Earthquake Hazard



Structural Weaknesses

SEISMIC PERFORMANCE GRADE

Seismic hazard score – location and soil type



 Liquefaction Zone

 Landslide Zone

SEISMIC PERFORMANCE GRADE

Structural score – house characteristics

House characteristics:

- Foundation
- Superstructure
- General Condition
- Non-structural, Age, and Size
- Local Site Conditions

Start with 100 and take off penalty points

A. Foundation (If the dwelling has a crawl space, the inspector should view all the areas that are accessible.)		Penalty	
*A-1 The exterior footing is:			
a. continuous concrete or reinforced masonry	[0]		
b. other footing conditions	[4.2]		
A-2 The lowest floor of the dwelling is:			
a. slab-on-grade	[0]		
b. wood framed over crawl space or basement	[2.9]		
c. combination of slab-on-grade and wood framed floor over crawl space or basement	[2.9]		
*A-3 At the dwelling crawlspace or basement interior, the lowest floor framing is supported on:			
a. continuous stem walls or a combination of continuous stem walls and beams on posts bearing on concrete footings/piers	[0]		
b. beams on posts bearing on piers/pad footings	[0.8]		
c. beams on posts supported directly on soil	[2.2]		
d. not applicable: slab-on-grade	[0]		
A-4 For a foundation on a slope of 3 horizontal to 1 vertical or steeper, the top of the footing or foundation stem wall on which wall studs or posts are supported is:			
a. sloped parallel to the ground slope	[3.7]		
b. stepped	[1.8]		
c. at a constant elevation with no steps	[0.6]		
d. not applicable	[0]		
*A-5 At the dwelling perimeter walls, where the foundation system supports a wood framed floor:			
a. the foundation sill plate (mud sill) is bolted to the foundation with average anchor bolt spacing of 72 in. or less	[0]		
b. the foundation sill plate is fastened to the foundation with retrofit anchors equivalent to 72 in. or less anchor bolt spacing	[0]		
c. the anchor bolts have average spacing that is > 72 in. but <= 108 in.	[1.7]		
d. the anchor bolts have > 108 in. average spacing	[4.6]		
e. the foundation sill plates have extensive decay, splitting, or inadequate edge distance at one-third or more of the anchor bolt locations such that significant slip of the sill plate could occur	[10.0]		
f. the anchor bolts have significant corrosion at one third or more of the anchor bolt locations such that significant slip of the sill plate could occur	[10.0]		
g. there are no foundation anchor bolts	[15.0]		
h. there are no foundation sill plates to connect to the foundation	[15.0]		
i. not applicable	[0]		
Total			0

Foundation checklist from FEMA P-50

SEISMIC PERFORMANCE GRADE

Table 5. Seismic Performance Grade Based on Structural Score and Regional Seismic Hazard Score

Seismic Hazard Score		0 - 1	2 - 3	4 - 5	6 - 7	8 - 10	11 - 12
Structural Score	1.0 - 45.9	B-	C+	C	D	D-	D-
	46.0 - 64.9	B+	B	C+	D+	D	D-
	65.0 - 74.9	A-	B+	B	C	C-	D+
	75.0 - 84.9	A-	A-	B+	B-	C	C
	85.0 - 100	A	A	A-	B+	B	B-

G. Determination of Seismic Performance Grade

1. Structural Score

- | | |
|---|---------|
| a. Foundation (Section A) | [3.7] |
| b. Superstructure Framing and Configuration (Section B) | [7.3] |
| c. General Condition Assessment | [2.4] |
| d. Nonstructural Elements, Age, and Size (Section D) | [5.0] |
| e. Local Site Conditions (Section E) | [1.3] |

Total Penalty Points (a to e):

19.7

Structural Score = (100 – Total Penalty points from line above):

80.3

2. Seismic Hazard Score (from Section F):

6

3. Seismic Performance Grade (from Table 5)

Note: insert this grade, including + or -, if applicable in box on page 1

B-

4. Anticipated Seismic Performance¹

Following anticipated seismic events:²

Grade A, A-: Excellent Performer
(Potential minor structural and finish damage, earthquake damage ratio³ of 0%-10%, continued occupancy is likely)

Grade B, B+, B-: Good Performer
(Potential moderate structural and finish damage, continued occupancy likely following minor structural repairs, earthquake damage ratio³ of 0%-50%, seismic retrofit measures are encouraged)

Grade C, C+, C-: Fair Performer
(Potential moderate to major structural and finish damage, structural repairs may be required prior to continued occupancy, earthquake damage ratio³ of 10%-60%, seismic retrofit measures are strongly encouraged)

Grade D, D+, D-: Poor Performer
(Potential severe structure and finish damage requiring significant repairs prior to re-occupancy, earthquake damage ratio³ of 20% – 100%, significant seismic retrofit measures are strongly encouraged)

SEISMIC PERFORMANCE GRADE

Combination of hazard and structural scores

Table 5. Seismic Performance Grade Based on Structural Score and Regional Seismic Hazard Score

Seismic Hazard Score		0 - 1	2 - 3	4 - 5	6 - 7	8 - 10	11 - 12
Structural Score	1.0 - 45.9	B-	C+	C	D	D-	D-
	46.0 - 64.9	B+	B	C+	D+	D	D-
	65.0 - 74.9	A-	B+	B	C	C-	D+
	75.0 - 84.9	A-	A-	B+	B-	C	C
	85.0 - 100	A	A	A-	B+	B	B-

Seismic Performance Grade Table from FEMA P-50

SEISMIC PERFORMANCE GRADE

Improving the seismic performance grade through retrofit

H. Improving the Seismic Performance Grade			
The Structural Score and Seismic Performance Grade may be altered as a result of seismic retrofit or by a more in-depth seismic evaluation of the dwelling and the site by a qualified licensed design professional. Guidance on these issues is provided in Chapter 8.			
If seismic retrofit is being considered, the Structural Score could be increased (and the Seismic Performance Grade potentially increased) by retrofitting conditions that would allow the elimination or reduction in penalties, if any, for the following items:			
Item	Retrofit Description	Points (circle applicable number)	Priority Retrofit
A-1	Provide continuous reinforced concrete foundation	4.2	
A-3	Provide foundation pads under interior posts	1.4	Yes
A-5	Add anchor bolts or retrofit anchors	1.7 4.6 10.0 15.0	Yes
B-2	Add bracing walls at dwelling exterior	3.2	
B-3	Install lighter roofing	1.8 3.5	
B-4	Install plywood/OSB or steel frame at garage front	3.0	Yes
B-5	Change exterior wall finish	1.0 2.5 3.5	
B-8	Improve bracing at perimeter walls below lowest floor	4.0 7.0 14.0	Yes
C-2	Repair cut structural framing	1.5	
C-3	Repair deteriorated stucco	1.0 2.0	
C-4	Repair deteriorated foundation	0.6 1.3	
D-1	Strap exterior chimney to roof and floors	1.0	
D-2	Provide bracing and flexible water and gas connections for water heater	1.0	Yes
D-3	Provide earthquake-activated gas shut-off valves	1.0	Yes
D-4	Anchor exterior stairs, deck and porch roof	1.0	Yes
E-3	Repair footing cracks	1.0 2.7	
E-6	Improve rain water routing away from foundations	1.3 2.6	Yes

Priority Retrofits: For this dwelling, the Structural Score can be increased by as many as 3.3 "Priority Retrofit" points (insert sum of points for circled items in rows with "Yes" in Priority Retrofit column). This will increase Structural Score to 89.4 (Section G, Item 1f Structural Score plus "Priority" retrofit points). This will result in an improved Structural Grade of B+ (from Table 5, using improved Structural Score).

All Retrofits: For this dwelling, the Structural Score can be increased by as many as 7.5 retrofit points (insert sum of ALL points for circled items). This will increase the Structural Score to 93.6 (Section G, Item 1f structural score plus ALL points circled above). This will result in an improved Structural Grade of B+ (from Table 5, using improved Structural Score).

Improving the grade table from FEMA P-50

Crawlspace (Cripple Wall) Weakness

House shifted and dropped



2014 South Napa M6.0 Earthquake Damage to a House

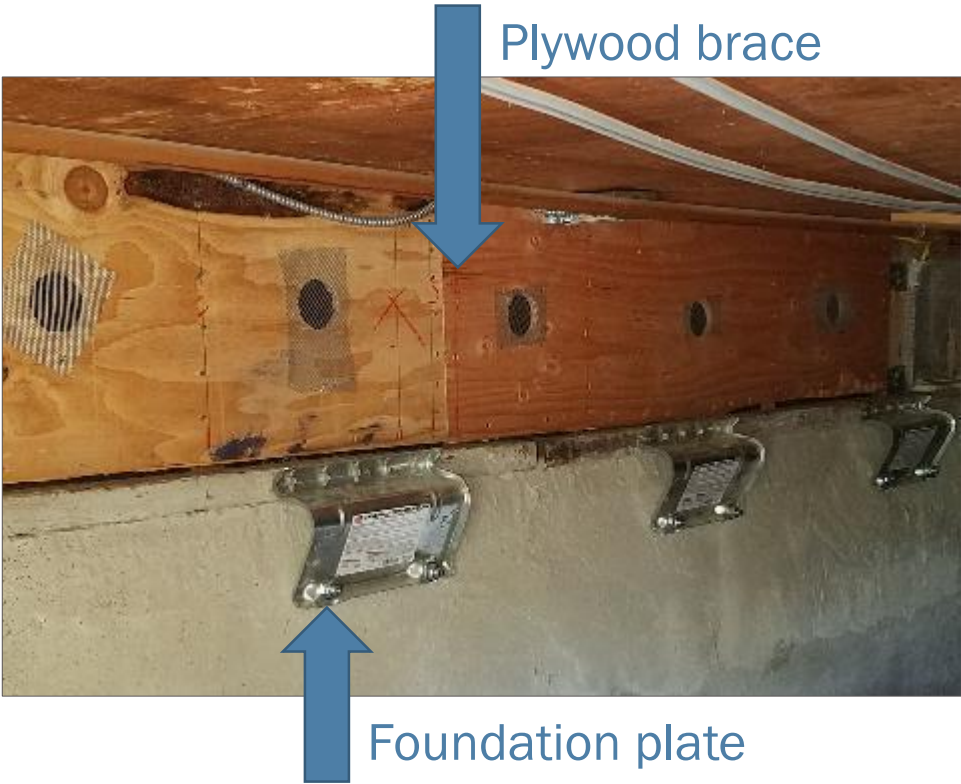
EARTHQUAKE BRACE + BOLT

Typical crawlspace (cripple wall) retrofit

Crawlspace **Before** Retrofit



Crawlspace **After** Retrofit



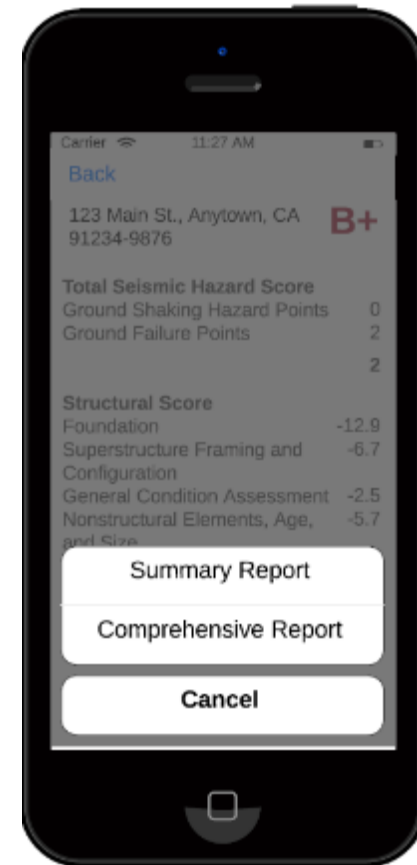
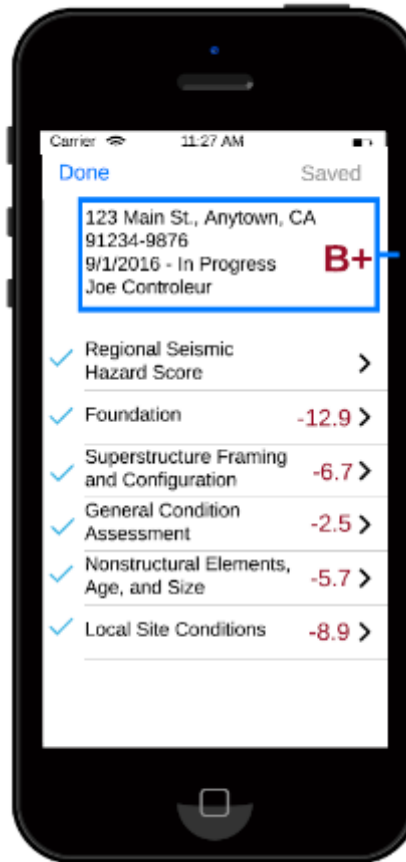
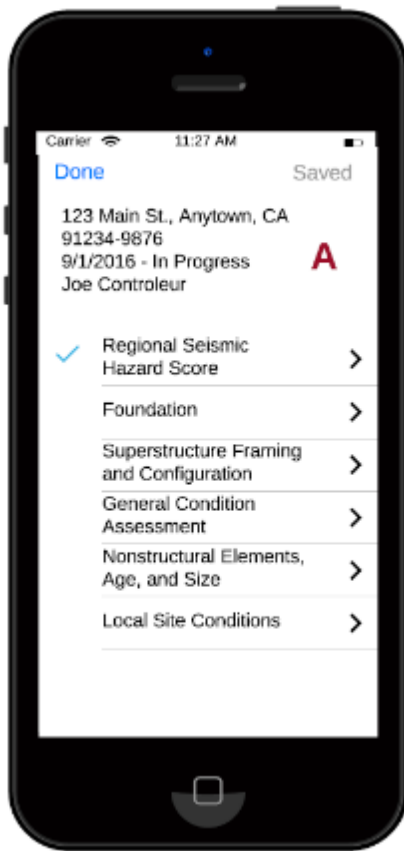
Plywood brace

Foundation plate





FEMA P-50 App for computer, smartphones, and tablets





QuakeGrade™ currently requires a contractor or engineering license

- CEA currently requires that a QuakeGrade™ user have a contractor or engineering license
- CEA is working on adding architects and trained home inspectors

The screenshot shows the website for the California Contractors State License Board. The header includes the CCB logo, social media icons, and a 'License Check' status. Below the header are navigation links for 'Consumers', 'Licenses', 'Applicants', and 'Or'. A row of five circular buttons offers search options: 'License Number', 'Business Name', 'Personnel Name', 'HIS Number', and 'HIS Name'. The main content area features a search form with the heading 'Enter the contractor license number to check the status of their license.' The form includes a text input field for 'Contractor License #' and a 'SEARCH' button. Below the form, a 'SEARCH TIPS' section provides instructions: 'A California contractor license number doesn't contain alphabetic characters. Each contractor's plastic pocket license will show the respective license number. Begin entry of your license number at the left position and don't exceed 8 digits in the license number.'

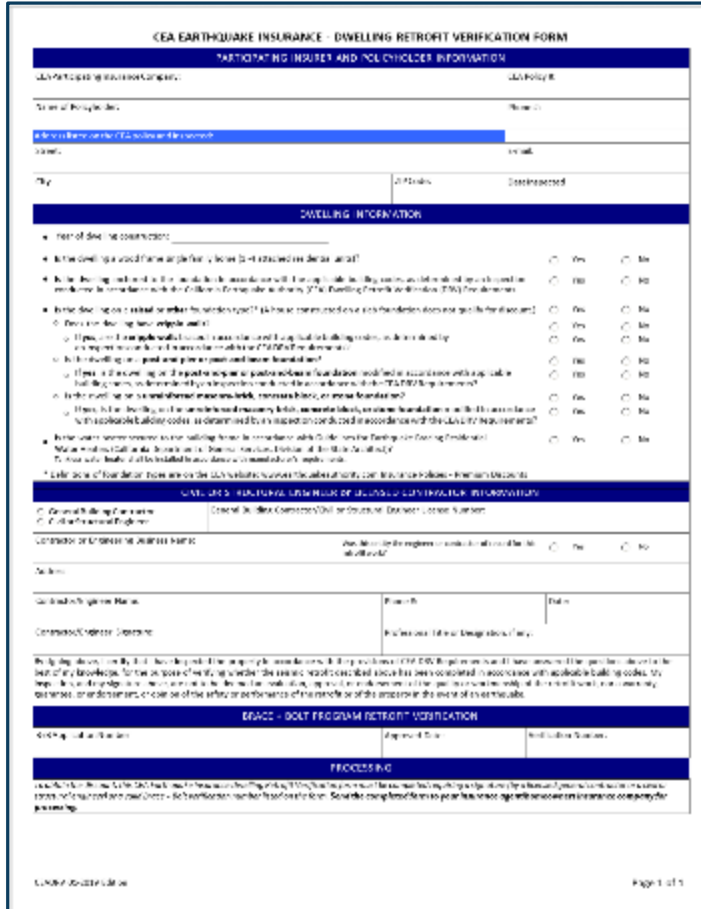


FEMA P-50 / QuakeGrade™ training for home inspectors

- **CEA is working with the Applied Technology Council and the California Real Estate Inspection Association (CREIA) to train CA home inspectors in the use of FEMA P-50**
- **CEA plans to have an inspector directory on the website**



QuakeGrade™ short report for CEA hazard reduction discount



CEA EARTHQUAKE INSURANCE - DWELLING RETROFIT VERIFICATION FORM

PARTICIPATING INSURER AND POLICYHOLDER INFORMATION

Advertiser/Insurance Company Name: [] Job Policy #: []

Name of Policyholder: [] Home #: []

Address/Name of the CEA under the contract: []

City: [] ZIP Code: [] State: []

DWELLING INFORMATION

- Year of dwelling construction: []
- Is the dwelling used full or part of the year? (If not, attached as detail area?) Yes No
- Is the dwelling used as a rental property? (If not, attached as detail area?) Yes No
- Is the dwelling used as a rental property? (If not, attached as detail area?) Yes No
- Is the dwelling used as a rental property? (If not, attached as detail area?) Yes No
- Is the dwelling used as a rental property? (If not, attached as detail area?) Yes No
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- Is the dwelling used as a rental property? (If not, attached as detail area?) Yes No
- Is the dwelling used as a rental property? (If not, attached as detail area?) Yes No

GENERAL INFORMATION

Is this dwelling a new construction? Yes No

Is this dwelling a new construction? Yes No

Is this dwelling a new construction? Yes No

Is this dwelling a new construction? Yes No

BOLT PROGRAM RETROFIT VERIFICATION

Is the dwelling a new construction? Yes No

Is the dwelling a new construction? Yes No

Is the dwelling a new construction? Yes No

Is the dwelling a new construction? Yes No

PROCESSING

Submitted on: [] Approved on: []

Submitted by: [] Approved by: []

Submitted by: [] Approved by: []

- CEA Policyholders with a code-compliant retrofit can receive a discount of up to 25% with a signed *Dwelling Retrofit Verification (DRV) Form*
- QuakeGrade™ can produce a DRV short report



QuakeGrade™ is live at QuakeGrade.com

Welcome Janiele Maffei
Logout

[+ Simplified Seismic Assessment](#)

[+ HRD Assessment](#)

[Clear](#)

In Progress Assessments

No in progress assessments.

Recently Completed Assessments

No completed assessments.

Archived Assessments

No archived assessments.

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A photograph of a modern building at dusk. The building has large windows and a balcony. The sky is a mix of blue and orange, with a bird flying in the distance. The text "It could happen today." is overlaid in white.

It could happen today.

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