

Today

Dear Mr. Doe,

This retrofit has been custom designed to provide maximum protection for the least cost.

I [created a video](#) that explains how this proposal is best understood. I think it is best to start there

I have also included this written proposal with graphics, a plan that shows you where the retrofit components may be installed, a cost estimate, and links to specific web pages. We want you to know exactly what we plan on doing and what you can expect to receive for your money.

The proposal, plan, and the estimate all have relevant links. Please open them all to better understand your proposal.

Howard Cook

Howard Cook M.A.
Founder/Owner Bay Area Retrofit
Office-510-548-1111
Mobile-408-664-6355
Retrofitting Homes for 25 years and still counting

Professional Highlights

Vice Chair of a seismic retrofit building code committee.

Co-author of Standard Plan A used by the California Earthquake Authority as well as building departments all over the Bay Area.

Course Instructor: “Principles and Practice of Earthquake Retrofitting” 2014 presented by the Association of Bay Area Governments.

Author of article “Seismic Retrofit for Cripple Walls”; The Journal of Light Construction. April 2006.

Featured expert “The Hayward Fault. Predictable Peril.” KQED, Channel 9.

Contributing Contractor “California Works to Prepare for the Big One”, PBS News Hour. This is a compilation of both the "The Hayward Fault. Predictable Peril" and the NewsHour documentaries.

Featured Expert in the "S.F. Homeowners Need To Be Ready" in the S.F. Chronicle

Source for this article in the New York Times

Guest Lecturer “Retrofit Principles and Practice for the Home Inspection Industry” Sponsored by the Golden Gate Chapter of the American Society of Home Inspectors.

Keynote speaker “The Preservation of Historical Wood-Framed Buildings” Sponsored by The City of Victoria Heritage Foundation in British Columbia.

Mayoral Appointee to the Berkeley Disaster Commission as a seismic retrofit expert.

Guest Lecturer: “Retrofit Principles and Practice for the Canadian Home Inspection Industry,” sponsored by the Canadian Association of Home and Property Inspectors.

Primary source for an article in the The Mercury News on Soft Story Retrofitting.

Featured contractor in "The Danger Beneath" in the East Bay Express

Residential Damage Inspector, FEMA. 1989-1994.

Member Associations

- Earthquake Engineering Research Institute
- Structural Engineers Association of Northern California

Publications by Bay Area Retrofit

- Co-Author with Wendy Allen, Engineer for Simpson Strong Tie, [“Mudsill Anchorage Systems in Cripple Wall Retrofits”](#), 2007.
- Co-Author and currently updating Bay Area's Retrofit Guidelines: [“Standard Plan A, Residential Seismic Strengthening Plan”](#), The International Code Council, 2005.
- [“Homeowner’s Guide to Seismic Retrofitting.”](#)
- Many other publications are available in the [PDF Library](#) at BayAreaRetrofit.com.

Please go to our [Reviews Page](#) on our website for customer references. Below is the name of the owner of a company that evaluates retrofits.

Larry Guillot, Owner & Consultant
QuakePrepare
Quakeprepare.com
Email: larry@quakeprepare.com
[Website](#)
707-965-3299



General principles

[These videos and webpage](#) discusses everything you will need to know about cripple wall retrofits on a general scale depending on how much information you want.

Floor to Floor Connectors

[This video and webpage](#) discusses floor to floor connectors

The building code does not regulate how an addition is attached to the main house. Earthquake forces may push an addition into the side yard. Install floor-to-floor connectors to hold them together. It is important to watch the video.

Foundation Bolts

[This video and webpage](#) discusses foundation bolts.

We must bolt the mudsill (piece of wood sitting directly on top of the foundation) to the foundation. The bolts we use have been tested and approved for retrofit applications in International Code Council Evaluation Report 2302.

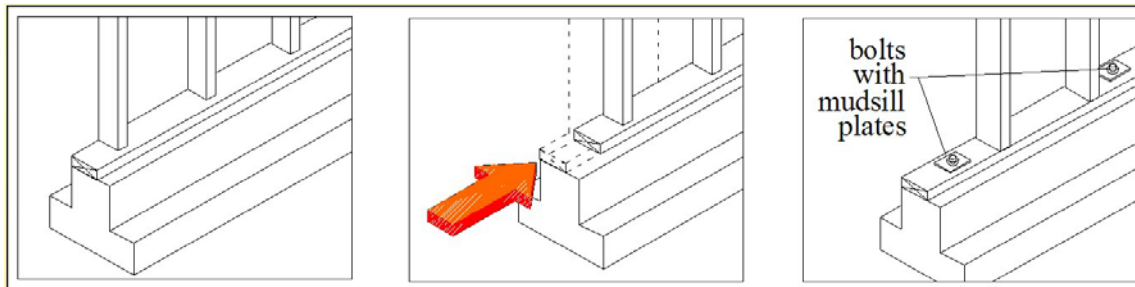


Diagram: Bolts prevent the bottom of the cripple wall from sliding off the mudsill.

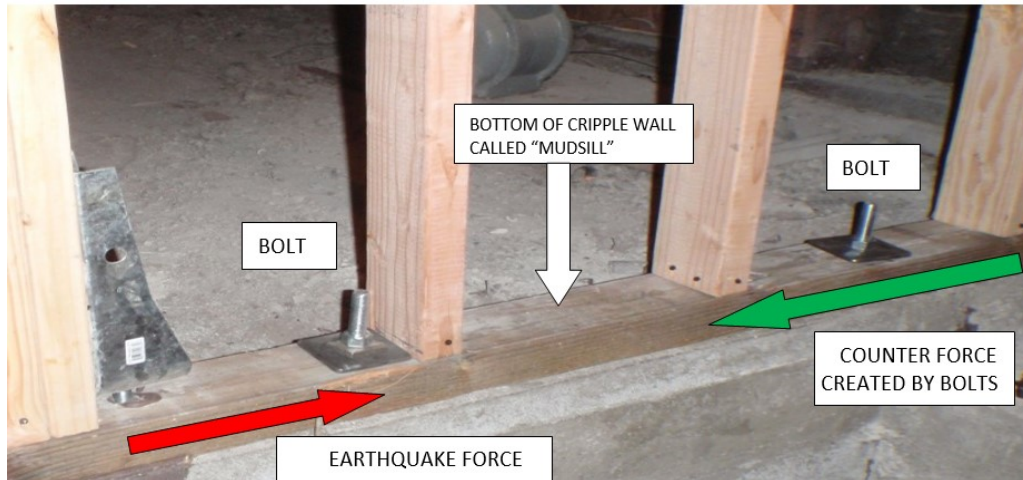


Photo: Cripple wall resists movement because of bolt counterforce.

Mudsill Plates

[The video and webpage](#) discusses mudsill plates.

To my knowledge, we are the only company in the country who uses this highly specialized type of hardware. Tests have shown Mudsill Plates can increase the strength of a bolt by 59%. Your retrofit includes installation of mudsill plates on all new bolts.



Photo: Teeth on mudsill plate prevent mudsill from splitting.

Plate Washers

[This video and webpage](#) discusses plate washers.

Plate washers prevent cross-grain bending damage. Your retrofit includes plate washers on all new bolts.

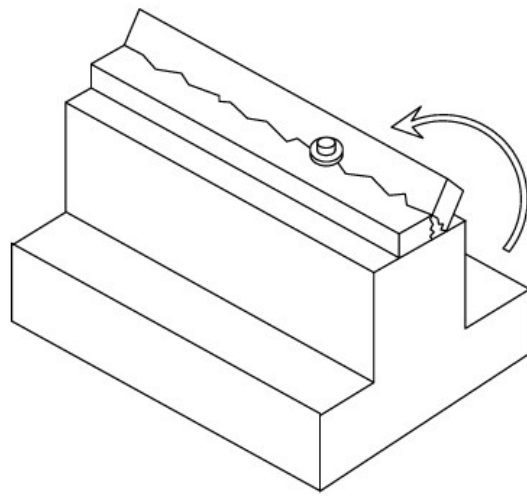


Figure: Cross-grain bending (splitting). Wood has practically no ability to resist cross grain bending.

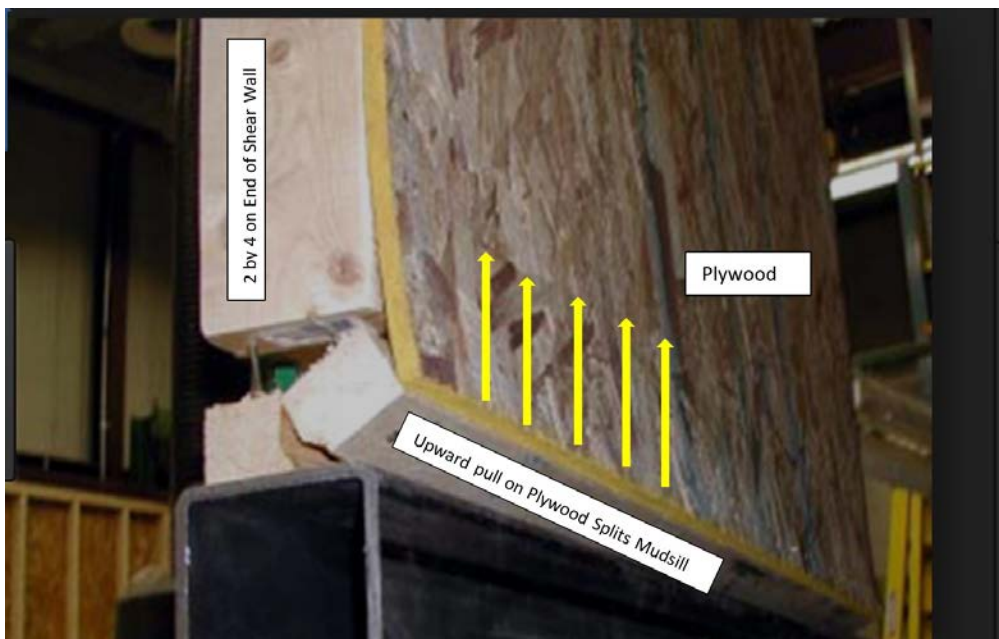


Photo: Cross-grain bending damage to mudsill in a testing laboratory.

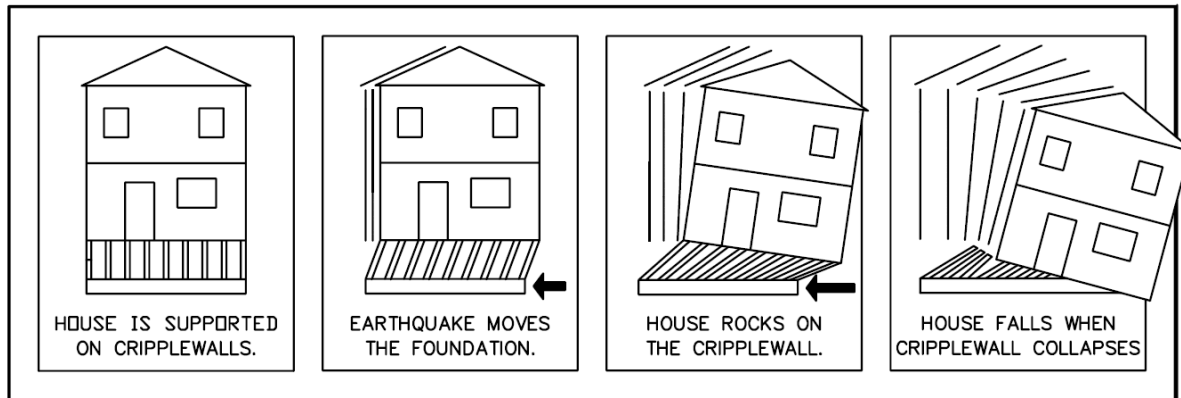


***Photo:** A square washer absorbs movement (converting it into an upward pull on the plate) and acts to prevent splitting of the mudsill.*

Install Plywood on Cripple Walls

Everything you could possibly want to know about plywood is [on this webpage](#).

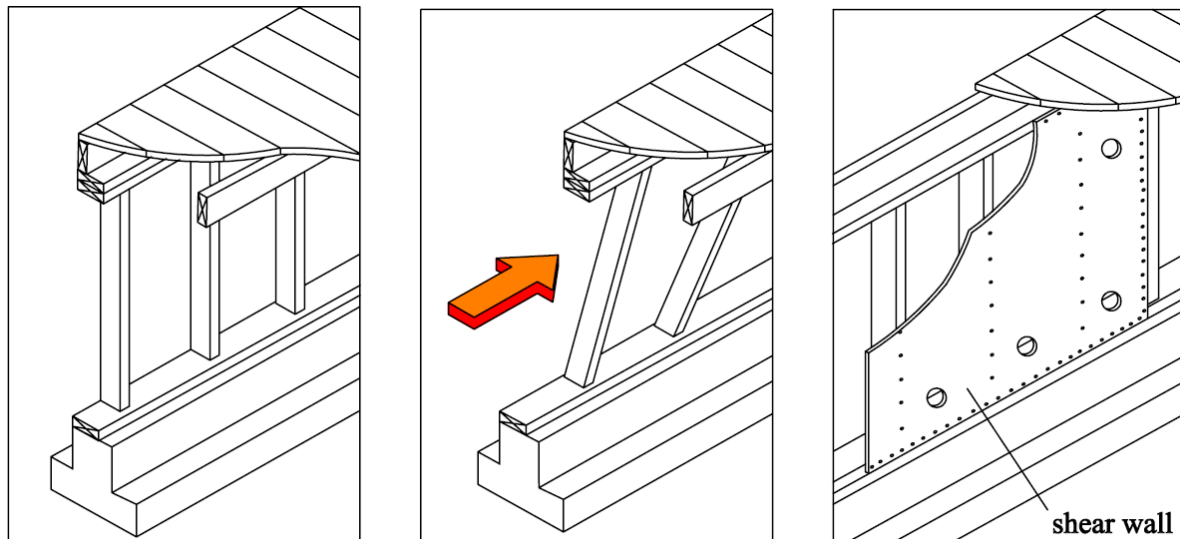
The diagrams below show what happens when a cripple wall collapses:



UNBRACED CRIPPLEWALL FAILURE

Diagram: Cripple wall collapse.

The diagram below illustrates how plywood prevents this from happening. The plywood we use has been tested by American Plywood Association Laboratories and is the best grade available for high performance shear walls.



Movement prevented by plywood shear panels.



TABLE 1.

RECOMMENDED SHEAR (POUNDS PER FOOT) FOR APA PANEL SHEAR WALLS WITH FRAMING SOUTHERN PINE^(a) FOR WIND OR SEISMIC LOADING^(b)

Panel Grade	Minimum Nominal Panel Thickness (in.)	Minimum Nail Penetration in Framing (in.)	Nail Size (common or galvanized box)	Panels Applied Direct to Framing			
				Nail Spacing at Panel Edges (in.)			
				6	4	3	2 ^(e)
APA STRUCTURAL I grades	5/16	1-1/4	6d	200	300	390	510
	3/8			230 ^(d)	360 ^(d)	460 ^(d)	610 ^(d)
	7/16	1-1/2	8d	255 ^(d)	395 ^(d)	505 ^(d)	670 ^(d)
	15/32			280	430	550	730
	15/32	1-5/8	10d	340	510	665^(f)	870

Earthquake resistance of plywood varies according nailing and type of plywood.

The purple and blue boxes call attention to differing strengths in plywood based on plywood nailing and the type of plywood used. In one case, the plywood can resist 200 pounds of earthquake force per linear foot, and in the other 870 pounds per linear foot. I use the 870 pounds per linear foot construction method.

The Plywood To Sill Connection.

[This webpage](#) discusses a very important shear wall connection.

The figure below shows how we attach plywood securely to the mudsill (“mudsill” refers to the top of the foundation) using the “flush cut” solution described in the video.



Photo: Comparison between old-growth redwood and tree-farm wood.

Another good solution is the reverse block method which is described in the video. This solution is normally our first choice. This is a letter I received from the International Code Council when I was on a building code development committee

A P A

The Engineered Wood Association

To: The International Code Council

Dear Council Members,

Based on my professional opinion, I would judge the retrofit strategies in the following order, from most preferred to least preferred.

- 1.) Flush-cut mudsill method
- 2.) Reverse block method
- 3.) Stapled blocking method
- 4.) Nailed blocking method

I believe the flush cut method would be more practical for most retrofits, but the reverse block method would be an acceptable alternative. Multiple nails through the face of the small blocks greatly increase the splitting potential of the blocks. Obviously if the blocks split for either the nailed or stapled blocking method, the structural integrity of the retrofit will be compromised. Nails tend to split wood worse than staples. Therefore, I believe the stapled block method is preferred over the nailed blocking method.

Sincerely,

Ph.D Senior Engineer Technical Services Division

Shear Transfer Ties

In order to complete the cripple-wall-to-shear-wall conversion process, we will connect the bolted and plywood braced cripple walls to the floor with steel known as shear transfer ties. We only install laboratory tested shear transfer ties.

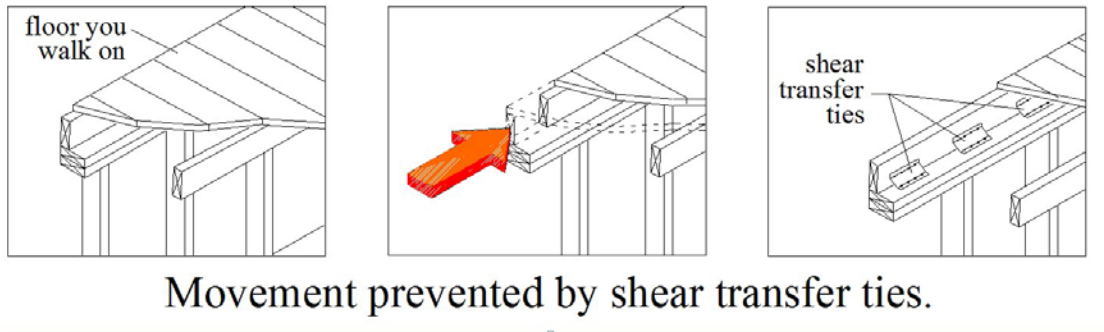


Photo: Two of the many shear transfer ties we use.

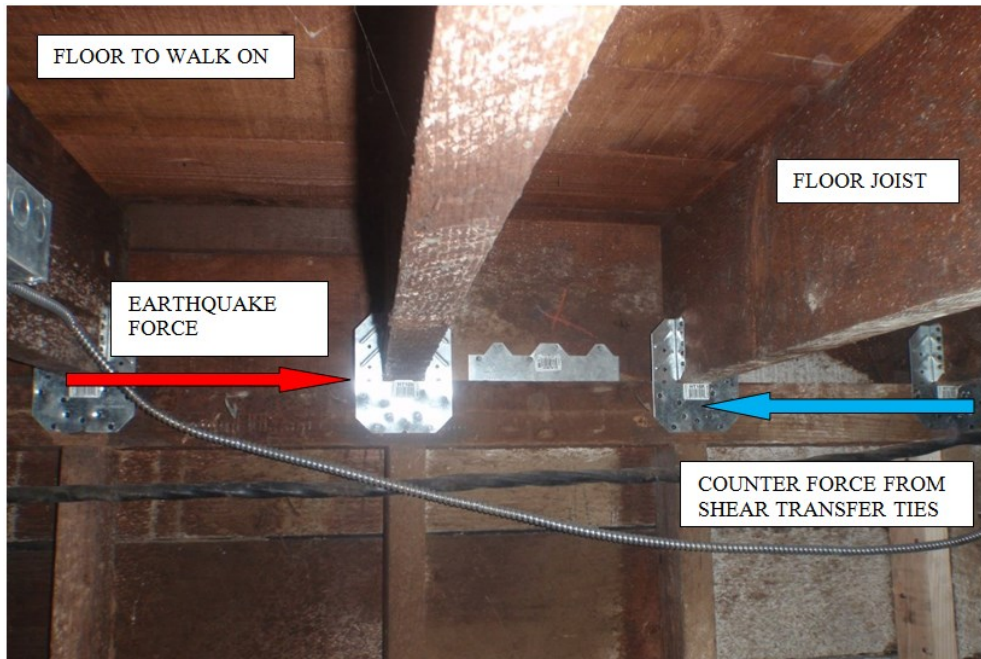
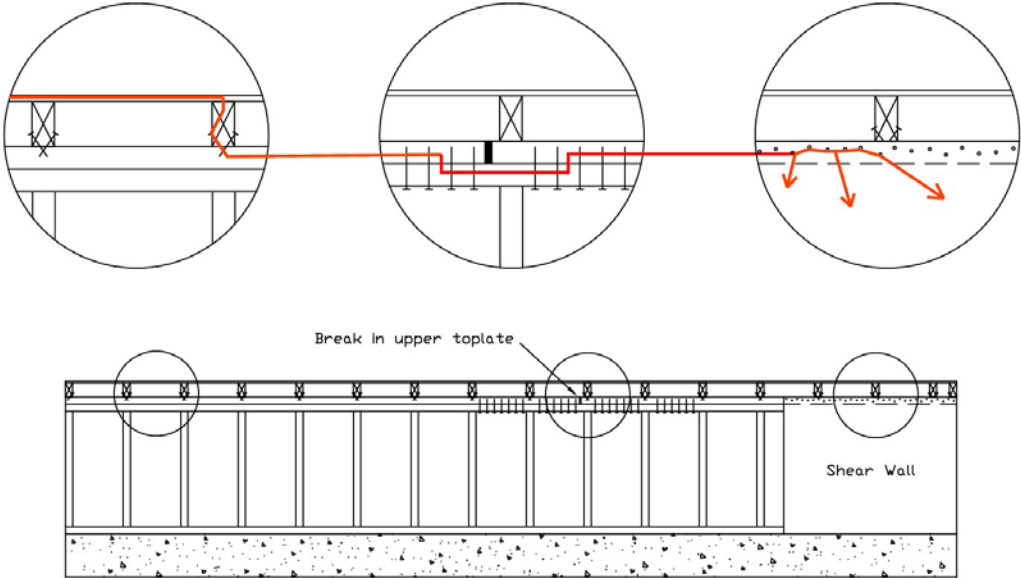


Photo: Two of the many shear transfer ties we use.

Top Plates and Cripple Wall Retrofits

[This video and webpage](#) discusses top plates.

The horizontal two by fours at the top of the cripple walls (known as top plates) are not connected. They tend to separate where not connected together. We will connect the top plates with either nails or steel to create a continuity tie.



Terms and Signature Page

* If you would like to proceed, please fill out this Terms and Signature Page and input the dollar amount of the contract, sign the ESTIMATE, and return them to info@bayarearetrofit.com,

This proposal is not intended to follow or meet requirements for any state of City programs.

Initial

* To complete the permit process, I may need to meet the inspector for the final inspection so he/she can look at the required smoke detectors. I understand I will need to be home available for an hour before and after slated inspection time (if known), or possibly for entire work day (8a-5p) if unknown.

Initial

If I get a permit I will need to have these detectors to meet City building department requirements

Initial

* If unexpected problems arise such as dry rot, termite damage, etc are exposed during the course of the work I understand such repair work will need to be done before we can complete our job. This work can be done by us or others under a separate contract. Our rate is \$140 an hour.

Initial

* Contractor not responsible for incidental damage that may occur which is caused by existing conditions such as previous poor workmanship or deterioration of other components of the house.

Initial

* I understand the type of hardware, quantities, linear footage of plywood etc may vary slightly depending on existing site conditions

Initial

* Contractor hereby disclaims any express or implied warranties that the seismically strengthened building will be able to withstand an earthquake without damage to its structure or contents.

Initial

I am aware the building permit does not mean the City will evaluate the retrofit for its ability to resist earthquakes. Please review [this webpage](#) before initialing.

Initial

Payment:

Full payment is due upon completion of work, regardless of rebate funds status **or receipt of photos (this can take a few weeks)**. Payable by: cash, check, or credit card plus 3% service charge. Unless arrangements are made, invoices not paid within 7 days of receipt of invoice are deemed past due and will accrue fees at rate of 2% per month.

Acceptance:

With permit: The specifications, prices, and conditions outlined in this proposal are satisfactory. I desire a permit. I have read and understand the information above, initialed where listed, and hereby accept this proposal. I agree to pay \$1,000 for permit processing and necessary structural plans **plus all associated building permit costs previously outlined.** These costs will be reflected in my final invoice I accept this proposal with a permit for:

\$ 18,604 + \$1000 permit processing

= \$19,604

Circle this number if this is the option you want

I do not need/want a permit and instead desire a photographic record and a [verification letter](#) from the founder of Bay Area Retrofit, which, along with the narrative proposal and plan in my possession, will be my documentation. I accept this proposal without a permit for

\$ 18,604

Circle this number if this is the option you want

Signature _____ Date _____

Print Name _____ E-mail _____

JOBSITE _____

Address _____

Phone _____



References

Previous customers will tell you we were pleasant, cleaned up, and were easy to deal with. But the references we are especially proud of are from industry professionals who know our work and expertise. Feel free to contact them.

Thor Matteson
Structural engineer specializing in seismic retrofitting
Email: Thor@shearwalls.com
[Website](#)
510-225-1112

John Fryer
President, Bay Area Chapter
American Society of Home Inspectors
Currently senior inspector for the City of Oakland
Email: johnfryer@gmail.com
[Website](#)
510-682-4908