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The Engineered Wood Association

January 13, 2003

Bay Area Retrofit
Attn: Howard Cook
154 Collins Street
Richmond, CA 94801

Dear Mr. Cook:

First, I would like to thank you for allowing me to provide comments on the various different retrofit strategies you and your committee have forwarded to our office. Several of my colleagues are actively involved in the development of building codes and retrofit guidelines. I personally have been involved with the last two cycles of the NEHRP Provisions, which as you probably know, serve as the technical basis to the seismic provisions in the International Building Code. I have been on several committees that have prepared seismic rehabilitation documents, and finally, since coming to APA in 1995, I've been actively involved in seismic testing of wood assemblies, most notably cyclic testing of shear walls. Perhaps your committee will find our opinions helpful in making the final retrofit strategy recommendations.

Seismic retrofitting wood structures is an art as much as it is a refined science. Sound structural engineering principles must be followed, as well as a strong knowledge of the behavior of light frame construction. For the contractors implementing the retrofit, clever adaptation of standard details is a must, since practically every retrofit is somewhat unique. All of these points combined make it difficult to rank the retrofit strategies in terms of "best performing". 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 have chosen to order the retrofit strategies based on several reasons. First, the flush-cut mudsill and the reverse block method are the closest retrofit strategies to a conventionally built shear wall (or sheathed cripple wall). There has been a long history of successful performance of conventional shear walls. Furthermore, the behavior of these structural elements is better understood with each significant research project that is completed. In the past 8 years, there has been an unprecedented amount of cyclic testing on shear walls by APA and other organizations. The results from these various programs would be more similar to either the flush-cut mudsill or the reverse block method, hence I have a great deal of confidence in either of these methods. I believe the flush cut method would be more practical for most retrofits, but the reverse block method would be an acceptable alternative.

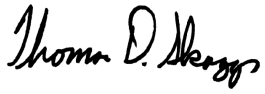
7011 South 19th Street • P.O. Box 11700 • Tacoma, WA 98411-0700
Telephone: (253) 565-6600 • Fax Number: (253) 565-7265

In my experience of personally working with small blocks of wood in the laboratory as well as small building projects of my own, I believe that multiple nails through the face of the small blocks greatly increase the splitting potential of the small wood 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. An alternative to either of these methods might be to use 1/4" self drilling/self tapping lag screws.

In summary, on paper, all of the retrofit strategies are acceptable. Since APA has not, and has no plans to conduct testing of these retrofit strategies, engineering judgment based on experience can be used to rank the different methods. I am of the opinion that my itemized list above is a reasonable ranking of the four methods.

I hope you find this information useful and if you have any questions, or would like to discuss this further, please don't hesitate to contact me.

Sincerely,



THOMAS D. SKAGGS, Ph.D., P.E.
Senior Engineer
Technical Services Division

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