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Performance of Perforated Shear Walls
with Narrow Wall Segments, Reduced
Base Restraint, and Alternative
Framing Methods

U.S. Dept of Housing and Urban
Development, NAHB Research Center Inc.

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2013-03-14Original language:EnglishPDF # 1 9.69 x .7 x 7.441, .17 #File Name: 128892542532 pages | File size: 76.Mb

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Between one and two million new homes are built in the United States each year, predominantly with wood framing. For this reason, efficient utilization of our lumber supply is important. Ideally, the residential construction industry wants to build stronger, safer buildings that can withstand hurricane and earthquake loads while at the same time using material and labor resources more efficiently. In order to accomplish this goal, the actual load capacity and ductility of structures must be better understood from an engineering standpoint. Shear walls are a primary lateral load resisting assembly in conventionally wood-framed construction. Traditional shear wall design requires fully sheathed wall sections restrained against overturning. Design of exterior shear walls containing openings, for windows and doors, involves the use of multiple shear wall segments and is required to be fully sheathed and have overturning restraint supplied by mechanical anchors. The design capacity of shear walls is assumed to be equal to the sum of the capacities for each full height shear wall segment. Sheathing above and below openings is typically not considered to contribute to the overall performance of the wall. The traditional method of design described above is significantly different than wall bracing methods used historically in conventional construction. It is also more expensive than conventional construction while providing greater strength. However, there are significant opportunities to optimize this design process so that both safety and economy are achieved through more accurate design approaches. This report is a continuation of an effort to develop, confirm, and enhance such an approach. The ultimate goal is to provide both safety and economy to housing construction in all wind and seismic areas in the United States.