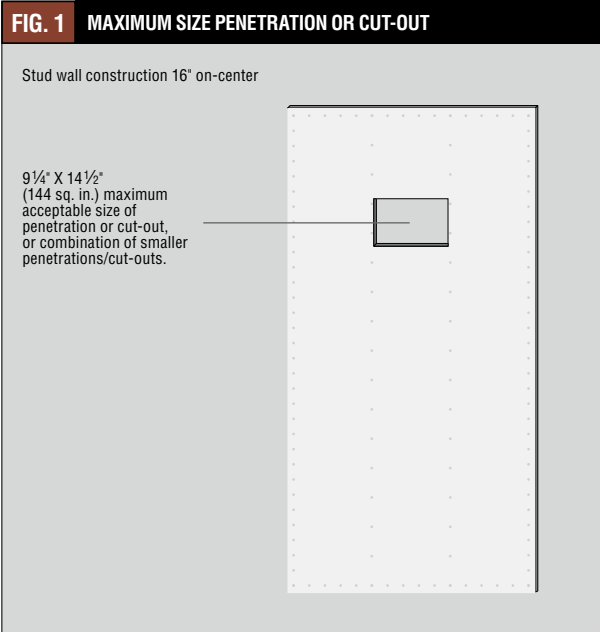


Penetrations and Cut-outs in 1/2" QuietBrace Sound-deadening Structural Sheathing



In exterior walls it is not uncommon to penetrate the wall assembly for utility routing, such as gas or electric service, water faucets, AC, and air intake or exhaust. Frequently, the penetrated area includes the structural wall sheathing installed as the required bracing.

The issue is whether the penetrated bracing panel can serve as structural bracing in view of the requirement in the building codes for structural fiberboard bracing to be 4' X 8' panels.

The building codes do not address the number or sizes of penetrations or cut-outs allowable in wall bracing panels. General language similar to the following is used: "Openings in shear panels which materially affect their strength shall be fully detailed on the plans and shall have their edges adequately reinforced to transfer all shearing stresses." This has been interpreted to apply to openings for doors and windows.

The question is, what maximum size penetration or cut-out does not materially affect the panel strength? Utilizing the measured in-plane or edgewise shear strength of QuietBrace as a material and the ultimate

racking shear strength of a properly installed panel allows a comparison between a full panel and a penetrated one. A guideline for field use can be developed based on the engineering equation in the box below.

For QuietBrace, using the equation, the theoretical maximum total width of one or more penetrations is 15 1/2". In practice, however, the maximum width is limited by the stud cavity width of 14 1/2" for 16" o.c. studs. A practical rule of thumb limits total penetration area to 144 square inches. This yields a 9 1/4" X 14 1/2" maximum acceptable size of penetration or cut-out, or combination of smaller penetrations/cut-outs, in any one panel of QuietBrace structural wall sheathing without materially affecting its strength. (FIG. 1)

MAXIMUM SIZE PENETRATION OR CUT-OUT EQUATION

$$\text{Panel shear} \geq (\text{Panel width} - \text{Penetration width}) \times \text{Panel thickness} \times \text{In-plane shear}$$

To Determine Maximum Penetration Width Not Materially Affecting Panel Strength:

Penetration width \leq Panel width - [Panel shear / (In-plane shear \times Panel thickness)], where

PANEL WIDTH	PANEL SHEAR	IN-PLANE SHEAR	PANEL THICKNESS
is	is	is	is
48	Panel shear is 2600 lb (HUD minimum in FMHCSS)	160 psi (Meas. Mar 2000 using ASTM D1037)	1/2"