

CUTTING, NOTCHING, & BORING WOOD FRAME MEMBERS

Minneapolis Construction Code Services
Informational Bulletin

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Definitions

Bearing Wall

Wood stud wall that supports more than 100 pounds per lineal foot of superimposed load.

Bending Member

This is any structural member that resists transverse loads. Generally, the loads act at right angles to the longitudinal axis of the member, tending to bend it.

Built-Up Member

This is any structural member made up of two or more framing members such as joists or rafters.

Cantilevered Member

A member that projects beyond one or both of its supports;

Non-Bearing Wall

Wood stud wall that supports 100 pounds per lineal foot or less of superimposed load.

Repetitive Members

An assembly of repetitive framing such as joists, rafters, and studs not over 4 inches in thickness spaced not more than 24 inches, not less than three in number and joined by Transverse

Load distributing elements adequate to support the design load.

Sawn Lumber Bending Member

This is any structural lumber bending member that is surfaced to a standard size or nominal size.

Simple Span Member

This is any member that rests on a support at each end, the member ends being free to rotate.

Span

For joists and rafters of nominal 2-inch or 3-inch thickness, the span is the clear distance between the face of supports.

The following items dealing with cutting, notching and boring of structural and structural sawn lumber members are found in the International Residential Code Chapters 5 and 6.

IRC SECTIONS R502.8.1 and R502.8.2 sets limits for notching as follows:

- on ends of joists: equal or less than 1/4 the depth
- top or bottom of joists: equal or less than 1/6th the depth
- notches shall not be located in the center 1/3rd of the span

It also says that bored holes in joists shall be located as follows:

- shall not be within 2 inches of the top or bottom of the joists
- the diameter shall not exceed 1/3rd the depth of the joists

Even though the code appears to be silent on notching and boring of rafters, the limits prescribed for joists should be the guidelines used when such application is necessary.

Engineered Wood Products

IRC SECTION R502.8.2: Cuts, notches and holes bored in trusses, laminated veneer lumber, glue-laminated members or I-joists are **not permitted** unless the effects of such penetrations are specifically considered in the design of the member.

Alterations to Trusses

IRC Section R502.11.3: Truss members and components shall not be cut, notched, spliced or otherwise altered in any way without the approval of a registered design professional. Alterations resulting in the addition of load (e.g. HVAC equipment, water heater, etc.) that exceed the design load for the truss shall not be permitted without verification that the truss is capable of supporting the additional loading.

Notching of Stud

IRC SECTION R602.6 (1): Any stud in exterior wall or bearing partition may be cut or notched to a depth not exceeding 25% of its width. Studs in nonbearing partitions may be notched to a depth not to exceed 40% of a single stud width.

Drilling of Stud

IRC SECTION R602.6 (2): Any stud may be bored or drilled, provided that the diameter of the resulting hole is no more than 60% of the stud width and the edge of the hole is no more than 5/8" to the edge of the stud, and the hole is not located in the same section as a cut or notch. Studs located in exterior walls or bearing partitions drilled over 40% and up to 60% shall also be doubled with no more than two successive doubled studs bored

Exception: Use of approved stud shoes is permitted when they are installed in accordance with manufacturer's recommendations.

Drilling and Notching of Top Plate

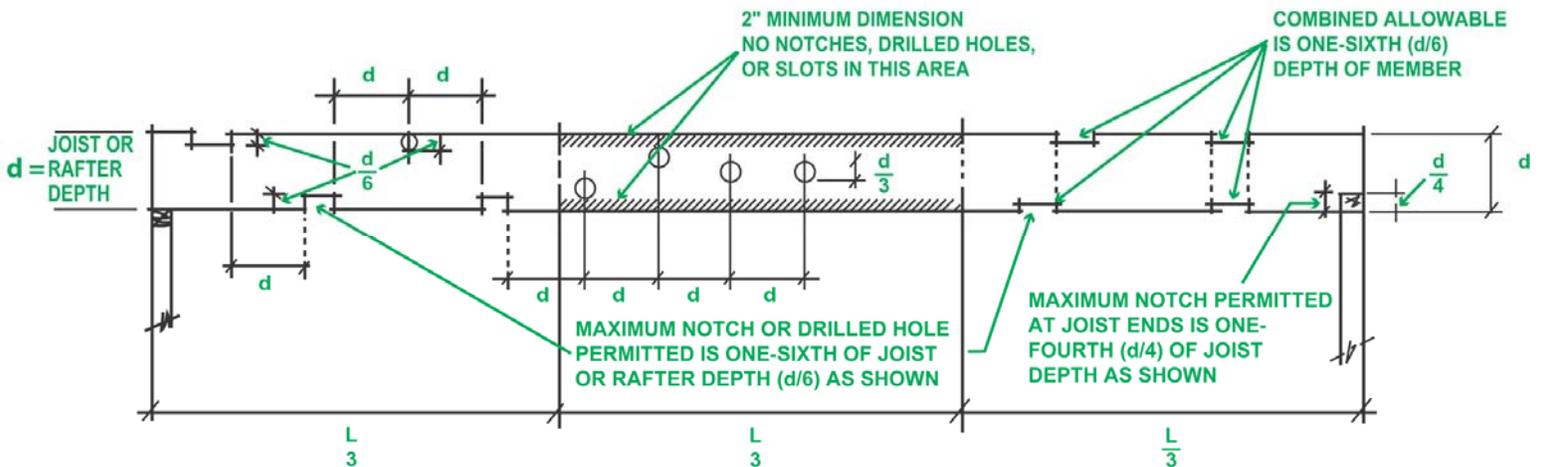
IRC Section R602.6.1: When piping or ductwork is placed in or partly in an exterior wall or interior load-bearing wall, necessitating cutting, drilling or notching of the top plate by more than 50% of its width, a galvanized metal tie of not less than 0.054 inch thick (16ga) and 1 ½ inches wide shall be fastened across and to the plate at each side of the opening with not less than eight 16d nails at each side or equivalent.

Exception: When entire side of the wall with the notch or cut is covered by wood structural panel sheathing.

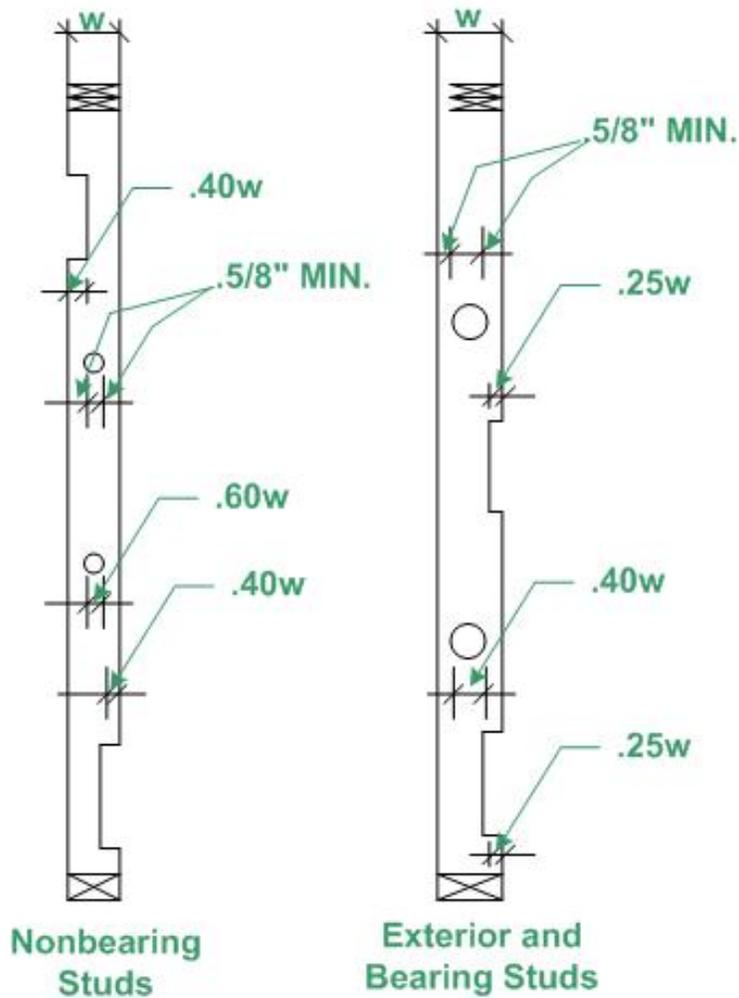
Note: At times it may be permissible to accept an alternate to this requirement, provided the tie is equal to or better than that required by the code.

The electrical code requires a greater edge depth of wood remaining where there is a hole bored for cable or conduit. If the depth is not provided, then the hole will require the protection of an appropriate metal member to protect the opening.

Notching and Hole Boring Guide



Notching and Hole Boring Guide, continued



General notes:

1. Holes, notches, and slots are not to be located adjacent to unsound or loose knots.
2. Preferred location of notch is at top of member.

ALLOWABLE NOTCH AND BORED HOLE DIMENSION							
JOISTS AND RAFTERS					BEARING STUDS		NONBEARING STUDS
Nominal	Actual	d/6	d/4	d/3	.25w	.40w	.60w
4"	3 1/2	5/8	7/8	1 1/8	7/8	1 3/8	2 1/8
6"	5 1/2	7/8	1 3/8	1 7/8	1 3/8	2 1/4	3 1/4
8"	7 1/4	1 1/4	1 7/8	2 3/8	1 7/8	2 7/8	4 3/8
10"	9 1/4	1 1/2	2 3/8	3 1/8			
12"	11 1/4	1 7/8	2 7/8	3 3/4			
14"	13 1/4	2 1/4	3 3/8	4 3/8			