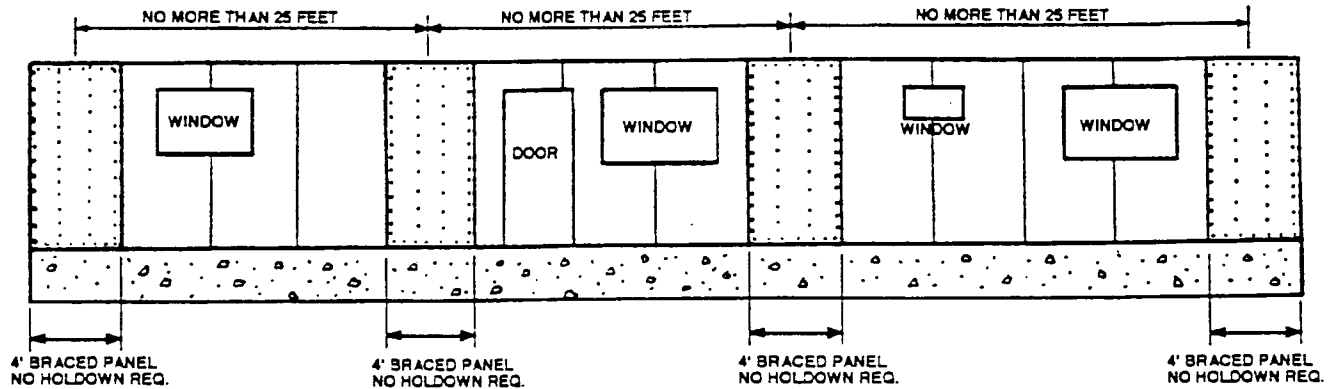


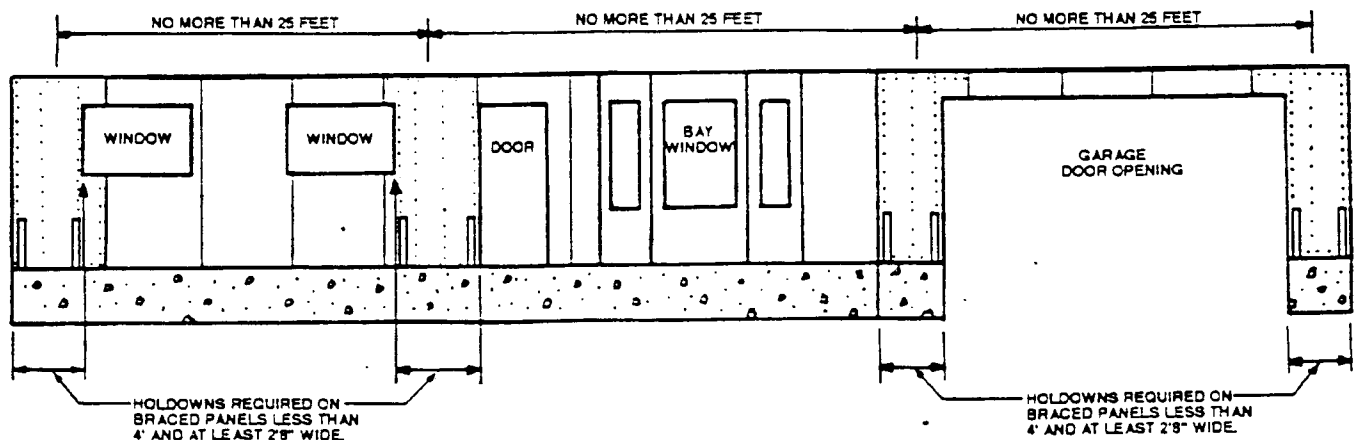
EXAMPLES OF BRACED PANELS FOR CONVENTIONAL LIGHT FRAME HOMES

ONE STORY WITH 4 FOOT PANELS



EXAMPLES OF ALTERNATE BRACED PANELS WITH HOLDOWNS

ONE STORY WITH BRACED PANELS LESS THAN 4 FEET WIDE BUT AT LEAST 2 FEET 8 INCHES WIDE



WHERE ARE HOLDDOWNS REQUIRED?

1. MINIMUM CODE REQUIREMENTS FOR BRACED PANELS AT LEAST 4 FEET WIDE

The uniform building code requires that any exterior wall of a conventionally framed house must have braced panels at least 4 feet wide within 8' of each end and no more than 25' on center. A braced panel is a wall section with no window or door openings. Braced exterior wall panels are typically sheathed with plywood and nailed per code. This requirement is for any conventionally framed house no matter what earthquake zone it is in. (UBC 2326.11.4)

Wood structures in earthquake zones 2B,3 and 4 require additional braced panels depending on how many stories high it is.

- a) If it is only one story the requirement is the same as above, (4 foot braced panels within 8' of each end and no more than 25' on center).
- b) If it is a two story structure each exterior wall of the first floor must have 4 foot wide braced panels on at least 25% of its length, including panels within 8' of each end and no more than 25' on center.
- c) If it is a three story structure each exterior wall of the first floor must have 4 foot wide braced panels on at least 40% of its length, including panels within 8' of each end and no more than 25' on center.

2. ALTERNATE DESIGN FOR BRACED PANELS LESS THAN 4 FEET WIDE

Many times the 4 foot minimum requirement can not be met because there is not enough room between two openings or between the corner of the house and an opening.

If there is not enough room for a full 4 foot braced panel but there is at least 2'8" of uninterrupted wall section the Uniform Building Code allows for an alternate braced panel system. **This braced panel must have a holddown at each end of it nailed to the end studs. Holddown capacity for one story buildings must be at least 1,800 pounds and 3000 pounds for two story structures.** The braced panel must be sheathed, nailed and bolted to the foundation according section 2326.11.4 of the 1994 UBC.

WHAT IF THE WALL IS LESS THAN 2'8"?

Building departments usually require engineering for braced wall panels less than 2'8", like garage doors and large window openings close to the end of a wall. Factors that effect the engineer's design include the weight and height of the building and the actual height of the braced panel.

WHY DO SOME HOMES HAVE SO MANY MORE HOLDDOWNS THAN OTHERS?

1. The Uniform Building Code is only a minimum standard. Building departments can, and often do, require more than the UBC especially in earthquake zones 2B,3 and 4.
2. If a home or other building does not meet the criteria of being a conventional light frame structure, building departments require the design be stamped by a licensed engineer (See UBC 2326). Engineered structures often require holdowns on all, or most, braced (shear) panels. This is especially true when wall lines have large window or door openings.
3. Holdowns can also be specified by building officials or engineers at each corner because wind uplift forces are magnified significantly at the corners.