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Wall Bracing Permanent Rules FAQs

Effective Date of Permanent Rules – September 1, 2014

1. General

Q: Are additional resources available?

A: Yes, see the Department's One- and Two-Family Dwellings (Uniform Dwelling Code) Program webpage for a non-mandatory compliance worksheet available for use and a guide on how to use the emergency rule provisions based on the compliance worksheet.

2. General

Q: I am very comfortable using and complying with the Emergency Rule UDC Wall Bracing provisions. May I continue to use this method after the effective date of the Permanent Rules?

A: No, the permanent rules provide numerous and important clarifications, updates, and limitations on the use of the prescriptive wall bracing provisions.

3. General

Q: When reviewing plans and processing permit applications, how does one determine which rules to apply?

A: The "code applies" date is the date upon which a valid permit application is received by the authority having jurisdiction. If received prior to the September 1, 2014 effective date, the emergency rule wall bracing provisions OR the permanent wall bracing rules may be used. If received on or after the September 1, 2014 effective date, the permanent rules shall be used to determine compliance with the wall bracing requirements.

4. Section 321.25(8)(a) and Figure 321.25-B

Q: How do the wall bracing provisions apply to methods of construction other than 'stick built' such as post frame, log homes, structural insulated panels (SIP's), insulated concrete forms (ICF's), etc.? How do you apply the wall bracing provision to a home with a walk out basement where some of the walls are concrete and other walls or portions thereof are wood-framed?

A: *SPS 321.25 (8) WALL BRACING. (a) General. Dwellings using wood-framed walls shall be braced in accordance with this section. Where a building, or a portion thereof does not comply with one or more of the bracing requirements in this section, those portions shall be designed and constructed in accordance with accepted engineering practice.*

The code language above indicates the requirements only apply to wood-framed walls, i.e. stick built with studs max 24" o.c. Therefore other methods of construction must be designed per applicable adopted standards and accepted engineering practice.

Walk-out basement: The Department considers a minimum 8" nominal thickness poured in place concrete basement wall as equivalent in lateral load/shear resistance to any of the allowable wood-framed wall bracing materials. To determine the required bracing for a walk out basement first draw a rectangle around the entire floor plan and projections as if all of the walls are wood-framed. Determine the required bracing amounts per the chosen bracing material and method and then locate the bracing to meet the requirements of Figure 321.25-C. Any required braced wall panel locations that occur on a wall or portion of a wall that is actually of poured in place concrete construction is considered equivalent and that amount of bracing will count towards the minimum required amount and will not need to be provided in another location on that rectangle side.

5. Table 321.25-G

Q: Can bracing materials and methods be mixed and matched on the same floor level or from one floor level to the next?

A: Yes, bracing materials can be mixed on any given rectangle side, within a story or from one story to the next. In addition, bracing methods either intermittent or continuous can be mixed within a story or from one story to the next. However, on any given rectangle side you cannot mix intermittent and continuously sheathed methods.

6. Table 321.25-G footnote ‘a’, Table 321.25-I footnote ‘e’, and Table 321.25-J footnote ‘d’

Q: Are braced wall panels on a gable end wall required to be sheathed full height on the interior with ½" gypsum board where the wall extends above the ceiling and faces normally unfinished attic space on the interior of the dwelling?

A: Yes, unless the required amount of bracing on the rectangle side is increased by the applicable 1.4 adjustment factor per Table 321.25-I footnote ‘e’ or Table 321.25-J footnote ‘d.’

7. Tables 321.25-G, H, I, and J

Q: On a gable end wall, how do you measure the nominal wall height?

A: When using Tables 321.25-G and H to determine the maximum allowable height and minimum width of a braced wall panel, the wall height is measured from the bottom of the bottom plate up to the underside of the roof deck/diaphragm. Per SPS 321.25(8)(c)7., if the height of the braced wall panel exceeds 12 feet it can have a maximum height-to-width ratio of 2.5:1. When using Tables 321.25-I and J to determine the required amount of bracing, the nominal wall height is measured to the top of the wall top plate at the bearing elevation of the roof structural assembly (trusses or rafters).

8. Figure 321.25-A

Q: Does the portal frame design require 7/16" OSB or plywood on all sheathable surfaces?

A: It depends on the bracing method being used for that rectangle side. If using the intermittent method, then No. If using the Continuously Sheathed method, then Yes.

9. Figure 321.25–A

Q: The first 2 lines under the heading indicate, depending on the extent of the header with double or single portal frame, that the portal frame may have one or two portal frame panels (depending on width). Table 321.25-I footnote ‘g’ states the following braced wall panel conditions shall be permitted to be counted as one-half a braced wall panel toward meeting the required number of panels: (5) one PF panel complying with Figure 321.25-A. How do you count portal frame panels when determining how much bracing they provide towards meeting the minimum required amount?

A: Intermittent Bracing Method: Per Table 321.25-I footnote ‘g,’ a single narrow portal frame panel at one side of the opening counts as one-half a braced wall panel. A narrow portal frame panel at each side of the opening would count as one full braced panel.

Continuously Sheathed Bracing Method: Table 321.25-J indicates the minimum required total length of continuously sheathed panels and Figure 321.25-A indicates the minimum required width of a narrow portal frame panel dependent upon the total wall height. The actual width of the portal frame panel in feet (16-24" per the figure) counts towards the minimum required total length of continuously sheathed panels determined from Table 321.25-J.

10. Figure 321.25-A

Q: Are oversize 2" x 2" x 3/16" plate washers still required for portal frame anchorage to concrete?

A: Yes, the permanent rules require oversized plate washers for adequate anchorage at the location of the narrow portal frame braced panels.

11. SPS 321.25

Q: SPS 321.25(8)(c)6. allows balloon frame walls up to two floors in height but Tables 321.25-I and J do not permit extrapolation beyond 12-foot wall height. Are braced wall panels allowed on a two-floor balloon frame wall and if so, how wide must the panels be?

A: Extrapolation is prohibited in Tables 321.25-I and J so the provisions may not be used on a building of an overall larger size and height than indicated in the bracing amount tables. Per SPS 321.25(8)(c)6., balloon frame walls should be viewed as an exception for a portion of the overall structure not the whole building. If braced wall panels must be located on the balloon frame portion, they shall have a maximum height to width ratio of 2.5:1.

12. Figure 321.25-B footnote 'b'

Q: Can you define what is meant by enclosed plan offsets and projections? Is a screen porch classified or defined as enclosed?

A: There are definitions currently in the UDC that provide guidance on this topic. Per SPS 320.07(59m), a "porch" means an unenclosed exterior structure at or near grade attached or adjacent to the exterior wall of any building, and having a roof and floor.

Per SPS 320.07(10t), a "carport" means a structure used for storing motorized vehicles that is attached to a dwelling and has at least 2 sides completely unenclosed.

Carports are specifically exempted as are open structures such as decks. A deck is a porch without a roof. A screen porch with no enclosing walls of any height and no other construction other than the structural members necessary to support the roof and the screen itself will be considered an open structure that can be excluded from the rectangle.

13. Figure 321.25-B

Q: Do rectangles have to abut at a wall line? Can it be a 100% interior wall line? How do you draw rectangles for homes with segments constructed at an angle or an attached garage at an angle to the dwelling?

A: Generally speaking, yes you want adjacent rectangles to abut at a common wall line which will be at least partially or may be entirely an interior wall line. It is permissible for rectangles to overlap but this may result in more bracing being required than if the rectangles did not overlap.

The permanent rule package includes diagrams of homes with portions of the home constructed at an angle and provide a method for calculating the amount of bracing which can be attributed to a rectangle side by an angled wall segment.

14. Tables 321.25-H, I , and J

Q: If a dwelling has varying wall heights, wind exposure categories, opening heights, etc. on each rectangle side how are the requirements and Tables to be applied? Are the most restrictive requirements applied to the entire building, to each rectangle, each rectangle side or to each braced wall panel?

A: It depends on the requirement being considered. The prescriptive requirements are a simplified method which attempts to strike a balance between practicality, simplicity and ease of use versus specificity and complexity.

Tables 321.25-I and J Bracing Amounts:

When applying these tables you must use the most restrictive variables for wall height and floor levels for the rectangle being considered. If the wall heights and number of floor levels vary an alternative would be to draw the rectangles differently so that each rectangle encompasses constant conditions.

For wind exposure category you could have and use different wind exposure categories for each wind direction or use the most restrictive or worst case wind exposure when evaluating the required bracing in both orthogonal directions.

For eave to ridge height it should be determined using the roof structure located on the portion of the building with the greatest number of floor levels (i.e. highest walls).

Table 321.25-H:

For braced panels located in walls of differing heights and with openings of differing heights the braced wall panel limitations are based on the context of its location and immediately surrounding conditions. So the minimum width of a braced wall panel may be determined based on then wall height and opening height where it is located.

15. Tables 321.25-I and J

Q: On a dwelling with varying number of stories, roof bearing elevations and roof heights what eave to ridge distance must I use when applying the bracing amount tables?

A: Generally, the most restrictive variables for the entire rectangle must be used when applying Tables 321.25-I and J to determine the required bracing amounts. The eave to ridge height of the roof with the highest roof bearing elevation and greatest number of floor levels must be utilized when applying the bracing tables. An alternative would be to draw additional rectangles for portions of the dwelling with fewer floor levels and lesser eave to ridge height.

16. Tables 321.25-I and J

Q: Are bonus rooms considered another floor level when applying the bracing amount tables? Do the walls associated with roof dormers create an additional floor level when applying the tables?

A: No, a bonus room contained wholly within an attic truss does not create an additional floor level when applying the bracing amount tables since the tables are based on the wall surface area subjected to lateral wind load and not the vertical uniform live loads associated with a floor level. Similarly for a dormer, being only a small portion of the overall roof area the amount of wall surface can be considered negligible in most cases (except maybe a large shed dormer or a story and a half cape cod home) and the wind load applied as if it is roof surface.

17. Table 321.25-J

Q: Eave-to-Ridge Height (feet) column: Should the numbers read, "0- 10, 10-15, 15-20" or do you have to interpolate values for, say a 12-foot roof or an 18-foot roof?

A: Per table footnote 'a,' interpolation shall be permitted when using the table but is not required. If interpolation is not used, then if the eave to ridge height falls between two of the rows, the next highest value/row for eave to ridge height must be used. For example, if the eave to ridge height is 12', the row for eave to ridge height of 15' must be used to determine the required length of bracing.

18. Figure 321.25-C

Q: Where does the 21-foot spacing begin and end with a portal frame?

A: Per Figure 321.25-A, a portal frame whether consisting of one or two narrow panels has a maximum opening dimension of 18-foot and therefore will automatically comply with the 21-foot spacing requirement. If only one side of the opening has a narrow panel the opposite side is required to be either a wood structural panel (WSP) if using the intermittent method or a continuously sheathed wood structural panel (CS-WSP) if using the continuous method. Then, at the outer extent of the portal frame figure whether it is a narrow panel or standard braced wall panel you measure 21 feet away from portal frame from the outside edge of the panel in the figure to the outside edge of the next nearest panel.