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↷ = positive moment: sum moments about A

$$\underbrace{\left(\frac{V}{2}\right)\left(\frac{h}{2}\right)}_{1} + \underbrace{\left(\frac{V}{2}\right)\left(\frac{h}{2}\right)}_{2} + \underbrace{\left(\frac{V}{2}\right)\left(\frac{h}{2}\right)}_{3} + \underbrace{\left(\frac{V}{2}\right)\left(\frac{h}{2}\right)}_{4} - \underbrace{D\left(\frac{\ell}{4}\right)}_{5} - \underbrace{\left(\frac{Vh}{\ell} + \frac{D}{2}\right)\left(\frac{\ell}{4}\right)}_{6}$$

$$\underbrace{-\left(\frac{Vh}{\ell} - \frac{D}{2}\right)\left(\frac{\ell}{4}\right)}_{7} \underbrace{-\left(\frac{Vh}{2} - \frac{D\ell}{4}\right)}_{8}$$

$$= \underbrace{Vh}_{1-4} - \underbrace{\frac{D\ell}{4}}_{5} - \underbrace{\frac{Vh}{4} - \frac{D\ell}{8}}_{6} - \underbrace{\frac{Vh}{4} + \frac{D\ell}{8}}_{7} - \underbrace{\frac{Vh}{2} + \frac{D\ell}{4}}_{8}$$

$$= Vh - \frac{Vh}{4} - \frac{Vh}{4} - \frac{Vh}{2} - \frac{D\ell}{4} - \frac{D\ell}{8} + \frac{D\ell}{8} + \frac{D\ell}{4}$$

$= -\frac{D\ell}{4} + \frac{D\ell}{4} = 0$ ~~$\neq 0$~~ in equilibrium.

**2305.3.6.1 Perforated shear wall segment width definition.** The width of a perforated shear wall segment, *w*, shall be defined as the width of full-height sheathing adjacent to openings in the perforated shear wall [see Figure 2305.3.5(a)].

**2305.3.6.2 Force transfer shear wall pier width definition.** The width, *w*, of a wall pier in a shear wall with openings designed for force transfer around openings shall be defined as the sheathed width of the pier at the side of an opening [see Figure 2305.3.5(b)].

**2305.3.7 Overturning restraint.** Where the dead load stabilizing moment in accordance with Chapter 16 allowable stress design load combinations is not sufficient to prevent uplift due to overturning moments on the wall, an anchoring device shall be provided. Anchoring devices shall maintain a continuous load path to the foundation.

**2305.3.8 Shear walls with openings.** The provisions of this section shall apply to the design of shear walls with openings. Where framing and connections around the openings are designed for force transfer around the openings, the provisions of Section 2305.3.8.1 shall apply. Where framing and connections around the openings are not designed for force transfer around the openings, the provisions of Section 2305.3.8.2 shall apply.

**2305.3.8.1 Force transfer around openings.** Where shear walls with openings are designed for force transfer around the openings, the limitations of Table 2305.3.4 shall apply to the overall shear wall, including openings, and to each wall pier at the side of an opening. Design for force transfer shall be based on a rational analysis. Detailing of boundary elements around the opening shall be provided in accordance with the provisions of this section[see Figure 2305.3.5(b)].

**2305.3.8.2 Perforated shear walls.** The provisions of Section 2305.3.8.2 shall be permitted to be used for the design of perforated shear walls. For the determination of the height and width of perforated shear wall segments, see Sections 2305.3.5.1 and 2305.3.6.1, respectively.

**2305.3.8.2.1 Limitations.** The following limitations shall apply to the use of Section 2305.3.8.2:

1. A perforated shear wall segment shall be located at each end of a perforated shear wall. Openings shall be permitted to occur beyond the ends of the perforated shear wall, provided the width of such openings is not be included in the width of the perforated shear wall.
2. The allowable shear set forth in Table 2306.4.1 shall not exceed 490 plf (7150 N/m).
3. Where out-of-plane offsets occur, portions of the wall on each side of the offset shall be considered as separate perforated shear walls.
4. Collectors for shear transfer shall be provided through the full length of the perforated shear wall.
5. A perforated shear wall shall have uniform top of wall and bottom of wall elevations. Perfo-

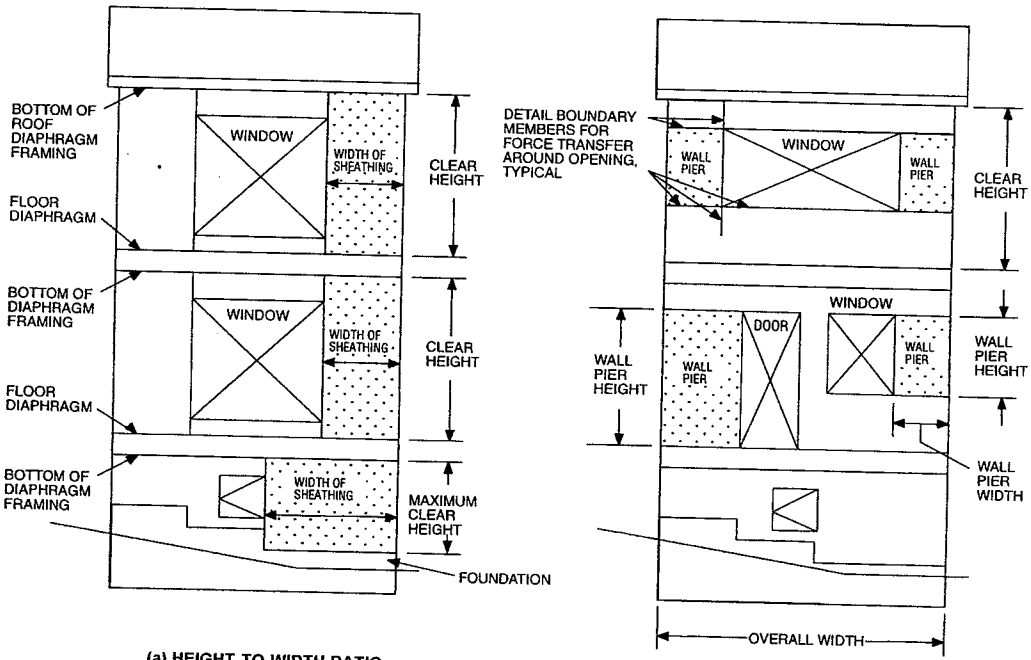


**FIGURE 2305.3.5**
**GENERAL DEFINITION OF SHEAR WALL HEIGHT, WIDTH AND HEIGHT-TO-WIDTH RATIO**