Design Load Considerations for Non-Load Bearing Partition Walls in Residential Construction

The dead load weight of non-load bearing partition walls are commonly ignored by floor system designers in residential construction. This oversight can have negative consequences on the floor system design.

For dead loads, the International Residential Code® (IRC®) states:

> R301.4 Dead load.
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> *The actual weight of materials and construction shall be used for determining dead load with consideration for the dead load of fixed service equipment.*

The IRC® itself does not provide weights of construction materials. However, the Code and Commentary edition of the IRC® published by the International Code Council does provide Table R301.4 Minimum Design Dead Loads for Typical Residential Components. In that table, under FRAME PARTITIONS, wood or steel studs, ½ inch gypsum board on each side, has a defined load of 8 pounds per square foot (psf). The design standard, *Minimum Design Loads For Buildings and Other Structures* (ASCE/SEI 7), published by the American Society of Civil Engineers® (ASCE®), also defines the weight of a wood or steel stud wall with ½" gypsum board on both sides as 8 psf.

In addition to the preceding references, APA® publishes Technical Note B429H, *Non-Load-Bearing Partitions on APA Structural Panels and Floor Joists*. Within B429H, a partition wall consisting of 2x4 studs with ½" gypsum wallboard on each side has a listed weight of 6 psf.

Boise Cascade EWP Engineering has reviewed the weights of common partition wall components. The 8 psf load referenced in the IRC® and ASCE/SEI 7 will encompass 2x6 partition walls sheathed with gypsum board on both sides and allows for incidentals (e.g.: electrical, plumbing, insulation). For 2x4 partitions as listed in APA B429H, a 6 psf load may be used.

To determine the linear load on a joist, multiply the wall load (psf) by the wall height (ft). BC Framer® allows the user to enter a weight for partition walls and then automatically applies the load to the supporting framing members. For perpendicular walls, the load is entered in the BC Calc® sizing software program as a concentrated linear dead load. Parallel walls may be entered as uniform linear dead loads. Increasing the uniform dead load may be another option, but will vary depending upon the weight, location and number of walls. For example, a single perpendicular partition wall located at mid-span of a 16 ft or greater span would require an additional 6 psf of uniform dead load on the entire span to produce an equivalent bending moment. Considering an existing floor design without the additional weight of the partition in this example, a 40/10 psf design load floor joist would still be structurally adequate if the original % allowable moment was below 90%.

Based on the preceding information, Boise Cascade strongly recommends floor system designers consider the weight of the non-load bearing partition walls in the design of residential floor systems. Considerations for dead load and partition walls in non-residential construction are addressed in chapter 16 of the International Building Code®.