

Basis of Lateral Force Calculations for IRC:

General:

- One- and two-family dwellings and Townhouses not more than 3 stories in height.
- Live Load 50 psf

Wind:

- The wind force calculation is completely based on ASCE 7 methods
- Map in Figure R301.1(2)-(4) was derived from the ASCE 7 maps.
- Mean Roof Height up to 60 ft
- The resistance is based on the same assumptions as the seismic resistance is based.
- Max Wind Speed is 140 mph
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Seismic:

- The original assumption is that the IRC would be based on a 25 ft x 25 ft square to determine the amount of bracing required. Then it was increased to a maximum of 60ft spacing between wall lines with associated increase in scaling factors that the AISI wanted.
- The maximum wall height originally was 10ft, but was increased with linear adjustment factors to 12 ft.
- Originally only had SDC D, but then agreed to split SDC D into D_1 and D_2 to give relief to those in the lower half of the range, which included about 75% or more of the total geographic area of SDC D. Then D_1 was again divided to D_0 and D_1 for the same reason.
- E.V. and I worked through the calculations at first using only the 0.2 sec. seismic parameter, but then he worked out a conversion for the long factor to use in the short period maps to get the equivalent spectrum to use.
- Then we converted the topographical map to a zone map that is used today.
- The dead loads are given in R301.2.2.2
- Roof/Ceiling dead load was originally assumed to be 15 psf (3-tab shingle roof, insulation, and gypsum ceiling, but then people wanted to include slate and concrete tile, so the dead load was increased to 25 psf.

- Exterior walls were assumed to have a 15 psf dead load and interior walls had a DL of 10 psf. I assume that the other material weights are those shown in Section R301.2.2.2
- Kelly Cobein did most of the insulated foam concrete calcs.
- The continuous sheathed braced wall option was based on the Perforated Shear Wall Method in the NDS and some adjustments from wall tests that I did with both wood and steel light-frame walls.
- The return corner effects are based on wall tests that I did for NAHB Research Center. A two-foot return corner provided an equivalent hold-down restraint to a Simpson HT-22 hold-down.
- Some of the cripple wall provisions are based on test results from the CUREE Woodframe Project.
- Originally, we used a capacity strength of 180 plf for WSP braced walls without hold-downs or return corners.
- The 2-ft off-set (4-ft max) allowance for segmented walls was a judgement decision based on experience.
- Walls with brick veneer requirements are based on a very load out-of-place strength of Light-Frame construction. BIA has done some seismic table and cyclic testing at Buffalo to justify relaxation of the hardware requirements.