# The lateral load resistance design needed for a building effects the plan review data submitted

When designing the lateral load resistance system of a building or structure, the designer determines and uses the greater factor between seismic loads or wind loads. Calculations for the governing force are submitted for plan review with the building plans.
Safety and Buildings Division staff experience is that for Seismic Design Category "A" buildings, wind controls in the majority of the cases. When wind loads control the design, submittal requirements are different than if seismic loads control.

These three descriptions are Seismic Design Category "A" buildings per Comm 62.1614(1) and IBC 1614.1:
1. The building is north of four percent of gravity line of Fig. Comm 62.16-2 [or IBC Fig. 1615(2)].

2. The building is south of the four percent line and is on a Site Class "A" to "C," per Table 1615.1.1., based on a soil investigation/report.

3. The building is south of the four percent line and is classified as Category "IV" (including self-storage/mini-storage units) in Table 1604.5.
When wind load controls, plan submittal documents should indicate that, and the appropriate wind load design data as listed in Table 1603.1.5.

## Determining seismic loads, step by step

When seismic load controls, designers determine the Seismic Design Category per the following steps:
1. Determine spectral response acceleration values. [s. 1615.1]
- Go to http://eqint.cr.usgs.gov/eq/html/zipcode.shtml and enter the site's zip code.
- Obtain the $S_s$ (0.2 sec) and $S_1$ (1.0 sec) spectral responses for two percent PE (probability of exceedance) in 50 years (last column, 2nd and 4th rows). Convert to decimal equivalents for use with the IBC. Per s. Comm 62.1615(1), the maximum $S_s$ value may be taken as fifteen percent.
- In lieu of using the federal web site calculator, the spectral response accelerations, $S_s$ (0.2 sec) and $S_1$ (1.0 sec), may be obtained from IBC Figures 1615 (1) and 1615 (2), respectively. In accordance with s. 1615.1, where a site is between contours, straight line interpolation of the value or the higher contour value must be used.

2. Determine Site Class. [s. 1615.1.1]
- Go to Table 1615.1.1 and, based on the soil profile name and properties, determine the site class.
- Where the soil properties are not known in sufficient detail, site class "D" shall be used (unless Site Class "E" or "F" soil is likely to be present at the site).

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- Where site specific data is not available to a depth of 100 feet, the designer responsible for determining soils conditions may estimate the soil properties and from that determine the site class.

3. Determine adjusted site coefficients [s. 1615.1.2]
- Go to Tables 1615.1.2(1) and (2) and obtain the coefficients $F_a$ and $F_{v,}$ multiply $S_s$ and $S_1$ by these coefficients, respectively, to obtain $S_{MS}$ and $S_{M1}$ (maximum considered accelerations). Note that in the tables, $F_a$ and $F_v$ vary with the unmodified $S_s$ and $S_1$ values, per footnote "a", straight-line interpolation is required in the tables.

4. Determine the design accelerations [s. 1615.1.3]
- Multiply $S_{MS}$ and $S_{M1}$ by 2/3 to obtain the $S_{DS}$ and $S_{D1}$.

5. Determine the Seismic Design Category [s. 1616.3]
- Go to Tables 1616.3(1) and (2) and select the most severe seismic design category. These tables are based on the $S_{DS}$ and $S_{D1}$ values and the building's Seismic Use Group, per s. 1616.2 and Table 1604.5, respectively.

(Note that buildings and additions falling within the scope of s. IBC 2308, conventional light frame construction, may use the prescribed method in lieu of structural analysis to determine seismic loads. A designer will have to determine the seismic design category of the building, in order to consider additional requirements for specific categories.)

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