

Table 12.3-2 Vertical Structural Irregularities

Type	Description	Reference Section	Seismic Design Category Application
1a.	Stiffness-Soft Story Irregularity: Stiffness-soft story irregularity is defined to exist where there is a story in which the lateral stiffness is less than 70% of that in the story above or less than 80% of the average stiffness of the three stories above.	Table 12.6-1	D, E, and F
1b.	Stiffness-Extreme Soft Story Irregularity: Stiffness-extreme soft story irregularity is defined to exist where there is a story in which the lateral stiffness is less than 60% of that in the story above or less than 70% of the average stiffness of the three stories above.	12.3.3.1 Table 12.6-1	E and F D, E, and F
2.	Weight (Mass) Irregularity: Weight (mass) irregularity is defined to exist where the effective mass of any story is more than 150% of the effective mass of an adjacent story. A roof that is lighter than the floor below need not be considered.	Table 12.6-1	D, E, and F
3.	Vertical Geometric Irregularity: Vertical geometric irregularity is defined to exist where the horizontal dimension of the seismic force-resisting system in any story is more than 130% of that in an adjacent story.	Table 12.6-1	D, E, and F
4.	In-Plane Discontinuity in Vertical Lateral Force-Resisting Element Irregularity: In-plane discontinuity in vertical lateral force-resisting elements irregularity is defined to exist where there is an in-plane offset of a vertical seismic force-resisting element resulting in overturning demands on a supporting beam, column, truss, or slab.	12.3.3.3 12.3.3.4 Table 12.6-1	B, C, D, E, and F D, E, and F D, E, and F
5a.	Discontinuity in Lateral Strength–Weak Story Irregularity: Discontinuity in lateral strength–weak story irregularity is defined to exist where the story lateral strength is less than 80% of that in the story above. The story lateral strength is the total lateral strength of all seismic-resisting elements sharing the story shear for the direction under consideration.	12.3.3.1 Table 12.6-1	E and F D, E, and F
5b.	Discontinuity in Lateral Strength–Extreme Weak Story Irregularity: Discontinuity in lateral strength–extreme weak story irregularity is defined to exist where the story lateral strength is less than 65% of that in the story above. The story strength is the total strength of all seismic-resisting elements sharing the story shear for the direction under consideration.	12.3.3.1 12.3.3.2 Table 12.6-1	D, E, and F B and C D, E, and F

EXCEPTION:

Forces calculated using the seismic load effects including overstrength factor of Section 12.4.3 need not be increased.

12.3.4 Redundancy

A redundancy factor, ρ , shall be assigned to the seismic force-resisting system in each of two orthogonal directions for all structures in accordance with this section.

12.3.4.1 Conditions Where Value of ρ is 1.0

The value of ρ is permitted to equal 1.0 for the following:

- Structures assigned to Seismic Design Category B or C.
- Drift calculation and P-delta effects.
- Design of nonstructural components.
- Design of nonbuilding structures that are not similar to buildings.
- Design of collector elements, splices, and their connections for which the seismic load effects including overstrength factor of Section 12.4.3 are used.
- Design of members or connections where the seismic load effects including overstrength factor of Section 12.4.3 are required for design.
- Diaphragm loads determined using Eq. 12.10-1.
- Structures with damping systems designed in accordance with Chapter 18.
- Design of structural walls for out-of-plane forces, including their anchorage.