

Appendix D

BUILDINGS EXEMPTED FROM TORSIONAL WIND LOAD CASES

D1.0 SCOPE

The torsional load cases in Fig. 27.4-8 (Case 2 and Case 4) need not be considered for a building meeting the conditions of Sections D1.1, D1.2, D1.3, D1.4 or D1.5 or, if it can be shown by other means that the torsional load cases of Fig. 27.4-8 do not control the design.

D1.1 ONE AND TWO STORY BUILDINGS MEETING THE FOLLOWING REQUIREMENTS

One-story buildings with h less than or equal to 30 ft, buildings two stories or less framed with light-frame construction, and buildings two stories or less designed with flexible diaphragms.

D1.2 BUILDINGS CONTROLLED BY SEISMIC LOADING

D1.2.1 Buildings with Diaphragms at Each Level that Are Not Flexible

Building structures that are regular (as defined in Section 12.3.2) and conform to the following:

1. The eccentricity between the center of mass and the geometric centroid of the building at that level shall not exceed 15% of the overall building width along each principal axis considered at each level and,
2. The design story shear determined for earthquake load as specified in Chapter 12 at each floor level shall be at least 1.5 times the design story shear determined for wind loads as specified herein.

The design earthquake and wind load cases considered when evaluating this exception shall be the load cases without torsion.

D1.2.2 Buildings with Diaphragms at Each Level that Are Flexible

Building structures that are regular (as defined in Section 12.3.2) and conform to the following:

1. The design earthquake shear forces resolved to the vertical elements of the lateral-load-resisting system

shall be at least 1.5 times the corresponding design wind shear forces resisted by those elements.

The design earthquake and wind load cases considered when evaluating this exception shall be the load cases without torsion.

D1.3 BUILDINGS CLASSIFIED AS TORSIONALLY REGULAR UNDER WIND LOAD

Buildings meeting the definition of a torsionally regular buildings contained in Section 26.2.

EXCEPTION: If a building does not qualify as being torsionally regular under wind load, it is permissible to base the design on the basic wind load Case 1 that is proportionally increased so that the maximum displacement at each level is not less than the maximum displacement for the torsional load Case 2.

D1.4 BUILDINGS WITH DIAPHRAGMS THAT ARE FLEXIBLE AND DESIGNED FOR INCREASED WIND LOADING

The torsional wind load cases need not be considered if the wind force in each vertical MWFRS element of a building is scaled to be 1.5 times the wind force calculated in the same element under the basic wind load.

D1.5 CLASS 1 AND CLASS 2 SIMPLE DIAPHRAGM BUILDINGS ($H \leq 160$ FT.) MEETING THE FOLLOWING REQUIREMENTS (REFER TO SECTION 27.5.2)

D1.5.1 Case A – Class 1 and Class 2 Buildings

Square buildings with $L/B = 1.0$, where all the following conditions are satisfied:

1. The combined stiffness of the MWFRS in each principal axis direction shall be equal, and
2. The individual stiffness of each of the MWFRS in each principal axis direction shall be equal and symmetrically placed about the center of application of the wind load along the principal axis under consideration, and