Bracing systems include bracing members, and their connections and supports, and shall be proportioned to resist the forces that develop at the brace points and limit the lateral displacement of the brace points.

Bracing for beams shall provide lateral restraint to the compression flange, except that for a cantilevered beam at the end of the cantilever and for beams subject to double curvature, the restraint shall be provided at both top and bottom flanges unless otherwise accounted for in the design.

9.2.4 Twisting and Lateral Displacements

Twisting and lateral displacements shall be prevented at the supports of a member or element unless accounted for in the design.

9.2.5 Simplified Analysis

Bracing systems shall be proportioned to have a strength perpendicular to the longitudinal axis of the braced member in the plane of buckling equal to at least 0.02 times the factored compressive force at each brace point in the member or element being braced, unless a detailed analysis is carried out in accordance with Clause 9.2.6 to determine the appropriate strength and stiffness of the bracing system. Any other forces acting on the bracing member shall also be taken into account. The displacement Δ_b shall not exceed Δ_o.

9.2.6 Detailed Analysis

9.2.6.1 Second-Order Method

Forces acting in the member bracing system and its deformations shall be determined by means of a second-order elastic analysis of the member and its bracing system. This analysis shall include the most critical initial deformed configuration of the member and shall consider forces due to external loads. In the analysis, hinges may be assumed at brace points in the member or element being braced.

The displacement Δ_b shall not exceed Δ_o unless a greater value can be justified by analysis.

9.2.6.2 Direct Method

Unless a second-order analysis is carried out in accordance with Clause 9.2.6.1 or the simplified analysis is carried out in accordance with Clause 9.2.5, bracing systems shall be proportioned at each brace point to have a factored resistance in the direction perpendicular to the longitudinal axis of the braced member in the plane of buckling equal to at least

$$P_b = \frac{\beta\left[\Delta_o + \Delta_b\right] C_f}{L}$$

where

P_b = the force used to design the bracing system. When two or more points are braced, the forces P_b alternate in direction.

β = 2, 3, 3.41, 3.63, or 4 for 1, 2, 3, 4, or more equally spaced braces, respectively, unless a lesser value can be justified by the analysis

Δ_o = the initial misalignment

Δ_b = the displacement of the bracing system, assumed to be equal to Δ_o for the initial calculation of P_b

C_f = the maximum factored compression in the segments bound by the brace points on either side of the brace point under consideration

L = length between braces

For flexural members, the force P_b, as calculated above, shall be increased, as appropriate, when loads are applied above the shear centre or for beams in double curvature.