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Interior Bracing: When to Use it

Longitudinal bracing is an essential part for a steel building. There are plenty of scenarios where interior bracing may be necessary, required, or more beneficial for the serviceability of the structure. Having interior bracing can aid with decreasing cost, limiting the amount of materials, and may help with overall building performance.

Cases where interior bracing may be applicable include:

- Modular buildings wider than 200 feet
- Distribution of sidewall bracing reactions to aid in foundation requirements
- Mezzanines that may require an additional wall of support
- Serviceability and maintenance of top running cranes

It is worth noting that there are two primary ways that metal buildings can offer longitudinal support. If the building requires inside clears, a good alternative to using x-bracing is to use portal frames. These provide more clearance but will have additional weight and movement of the structure associated with them.

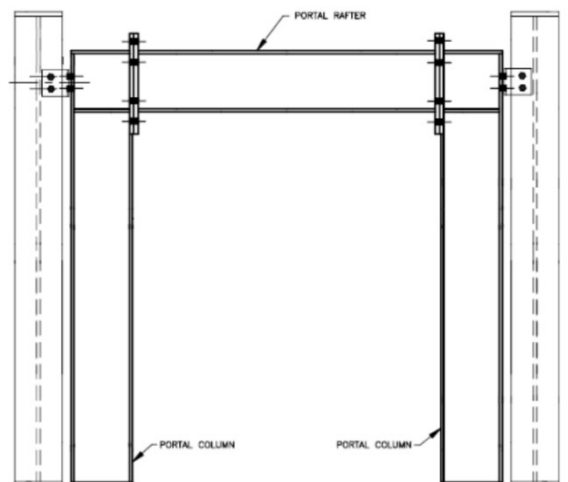


Figure 1 - Full Height Portal Frame

Whether it is x-bracing or portal frames, interior bracing gives a longitudinal system with improved quality that helps with the buildings performance. As shown in the following example, interior bracing can be an overall benefit when it comes to providing workable solutions as well as lower cost in certain scenarios. While not needed in every building, the benefits may be more sincere in the situations it is applicable.

Example:

The following table is a side-by-side comparison of a 300'-0" wide by 100'-0" long by 30'-0" tall building with and without interior bracing. Both buildings will utilize (2) 25'-0" bays of bracing to finished floor on each wall. The wind load will have a 115-mph wind speed at wind exposure C.

Bracing File	Bracing w/o Interior Bracing (Model 1)	Bracing w/Interior Bracing (Model 2)
Weight of Rods	4200 lbs.	4000 lbs.
Weight of Roof Struts	6400 lbs.	3900 lbs.
Approximate Max Reactions at Sidewall Bracing	35 kips (Horizontal)/ 40 kips (Vertical)	20 kips (Horizontal)/ 23 kips (Vertical)
Approximate Max Reactions at Interior Bracing	N/A	30 kips (Horizontal)/ 51 kips (Vertical)
Max Movement at Bracing Locations	2.4 inches	1.4 inches

(These numbers are used specifically for example purposes only)

Looking at a comparison between a building with and without interior bracing, some of the factors that will be different are:

- Reactions will be distributed differently
- Total movement in the longitudinal direction
- The weight of steel required to support the building longitudinally will be different

