Coffee Break Training - Fire Protection Series

Building Construction: Shear Walls in Steel Construction

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Learning Objective: *The student shall be able to explain two functions of shear wall construction.*

These X-shaped cross braces are part of a structural reinforcement called a "shear wall."

These cross braces provide added strength and stiffness to the building.

In those environments where high winds or earthquakes pose a risk to structural stability, shear walls are used to provide strength and stiffness to the building.

When shear walls are strong enough, they will transfer these horizontal forces to the next element in the load path below them, such as other shear walls, floors, foundation walls, slabs, or footings. Shear walls also provide lateral stiffness to prevent the roof or floor above from excessive side-sway. When shear walls are stiff enough, they will prevent floor and roof framing members from moving off their supports. Buildings that are sufficiently stiff will usually suffer less nonstructural damage.

To maintain the lateral stability of the buildings constructed with load-bearing steel stud walls, the design engineer often uses the cold-formed steel shear walls. The most common cold-formed steel shear wall constructions are

1. Orientated strand boards (OSB) on the exterior face of the wall.
2. Steel strap X-bracing on one face or both faces of the wall.
3. Gypsum wall board (GWB) on both faces of the wall.

Where steel strap X-bracing is specified, it is often necessary to provide splicing details for the strap and top track since the stock length of the steel straps and tracks are typically 10 ft (3.04 m).

Cross bracing can be installed after the walls have been raised, plumbed, aligned, and attached to the foundation or floor deck.

The straps should be inspected after they are installed to ensure the correct number of fasteners is used.

The design and number of fasteners should be approved by a qualified engineer. The designer also should emphasize the importance of pulling the straps tight to eliminate any slack.