



Design Method for Steel Deck Diaphragms

Cold formed steel diaphragms are composed of profiled steel sheets or panels fastened together and to framing members to resist in-plane shear forces.

Knowledge of the diaphragm capabilities of roofs, walls and floors can be of great advantage to the structural engineer in designing buildings to resist forces caused by wind, seismic and other lateral loads. Roof and wall panels used for enclosure are customarily designed only for transfer of the normal components of surface loads into the structural framework. The in-plane shear resistance of such systems can also be utilized with the proper design methods.

Most manufacturers of steel deck publish tables or have on-line calculators for the diaphragm design using their products. The CSSBI has also published tables for the more common deck profiles and fastener patterns. The problem arises, however, if a designer is faced with an assembly that is not typical and for which there are no published values.

In Canada the standard governing the design of steel deck diaphragms is AISI S310 *North American Standard for the Design of Profiled Steel Diaphragm Panels*. This standard provides an analytical method for determining the strength and stiffness of the steel deck diaphragm as well as the option of determining these limit states by test. The AISI S310 standard has been adopted by reference in CSA-S136-16 *North American Specification for the Design of Cold-Formed Steel Structural Members* for the design of steel deck diaphragms in Canada.

The AISI S310 and CSA-S136 standards are available on-line as free pdf downloads. The CSSBI B13 *Design of Steel Deck Diaphragms* is available as a free pdf download accessible at www.cssbi.ca/resources.