

## WELDING WASHERS FOR STEEL DECK

This document has been published by the Steel Deck Institute as a position paper in response to discussions taking place in the engineering community on the feasibility of welding steel deck to structural supports when the weld includes a washer. This statement is based on the Steel Deck Institute previous document on the subject and addresses the testing carried out at Ecole Polytechnique and McGill University in Montreal, Canada, and subsequent published papers. (See document references listed below.)

The reports and papers published at Ecole Polytechnique and McGill University in Montreal, Canada, were based on research for a way to dissipate seismic forces through the use of **inelastic behavior of steel deck**. The existing design methods with their safety or performance factors for steel deck diaphragm are based on elastic response of the steel deck to the seismic forces applied to the deck diaphragm. Inelastic behavior of steel deck under seismic loads implies that some of the roof deck would need to be replaced after an earthquake strong enough to require the inelastic behavior of the deck.

The capacity values for welds used in the Diaphragm Design Manual tables published by the Steel Deck Institute (SDI) and the Canadian Sheet Steel Building Institute (CSSBI) are **based on welds without washers** for material thickness equal or greater than 0.0280 in. (0.71mm). The appropriate safety and resistance factors allow for normal variability in workmanship.

Welding and other type of **attachments should always be monitored on site** to verify that the proper size of attachment is provided and the proper procedures are followed to produce attachments that will behave in accordance with their theoretical capacity.

Furthermore the use of washers for welded attachment to steel supports can be detrimental for the following reasons:

- The size of the washers provided by the deck installer may not allow proper contact at the bottom of the standard flutes,
- There are no washers that will allow welding to the support on either side of an interlocking side lap which is a very important attachment since it is often a controlling failure mode for diaphragm action,
- Welding with washers require special welding procedures that require more welding time in order to produce the proper fusion between weld material, steel washer, steel deck, and steel support.

For those reasons, the **SDI does not recommend the use of welding washers to weld steel deck to support for sheet material thickness equal or greater than 0.0280 in. (0.71mm)** when using the existing SDI diaphragm resistance formulas.

**REFERENCES**

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