



# SHEAR STUDS: TACKLING 20MM-PLUS THROUGH-DECK WELDS

Image courtesy of Metal Deck

AS/NZS 2327:2017 (SA/SNZ, 2017) imposes restrictions on through-deck welding of shear studs that exceed 20mm in diameter, particularly when profile ribs are oriented transverse to the supporting beam and the profile remains continuous. This fact sheet discusses the technical basis for this restriction and includes recommended approaches for welding studs greater than 20mm to steel beams.

## BACKGROUND TO LIMITATION

The limitation of the through-deck welding of shear studs that exceed 20mm is due to insufficient test data to verify that the AS/NZS 2327 stud capacity design rules are appropriate for this range of stud diameters.

**“Push tests conducted by HERA [Heavy Engineering Research Association] have revealed suboptimal performance of 22mm-diameter studs. The study indicates that the characteristic slip capacity for one test group was remarkably low, rendering the shear connectors non-ductile and incapable of justifying normal plastic design principles.”**

STEPHEN HICKS, FORMER STRUCTURAL MANAGER, HERA



Image courtesy of Metal Deck

## RECOMMENDED APPROACH

The suggested alternative is to use 19mm-diameter shear studs where possible. If 19mm-diameter studs are not sufficient, the number of studs can be increased to two per trough.

However, in cases where 22mm-diameter studs are deemed necessary, the following precautions are recommended:

1. Cut holes in the metal sheeting so that the studs can be directly welded to the steel.
2. Design the metal decking as simply supported; weld shear studs directly to the steel and place metal sheeting on each side of the studs.
3. Check the minimum flange thickness using the following formula:  
$$t_{f\_min} = 0.4 \times dia_{stud}$$
  
(i.e.  $0.4 \times 22mm = 8.8mm$ )  
Welding larger diameter studs may lead to the flange melting or other damage to the element.

### Reference

SA/SNZ. (2017). *Structural Steelwork – Composite structures – Composite steel-concrete construction in buildings (AS/NZS 2327)*. Standards Australia; Standards New Zealand. Australia; Standards New Zealand.

**Need help? For stud welding enquires, contact SCNZ or the HERA Welding Centre.**