

AD 504:

Web to flange welds in box sections subject to bending and torsion

SCI has recently been asked about sizing [welds](#) between webs and flanges of a [fabricated](#) box section subject to applied torsion and bending. This AD note gives guidance on sizing the welds.

The applied [torsion](#) is resisted by shear flow round the box section. The constituent plates deform in shear and complementary shear flows develop parallel to the longitudinal axis of the box and are transferred between the [plates](#) by the web to flange welds.

The shear flow s round a box section due to a torsion T is given by:

$$s = \frac{T}{2A} \text{ kN/mm}$$

where A is the area enclosed by the mid-line of the flanges and webs as shown in the figure.

The shear flow between the webs and flanges due to bending is given by the standard formula where A_f is the area of the flange where for two webs and shear force V parallel to the z axis:

$$s_b = \frac{VA_f \bar{z}}{2I_y} \text{ kN/mm}$$

The force per mm for sizing the web to flange welds is the sum of the two shear flows:

$$\text{force per mm} = s + s_b \text{ kN/mm}$$

