

## **Stabilisation of slender beams against lateral torsional buckling by shear stiffness of trapezoidal sheeting which is fastened along two edges**

According to available design codes it is not possible to use the shear stiffness of trapezoidal sheeting which is fastened along two edges only for stabilisation of slender beams against lateral torsional buckling. Therefore the effect of unsupported edges parallel to the span is investigated experimentally and numerically by means of a Finite-Element program. This analysis included the nonlinear flexibility of the fasteners at the edges normal to the span. The investigation shows the non-uniform distribution of the shear forces for diaphragms with only two edges fastened which deviates from the uniform distribution for diaphragms fastened along four edges. The non-uniform distribution is influenced by the width of the diaphragm. The shear stiffness determined by a parametric investigation is given as ratio of two-sided and four-sided support subject to the  $a/b$ -ratio of the diaphragm. From this a simple formula is derived, which gives the shear stiffness for a diaphragm of trapezoidal sheeting supported along two edges in dependence on the known shear stiffness of all-side fastened diaphragms.