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STRUCTURAL BEHAVIOUR OF HYBRID GLASS BEAMS WITH T CROSS-SECTIONS

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Abstract

An experimental investigation regarding the flexural and the shear behaviour of glass beams with length 900, 1300, 1700 mm and T cross-section is presented and discussed. T cross-sections were obtained by assembling glass web and glass flange. Some specimens were also reinforced internally in the web with steel plates of thickness 6 mm and depth 25 and 50 mm placed at the bottom portion of the beams for the entire length of the beams themselves. Three specimens for each investigated series were tested in flexure focusing on the flexural and shear response through the determination of the load-deflection curves and the crack patterns at rupture identifying the effects of steel plates. The shear span to depth ratios a/d were 2, 3 and 4, respectively. A simple model is also presented for a preliminary design of composite glass beams able to predict the ultimate load including limit states due to glass cracking, flexural failure with glass crushing or plates yielding, shear compression and diagonal tension failure.

The resistance is obtained from equilibrium conditions of a portion of beam enclosed between the support and shear span, taking also into account the presence of steel plates. The model is able to reproduce experimental results to the varying of the geometrical characteristics of beam, of the reinforcement area and on the type of reinforcement.

Key words: Glasses; Adhesion; Mechanical testing; Assembly.