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SHEAR BUCKLING RESISTANCE OF CANTILEVER GIRDERS WITH CORRUGATED WEB

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Abstract

The study reports investigations into shear buckling resistance of the corrugated web of cantilever SIN girders. Experimental tests were conducted on ten SIN girders with the web height of 500, 1000, 1250 and 1500 mm made to 1:1 scale. The tests confirmed the advantageous effect of support stiffeners of cantilever girder parts on shear buckling resistance. Load-displacement paths of global displacements in cantilevers of SIN girders were analysed. The Finite Element Method was used to construct models that simulated the behaviour of the experimental models. The numerical analysis of FEM girders was conducted for twelve models with the web height ranging from 500 to 1500 mm, and web thickness of 2, 2.5 and 3 mm. In the FEM analysis, different modes of the web failure, namely local and interactive ones, were taken into account. Based on experimental investigations and the FEM analysis, a method for estimating design shear buckling resistance of the corrugated web in cantilever girders with support stiffener was proposed. The method was based on the determination of interactive buckling resistance. It was demonstrated that support stiffeners in cantilever girders produced an advantageous effect on increase in shear buckling resistance. The solution developed was compared with the methods currently employed to determine buckling resistance. Conclusions and recommendations were drawn on dimensioning of cantilever girders with support stiffener.

Keywords: **Cantilever girders with corrugated web type SIN; Interactive shear buckling resistance; Design shear buckling resistance; Support stiffener; Finite element method.**