JOINT WITH LARGE DIAMETER FASTENER
CONSTRUCTED FOR LARGE SPAN TRUSS GIRDERS

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ABSTRACT: In this paper the truss girder with hybrid joint will be presented. Hybrid joint is combined from glued-in steel rods in local reinforced chord, steel tube (fastener) that transmits the load into the chord. Glued-in steel rods are used to transmit forces in diagonals of truss girder. Local reinforcement of truss chord was carried out using fiberglass textile glued between the timber lamellas in the bonding process. Fastener 49.0 mm in diameter, and Allen bolts for making connection between fastener and glued-in steel rods, were used for transferring the load from the diagonals into the chord. The results obtained by experimental testing of the joint, and the results obtained by FEM analysis using ABAQUS software, are carried out. Four models of truss girder, 2.0 m high and 6.0 m in span, with previous described joint were experimentally tested. During the experimental tests, global truss girder and local joints deformations were measured. Load-deformation diagrams were conducted and analyzed. ABAQUS was used for modelling proposed joint. Very small zone of timber elements around the fastener with corresponding boundary conditions was modelled. For defining wood properties UMAT subroutine with Tsai-Wu yield criterion was used. Furthermore, the comparison between results obtained by FEM, experimental tests and EC5 was carried out. The results show that equation for fastener embedment strength given by EC5 need to be changed, and that the fastener resistance obtained by tests is much higher than resistance given by EC5.

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