

Adhesive Connections in Timber: A Comparison between Rough and Smooth Wood Bonding Surfaces

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Abstract : The use of adhesive anchors for wooden constructions is an efficient technology to connect and design timber members in new timber structures and to rehabilitate the damaged structural members of historical buildings. Due to the lack of standard regulation in this specific area of structural design, designers' choices are still supported by test analysis that enables knowledge, and the prediction, of the structural behavior of glued in rod joints. The paper outlines an experimental research activity aimed at identifying the tensile resistance capacity of several new adhesive joint prototypes made of epoxy resin, steel bar and timber, Oak and Douglas Fir species. The development of new adhesive connectors has been carried out by using epoxy to glue stainless steel bars into pre-drilled holes, characterized by smooth and rough internal surfaces, in timber samples. The realization of a threaded contact surface using a specific drill bit has led to an improved bond between wood and epoxy. The applied changes have also reduced the cost of the joints' production. The paper presents the results of this parametric analysis and a Finite Element analysis that enables identification and study of the internal stress distribution in the proposed adhesive anchors.

Keywords : glued in rod joints, adhesive anchors, timber, epoxy, rough contact surface, threaded hole shape

Conference Title : ICWACT 2015 : International Conference on Wood Adhesives, Chemistry and Technology

Conference Location : Miami, United States

Conference Dates : March 09-10, 2015