

Abstract

Glued laminated beams (glulam) are one of the most widely used engineering product in structural works. The glulam is made under pressure by the attachment of wooden layer parts with different lengths and arrangement by industrial adhesives and allows for the design of large-sized composite structures. The main concern for using glulam beams in terms of resistance, stiffness and displacement. The purpose of this study is to investigate the mechanical properties of glulam beams reinforced by steel bars. one of the problems in making glulam beams is need to use of long wooden layers with the least amount of nodes which requires increased felling of trees and reduction of forest resources. therefore this study has been tried to beyond the strengthening of the glulam beams, glulam brick beams to become also reinforced to avoid excessive waste of wood resources. Layers of abies wooden species used to make wooden beams .the beam test method was based on the four point bending test according to standard ASTM-D198.in the process of making samples, first , the layers were cut and after drying and eating ,the layers became glued and connected with clamp together to beams become integrated. The method of reinforcing ordinary glulam and glulam bricks was done in the same way . In the first method a single non-tread bar was passed through the groove that was formed in the tensile zone and was restrained with the washer and nut at the ends of the beam. In this method of reinforcement for ordinary samples bending stiffness increased by 37/89 % and service load increased by 34/40 %. for bricks samples the increase in bending stiffness and service load was 31/59% and 24/65 % respectively. In the second method in addition to the tensile region bar, a bar was placed in the compression area at the top of the beam and into the groove. In this method of reinforcement for ordinary samples bending stiffness increased by 28/05%and service load increasef by 28/24%. for bricks samples the increase in bending stiffness and service load was 23/77% and 21/30% respectively. It was also found that the placement of compression bar significantly increases the absorption of energy in the beams which is very useful for earthquake resistant structures

Key words: wooden beams, Flexural behavior, Glulam, reinforcement.



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