



Wood-Based Beams Strengthened with FRP Laminates: Improved Performance with Pre-Stressed Systems

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Summary:

Using bonded fibre-reinforced polymer (FRP) laminates for strengthening wooden structural members has been shown to be an effective and economical method. In this paper, properties of suitable FRP materials, adhesives and two ways of strengthening beams exposed to bending moment are presented. Passive or slack reinforcement is one way of strengthening. The most effective way of such a strengthening was to place reinforcement laminates on both tension and compression side of the beam. However, the FRP material is only partially utilised. The second way is to apply pre-stressing in FRP materials prior to bonding to tension side of flexural members and this way was showed to provide the most effective utilisation of these materials. The state of the art of such a strengthening and various methods are discussed. Increasing the load-bearing capacity, introducing a pre-cambering effect and thus improving serviceability which often governs the design and reducing the amount of needed FRP reinforcement are some of the main advantages. A recent development on how to avoid the requirement for anchoring the laminates at the end of the beams to avoid premature debonding is shown and the advantage of such a system is described.

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