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Spotlight on *Structures*

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Volume 33 of *Structures* (October 2021) is now available to read at www.sciencedirect.com/journal/structures/vol/33.

Editor-in-Chief, Leroy Gardner, has selected a paper on the flexural behaviour of structural timber beams strengthened with NSM basalt and glass FRP bars as his 'Featured Article' from this issue. The article will be available free of charge for six months.

Editor-in-Chief's Featured Article

Investigation of flexural behaviour of structural timber beams strengthened with NSM basalt and glass FRP bars

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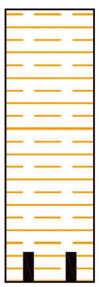
Highlights

- 20 four-point bending tests on timber beams.
- NSM BFRP and GFRP reinforced timber beams were studied.
- The flexural behaviour was improved by FRP reinforcement.
- A theoretical model able to predict the flexural strength was presented.

Abstract

Near Surface Mounted (NSM) fibre reinforced polymer (FRP) bars is an effective technique of improving the performance of timber beams. Despite the potential of NSM technique, literature remains limited, whilst there is not any standard method for the prediction of the NSM FRP timber flexural capacity. Extending the pool of experimental data and thus the understanding of FRP strengthened timber structures, the present paper reports an experimental study of timber beams reinforced with glass and basalt FRP bars. Moreover, the paper presents a general theoretical model in order to estimate the moment resistance of the NSM FRP timber beams. The experimental study examined white spruce timber specimens in two reinforcement configurations; one with reinforcement bars only on the tension zone and one with reinforcement bars both on the tension and the compression zone. Control specimens were also included for comparison purposes. All beams had a rectangular cross-section of 70 × 215 mm and were loaded under four-point bending configuration with a 2.3 m span. A total of 20 specimens were tested under displacement control quasi-static monotonic loading. The main failure mechanism observed for both NSM FRP reinforced and unreinforced specimens was brittle tensile failure of the timber at the tensile zone. The load–deflection curves, the strain distribution profiles and the failure modes were discussed. It was observed that a significant increase on the ultimate load (33–69%) and the flexural stiffness (22–33%) of the timber beams can be achieved due to the NSM reinforcement. The proposed theoretical model for the ultimate strength of NSM FRP strengthened timber beams is assessed on the basis of the test results and collated data, showing a good comparison between the experimental and theoretical results.

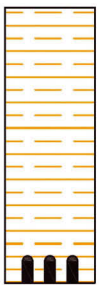
→| Read the full paper at **https://doi.org/10.1016/j.istruc.2021.04.044**



Bottom single reinforced with 2 bars in rectangular grooves

Bottom single reinforced with 2 bars in rectangular grooves on lateral sides

Bottom and top double reinforced with 2 bars in rectangular grooves



Bottom single reinforced with 3 bars in circular grooves

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