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# INFLUENCE OF FIBRE ORIENTATION ON PULTRUDED GFRP MATERIAL PROPERTIES

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## ABSTRACT

Pultruded glass fibre reinforced polymer (GFRP) has light weight, good strength, and excellent resistance to corrosion. These features make GFRP a material well-suited for civil engineering applications. Considering the composite action of fibre and resin in pultruded GFRP, understanding the dependency of strength and stiffness on its material constituents has gained interest amongst researchers. This paper studies the influence of fibre orientation on material properties of pultruded GFRP, namely tensile strength and elastic modulus. Eighty coupons with fibre orientations from  $0^\circ$  to  $90^\circ$  are tested under uniaxial tensile loadings. Based on the experimental results, a generalized Hankinson's formula is proposed to predict the off-axis properties of pultruded GFRP. To verify this proposed formula, off-axis strengths and elastic moduli of pultruded GFRP from previous studies are compared with the predictions. This work should find use in structural design guidelines for pultruded GFRP, and provides a complete understanding of fibre orientation effect.

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