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Effect of Stitching on the Tensile Mechanical Property of Empty Fruit Bunch Oil Palm Fiber Reinforced Epoxy Composites

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Abstract

Stitching has proven to be an effective reinforcement for improving through-thickness (out-of-plane) mechanical properties with the incorporation of z-direction reinforcements of synthetic fiber. There are drawbacks to stitching as it may cause focal stress concentration, and fiber misalignment and breakage, but at the same time, it can also improve the tensile performance of the composite. Tensile properties, such as tensile strength and modulus of elasticity, were obtained from tensile tests performed on both stitched and unstitched oil palm fiber composites as per ASTM D638 specifications using Universal Testing Machine INSTRON 5582. The test results indicated that stitching natural, short, untreated and random empty fruit bunch oil palm fiber reinforced epoxy composites improve the tensile strength and elastic modulus due to the increase in matrix volume percentage and additional tensional resistance.

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