

Mechanical performance of hybrid woven jute-roselle-reinforced polyester composites

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ABSTRACT

Natural fibre acts as a significant replacement for the known synthetic fibre that tends to cause critical environmental issues. Hence, the hybridization of natural fibre reinforcement has been considered as one of the strategies in reducing synthetic fibre applications. The current research was conducted to determine the effect of layering sequence on the mechanical performance of hybrid woven jute–roselle. In addition, eight different types of composite plate that consisted of single and hybrid were fabricated through the implementation of hand lay-up method. In this case, each composite plate had to undergo the tensile, flexural and impact testing in order to acquire the effect of varying layering sequences. The results of the present study showed that the hybridization of jute–roselle provided was significant, especially on the flexural and impact performance. Furthermore, the tensile strength and modulus were higher on the JRRJ sample and maximum flexural strength also managed to be recorded by the same sample. However, the maximum flexural modulus only managed to be recorded in sample RRJJ. Meanwhile, the impact testing revealed that the composite plate of sample JJRR had the highest impact strength. The void content for all the samples was acceptable because all of them were less than 7%. Finally, scanning electron microscopic image illustrated that the fractured surfaced of composite sample was typically smooth with less formation of void and fibre pull-out.

KEYWORDS

Natural fibre, hybridization, mechanical properties, layering sequence, woven

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