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Machinability Study on Milling Kenaf Fiber Reinforced Plastic Composite Materials using Design of Experiments (Conference Paper)

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Abstract

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The surface roughness (R_a) and delamination factor (F_d) of a milled kenaf reinforced plastic composite materials are depending on the milling parameters (spindle speed, feed rate and depth of cut). Therefore, a study was carried out to investigate the relationship between the milling parameters and their effects on a kenaf reinforced plastic composite materials. The composite panels were fabricated using vacuum assisted resin transfer moulding (VARTM) method. A full factorial design of experiments was use as an initial step to screen the significance of the parameters on the defects using Analysis of Variance (ANOVA). If the curvature of the collected data shows significant, Response Surface Methodology (RSM) is then applied for obtaining a quadratic modelling equation that has more reliable in expressing the optimization. Thus, the objective of this research is obtaining an optimum setting of milling parameters and modelling equations to minimize the surface roughness (R_a) and delamination factor (F_d) of milled kenaf reinforced plastic composite materials. The spindle speed and feed rate contributed the most in affecting the surface roughness and the delamination factor of the kenaf composite materials.

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Indexed keywords

Engineering controlled terms: Analysis of variance (ANOVA) | Curve fitting | Delamination | Design of experiments | Fiber reinforced plastics | Hemp | Integrated circuits | Milling (machining) | Reinforced plastics | Reinforcement | Resin transfer molding | Stars | Surface roughness

Engineering uncontrolled terms: Composite panels | Delamination factor | Fiber - reinforced plastic composites | Full factorial design | Milling parameters | Response surface methodology | Spindle speed | Surface roughness (Ra)

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