Comparison Effect of Delamination Factor (F-d) on Unidirectional and Woven Kenaf Fibre Reinforced Plastic Composite Materials during Milling Process

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Abstract

Kenaf fibre is a fibre-based plant in the natural fibre group that is becoming more widely used. Kenaf fibre was mixed with polymer (epoxy) materials to develop a new material with good mechanical properties with low manufacturing costs. The workpiece is divided into two types which is the unidirectional kenaf fibre and the woven kenaf fibre. The experiment will focus on comparison the effect of delamination factor (F-d) which was produced during milling process on that materials with the most optimum set of parameter to reduce the effects of F-d. This experiment will be conducted based on roughness surface methodology (RSM) analysis with the Box-Behnken Design approach to get the effects of dependant factors on response. The factors involved are cutting speed, feed rate and depth of cut. The straight line (slotting) milling process will be conducted to indentify the effect of F-d using high speed steel (HSS) uncoated and tungsten carbide uncoated end milling with 10 mm diameter cutting tools. Image from microscope shown the unidirectional kenaf fibre composite material has a high delamination factor compared to effect on woven kenaf fibre composite material. On optimum parameter setting, unidirectional kenaf fibre workpiece is low cutting speed, feed rate and depth of cut. While for woven kenaf fibre workpiece, the optimum parameter setting is low cutting speed with high feed rate and depth of cut.

Keywords

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KeyWords Plus: DESIGN EXPERIMENTS; GLASS

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