FRACTURE TOUGHNESS OF KENAF POWDER THERMOSET COMPOSITE

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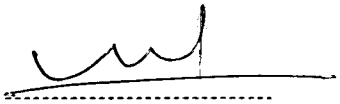
"I declare that this thesis is the result of my own work except the ideas and summaries which I have clarified their sources. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any degree."

Signed : 

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ABSTRACT

As nowadays dependency on petroleum based product increase tremendously and causing the environmental issues, the demand of developing such material that can replace the existing materials have been develop tremendously in order to lesser the effect to the environment. As for this reason a natural composite is been introduce and one of it is using kenaf fibre. For this report, the natural composite is built from kenaf powder instead of fibre, bonded with epoxy or polyester and laminated with thin aluminium. It is called kenaf powder composite laminate (KPCL). This study begins with the fabrication process of the composite for the KPCL using 20%wt of kenaf powder. The kenaf powder been used in this study is from MARDI and with the size of 90μ - 180μ. The kenaf powder is not been heat treated and be used readily. The KPC is been fabricated in room temperature and been pressed under a weight of 300 kN and left to cure about 24 hours. Tensile test is been conducted to determine the mechanical properties such as maximum tensile stress and modulus of elasticity and the result indicate that the KPCL/epoxy has the highest value of maximum tensile stress that is 31.53 MPa and 6.64 GPa for modulus of elasticity. It is 58% higher than kenaf powder composite (KPC)/epoxy, 43% higher than epoxy, 26% higher than KPCL /polyester and 55% higher than polyester. In the fracture toughness test, the KPCL /epoxy gives the highest value that is 4.092 MPa$\sqrt{m}$ that is 17% higher than KPCL /polyester, 66% higher than KPC/epoxy, 70% higher than KPC /polyester, 0.6% higher than epoxy and 21% higher than polyester. Fractography done to the damage specimen, it shows that the KPC/epoxy has a better surface condition and less brittle compare to the KPC/polyester

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