

Characteristics Analysis of Composite Materials Using Polyester Resin Reinforced By Woven Banana Leaf Fibers and woven carbon fiber

by

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ABSTRACT

Various fields of science and technology are currently advancing. Science related to engineering materials, along with the increasing use of synthetic or artificial fiber materials, starting from the manufacture of motorcycle bodies to car bodies. This study aims to test the impact and tensile strength of composite materials using banana fiber reinforced materials compared to using carbon fiber with a woven fiber arrangement and its application to the vehicle body. The method used is experiments using woven banana stem fiber and woven carbon fiber with a volume fraction of 30%, 40% and 50% respectively for the tensile strength and impact resistance values. The results showed that carbon fiber had higher tensile strength and impact resistance values of 92.1 MPa and 0.0914 Joule/mm² compared to woven banana frond fiber of 12.21 MPa and 0.0524 Joules/mm² with a difference of 79.89 MPa and 0.039 Joules/mm², the greater the volume fraction, the higher the mechanical strength. However, in woven banana frond fibers, an increase in the volume fraction actually decreases the impact strength. This is due to the uneven distribution of fibers with increasing fractions, which causes clumping and uncoated woven banana midrib fibers, thereby reducing their tensile strength and impact resistance. Banana frond fiber is not suitable for making vehicle bodies because in terms of strength and appearance it is still not sufficient and banana frond fiber has a shape that tends to be larger than carbon fiber and for the arrangement of banana frond fiber it is more difficult to manage, tends to be more rigid and the banana frond fiber looks hollow in application to cover gear.

Keywords: *Composite, Banana Stem Fiber, Carbon Fiber, Tensile Strength, Impact Resistance*