

ABSTRACT

EFFECT OF THE AMOUNT OF BOND ON TENSILE FORCE OF PALM FIBER COMPOSITE WITH EPOXY MATRIX

By

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The development of composite does not only lead to synthetic composites, but also to natural composite which can be recycled or renewable, thereby reducing the consumption of petrochemical and environmental damage. Composites with natural fibers have some advantages compared to synthetic ones. Natural composite is friendlier to the environment because it can naturally degrade and also the price of natural fiber is cheaper than synthetic fibers. The production of natural fibers from year to year is constant, but the percentages to the entire production of textile fibers decrease since the production of synthetic fibers are growing. The study (Efri, 2013) about the influence of fiber length on the composite's tensile force and physic using fibers with epoxy matrix showed that the highest tensile force was the fiber with length of 90 mm at 36.37 MPa and 9.34% of strain because with longer fibers in the matrix, the fiber surface that bear the load from the matrix becomes larger, and otherwise, with shorter fibers in the matrix, the fiber surface that bear the load becomes smaller. Based on this result, the researchers conducted a study on the effect of fiber bond on the tensile force of palm fiber composite using epoxy matrix in order to create a better, cheaper, and stronger fiber compared to other composite.

The researcher performed a series of tests using palm fiber with epoxy matrix. There were three variations used; 1 bond, 3 bond and 5 bond. In this test, the researcher firstly prepared fibers with a diameter of 0.3 mm, which was given a treatment. Then, the researcher made a mold for the test specimen before finally conducted a tensile test and SEM observation.

The result showed that the strongest force was found on the specimen of 5 bond fiber at 41.17 MPa and 4.18% of strain. There was an increase from 1 bond to 3 bond by 10%, then from 3 bond to 5 bond by 26%. The bigger number of the bond created the bigger force of traction during tensile testing. From the observation of SEM, the picture of 5 bond fiber specimen showed a good image. It was shown by the appearance of a good bond of the matrix and fiber, and the absence of voids and debonding.

Keywords: palm fiber, epoxy, tensile test, SEM observation.