THE EFFECT OF SIZE AND COMPOSITION ON BAMBOO PARTICULATE FILLED COMPOSITE

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ABSTRACT

THE EFFECT OF SIZE AND COMPOSITION OF THE FILLER ON BAMBOO PARTICULATE COMPOSITE

The mechanical properties of composite depending on the size and composition of the particulate bamboo were studied. The matrix use is Homopolymer Polypropylene from Propelinas Malaysia. No coupling agent was added into the compound. Bamboo use was from the type of *Gigantochloa Scortechinii.* The bamboo will not go throughout any treatment to modify its compatibility. No coupling agent added into the composite blend to enhance its compatibility. Fabrication process was done by hot and cool press molding in the temperature of 200°C. The composite formed will be testing by several test namely tensile test, Izod Impact test, Fourier Transform Infrared Test and Thermogravimetric Analysis Test. Experiment conducted shows that an increasing in filler loading will decrease the strength and impact properties of the product. Meanwhile, a smaller particle size will increase the strength and impact properties. Smaller particle size also leads to increase the interaction of matrix and filler, and increase the degradation temperature of the compound. Moreover, more functional bonding can be seen by decreasing the particle size of the filler. The mechanical properties of the composite do not eclipsed the mechanical properties of pure Polypropylene due to poor binding forces. The present of bubbles and voids also affecting the overall properties of the composite.

CHAPTER 1

INTRODUCTION

1.1 Background

The history of fiber reinforced plastic composite is long, started on 1908, fiber reinforce plastic composite began with cellulose fiber-reinforced phenolics, later extending to urea and melamine, and reaching commodity status in the 1940's with glass fiber reinforced unsaturated Polyester. The manufacturing process, use and others is traditionally use traditional composite itself, usually made of glass, carbon, Aramid fiber reinforced with epoxy, unsaturated Polyester resins, Polyurethane, or Phenolics. Glass fiber is the dominant fiber and is used in 95% of industrial worldwide to reinforce thermoplastic and thermoset composite. Problems arise as these use natural resources. The world's supply of the natural resources is decreasing, while the demand for raw materials itself increasing. Meanwhile, the disposals of the composites after their intended life span are become critical and expensive. The recycling and reuse of composite material is not easy since it is made from dissimilar material. Two disposal alternatives are land filling and incineration. Landfill space is decreasing due to heavy ongoing waste disposal while the incineration process is higher in cost and the issues of effect to health [1].

After decades of development of high performance artificial fibers like carbon, aramid and glass, natural fibers have gained a renewed interest, especially as glass fiber substitute in automotive industries.