

## **ABSTRACT**

The aim of this project is to make bamboo fiber/epoxy composite material using locally available bamboo i.e. *Dendrocalamus giganteus*. Bamboo is largely available in Assam and it is the fastest growing grass. The study systematically explore the effect of different alkali concentration for the same time on the surface roughness and mechanical properties of the bamboo fibre strip. Scanning electron microscopy, tensile test, interfacial shear test were conducted to determine the effect of different alkali treatment over the bamboo fiber. The bamboo strips were immersed in 5%, 8%, 12% and 15% aqueous NaOH solution for soaking time of 12 hrs. Bamboo fiber strips were washed properly to neutralise its basic nature and litmus test was done. Then experimentally mechanical properties are evaluated and optimal alkali concentrated strips are selected for further work. From the test it is found that 12 wt% alkali treated bamboo strips have better mechanical property, so it is considered as optimal for further work. A compression moulding machine is fabricated for FRP composite. Traditional compression moulding machine used in industry has high cost and needs skilled worker to operate the machine. So, to eliminate these difficulties a compression moulding machine using car scissor jack and collecting materials from the scrap is fabricated and different parameters are calculated analytically. Two types of composite Type-I and Type-II is fabricated. Type-I is made using hand lay-up followed by compression moulding method and type-II is made by traditional hand lay-up method. To evaluate the mechanical and thermal properties of these two composite material different tests were conducted. The tests include tensile test, three point bending test, impact test, hardness test, thermogravimetric analysis. Density of the two types of composite also found using water displacement method.