INVESTIGATION OF MECHANIL PROPERTIES OF HEMP & BANANA FIBER COMPOSITE

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Abstract:- ***As world is demanding more of natural fiber material source which are biodegradable and eco-friendly in nature. That is why usefulness of composite materials are increasing day by day in the field of engineering.The composite mainly consists of two phases that is matrix and reinforcement of fiber.The availability of natural fiber in environment is high. The reason behind this is because it produced in farm , forest , mountain etc places . Natural fibers are low density fiber with high specific properties at low cost. These are environment friendly and biodegradable , unlike other synthetic fibers. They are promptly accessible and their particular properties are equivalent to those of different strands utilized as standard fortifications. The properties of normal filaments over inorganic strands incorporate low thickness, minimal effort, low vitality utilization, no wellbeing hazard. The main considerations constraining the vast scale creation of common fiber composites incorporate the propensity of regular fiber to retain water, corruption by microorganisms and daylight and low administration life.This work depict the mechanical conduct of banana and hemp fiber fortified polymer composite with the phenomenal references to the effect of fiber introduction and the way toward assembling fiber composites which is hand layup technique. This strategy is a standout amongthe best technique for making composites.***

. The properties of natural fibers over inorganic fibers include low density, low cost, low energy consumption, no health risk. The major factors restricting the large scale production of natural fiber composites comprise the tendency of natural fiber to absorb water, degradation by microorganisms and sunlight and low service life.This work describe the mechanical behavior of banana and hemp fiber reinforced polymer composite with the extraordinary references to the impact of fiber orientation and the process of manufacturing fiber composites which is hand layup method. This method is one of the most effective method of making composites.

Keywords—Natural fiber,UTM/FTM machine,composite.

I. INTRODUCTION

Hemp & Banana natural fiber in its dry condition by using adhesive as matrix in composite to join fiber with each other by mean of external force. Checking the Mechanical properties of composite with different orientation. Various works in the field of composite of Hemp & Banana are explained further. Teneli Vaisanen [1] he worked on a composite fiber and concluded that fresh fiber was initially cleaned and dried at 70^0 C and then made in a form of sheets of composite fiber, which showed better mechanical properties. M. Ramesh [2] investigated that composite prepared by hand lay-up method of different volume fraction apply pressure at room temperature havegood strength.Keerti Gowda B.S. [3] worked on banana fiber

composite of different volume fraction is prepared by hot compressive moulding method. Bhoopathi [4] found three different type hybrid laminate fabricated by hand layup method as reinforced material epoxy resin. R. Badrinath [5] usedhand layup to prepare composite by changing the orientation of placing the fibersand concluded that the tensile strength of 90^0 orientation was high. Sair & Oushabi [6] they formed composite by varying the hemp fiber constitution 5%,10%,15%,20% & varying the other constitution of matrix & reinforced material & he concluded that from a different amount of each constitute of composite by varying the percentage of hemp fiber in composite increased the composite bending & flexural strength. Muhammad Bakri [7] said that the banana fiber is treated first by alkaline treatment using 5% of sodium hydroxide & concluded the alkali treatment on the fiber caused adhesion of epoxy in the banana epoxy composite . Manickam Ramesh [8] investigated mechanical properties of hemp , banana kenaf and sisal fiber and he concluded the fibers have unique properties such as low density , good strength combined with sustainability. Rodriguez & Orrego [9] they made Banana fiber based composite combination with polyester resin and found considering the scope of study this bio-composite as lower cost and environmental impact. Tharazi & Sulong [10] they fabricated biodegradable composites from unidirectional kenaf fiber reinforced polylactic acid by hot pressing method

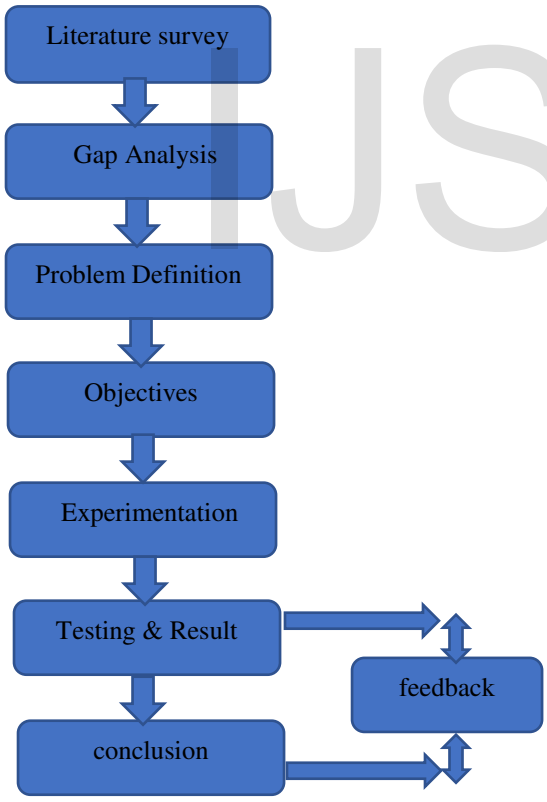
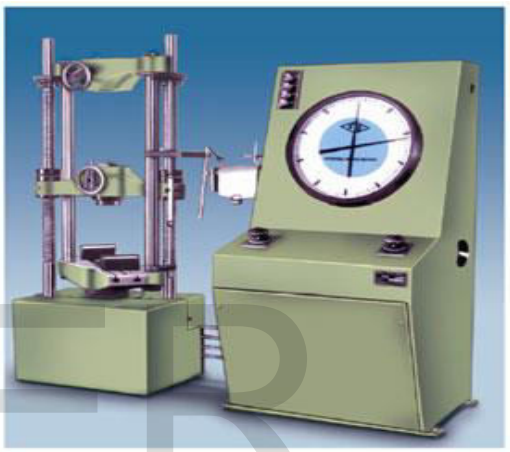


Fig. 1. Overall methodology of composite method

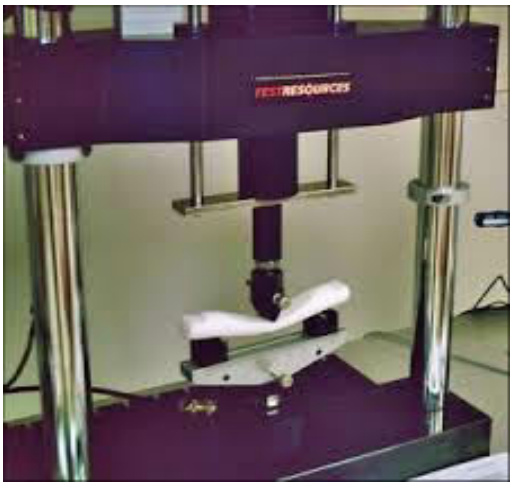
II. Experimental Details and Measurement

After preparation of composite thecomposite is cut into as per the ASTM D3039 standard . As the dimension of specimen is fixed for particular shape of material that to be tested . After that the specimen is subjected to UTM machine for testing tensile strength .Then after , the readings is note down .

The similar procedure is follow for the FTM machine for testing the flexural strength of composite . The load , area , deflection of specimen is noted down for the calculation purpose of FTM machine .



UTM machine



FTM machine

III. HAND LAYUP METHOD

[1] Hand Lay-up process is the most widely used and most economical open type molding technique since it requires minimal effort & time for manufacturing .

[2] Gel coat or wax is initially applied on the mold which acts as a releasing agent.

[3]Fiber reinforcements are manually placed on the mold.

[4] The laminating resin is applied by pouring,brushing or spraying on layer of fiber.

[5] The rollers are utilised to unite the overlay completing wetting the fortification and avacuating ensnared air.

[6] An external pressure is applied to the mold so as to form thin sheets as required.

Specimen of composite

IV. RESULTS AND CONCLUSIONS

[1] Using composites instead of customary materials, for eg. Steel for the most part gives real weight reserve funds.

[2] Bio composites are the future of composite materials because of their sustainable and degradable properties.

[3] They can be disposed of without harming the environment. The Hemp & Banana fiber composite have higher tensile & flexural strength then individual .The properties of composite is enhanced by 12 to 15 %.

RESULT TABLE OF UTM MACHINE

SPECIMEN	AREA(MM^2)	LOAD(N)	TENSILE STRENGTH(MPA)
HEMP-BANANA COMPOSITE	233.52	4000	17.13

RESULT TABLE OF FTM MACHINE

SPECIMEN	AREA (MM^2)	LOAD (N)	DEFLECTION (MM)	FLEXURAL STRENGTH (MPA)
HEMP-BANANA COMPOSITE	233.52	4400	7.1	18.84

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