NOVATEUR PUBLICATIONS
INTERNATIONAL JOURNAL OF INNOVATIONS IN ENGINEERING RESEARCH AND TECHNOLOGY [IJIERT]
ISSN: 2394-3696
VOLUME 6, ISSUE 12, Dec.-2019

FABRICATION AND TESTING OF HYBRID FIBER COMPOSITE MATERIAL

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ABSTRACT
The use of hybrid composite material has increasing in our day to day life. The hybrid composite are the materials prepared by mixing two or more materials of different forms having higher strength and resistant to weight. Here in this paper we have taken natural fibers like wood powder, corn husk and paddy husk. These are been fabricated with epoxy resin LY556 and catalyst HY 951.The properties of hybrid composite are compared against the tensile and compression strength. Out of which the one that is fabricated with 50% wood power and 50% corn husk composite material showed equally good results when compared with that of wood powder composite.

KEYWORDS: Paddy husk, Corn husk, Wood powder, Epoxy resin.

INTRODUCTION

The sustainable human life improved greatly because of the alternatives available in the different fields. Composite materials can be a good alternative in terms of development. The use of alloys bricks plywood laminated sheets etc have replaced the ancient materials like metals stones wood etc and are acting as a good replacement for them, Composite materials are generally made out of two or more synthetic, natural fibers. These are been bonded with the help of resin, accelerators and catalyst. Composite materials are been used in various fields like automobiles, construction manufacturing etc.This paper deals with the fabrication of materials like corn husk, wood powder and paddy husk .the various properties are been analyzed the detail of the experiment presents the out put results and the conclusion.

LITERATURE SURVEY

1. Dani Jagadesh, P. Sunderkara, P.W.Lee [1] has fabricated t he agricultural waste corn husk with poly propylene. They studied the flexural strength and other mechanical properties by increasing both corn husk weight ratio by 10,20,30 and 40wt %
2. M.Y. Ahmed,.Ismail, M.S.Mansor [2] has studied the varies types of rice husk like RHA,BRHA,WRHA AMRHA concluded that if crystalline RHA is covered to amorphous RHA it gives good tensile strength
3. Dr.Deverderappa,Guruchetan [3] has fabricated the plastics and wood which have given good results of tensile and flexural strength.

MATERIALS USED:

Wood powder : Wood powder can be a good composite due to its amorphous and uniform distribution it has good physical and mechanical properties

Paddy husk: There are various types of rice husk available which are agro waste produced which have good strength and feasibility ion the field of composites

Corn husk: Corn husk are dried corn leaves. This husk is also used in producing alcohol. But here we are fabricating corn husk with epoxy to bring out the mechanical properties of corn husk.

Binder: The binder that is used here is epoxy resin (LY 556) which has less moisture absorption capacity, light in weight, non-straining and can be easy to fabricate. The hardener (HY951) is used for curing which acts like a catalyst.

COMPOSITIONS:

In order to examine the properties, the sample of composite materials are fabricated by using Paddy Husk, Wood Powder and Corn Husk, Exopy resin LY556, and catalyst HY 951. Hand layup method is used for the fabrication of the composites. The hand mould is prepared by using polyvinyl sheet, aluminum foil and clamps. Then the samples are tested in order to find varies properties like Tensile strength, compression strength.

A. Preparation of samples.

1). Wood powder Sample (F): The sample (F) composite material prepared with that of wood powder as the ingredient by using the given composition. They are made to cut in various sizes for experimental use.

Wood Powder - 100gms
Epoxy Resin LY556 - 200ml
Catalyst HY 951 - 20ml

2). Paddy Husk Powder Sample (E): The sample (E) composite material prepared with that of paddy husk powder as the ingredient by using the given composition. They are made to cut in various sizes for experimental use.

Paddy husk Powder - 100gms
Epoxy Resin LY556 - 150ml
Catalyst HY 951 - 15ml

3). Corn husk Sample (D): The sample (D) composite material prepared with that of corn husk powder as the ingredient by using the given composition. They are made to cut in various sizes for experimental use.

Corn husk Powder - 100gms
Epoxy Resin LY556 - 150ml
Catalyst HY 951 - 15ml

4). Wood & Paddy Husk Powder Sample (C): The sample (C) composite material prepared with that of wood and paddy husk powder as the ingredient by using the given composition. They are made to cut in various sizes for experimental use

Epoxy Resin LY556 - 200ml
Catalyst HY 951 - 20ml
Powder - 50gms (each)

5). Corn Husk & Wood Powder Sample (B): The sample (B) composite material prepared with different compositions as the given ingredients. They are made to cut in various sizes for experimental use

Epoxy Resin - 200ml
Catalyst HY 951 - 20ml
Corn husk .Powder - 30gms
Paddy Powder - 20gms
Wood Powder - 15gms

6). Corn husk and Paddy Husk Powder Sample (A): The sample (A) composite material prepared with different compositions as the given ingredients. They are made to cut in various sizes for experimental use

Epoxy Resin LY556 - 200ml
Catalyst HY 951 - 20ml
Powder - 50gms (each)

RESULTS:

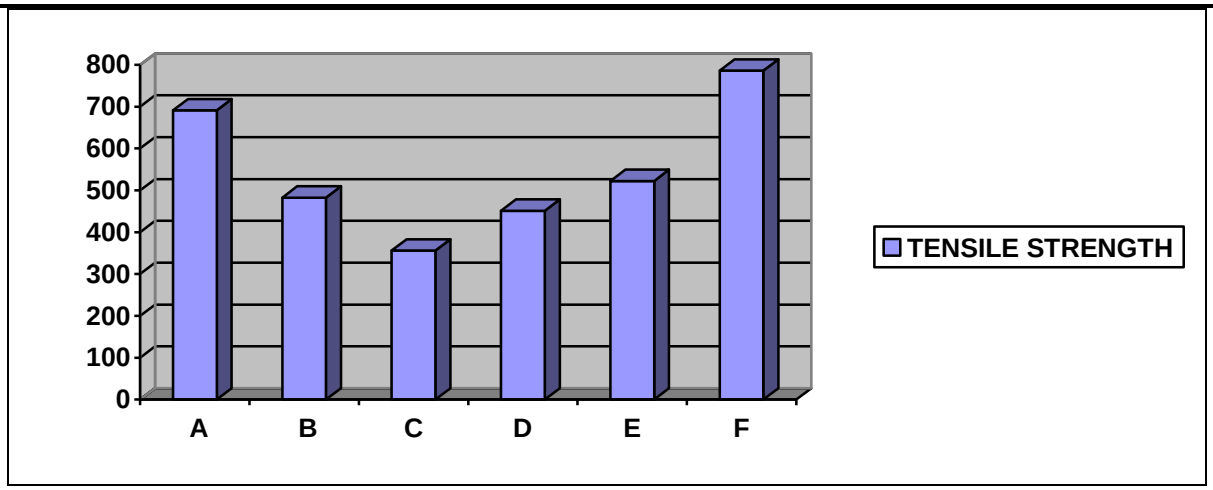
The samples of composite material in various sizes prepared as per the given composition and are subjected to Tensile and Compression test. The test results output are tabulated is as follows.

Fig1: Tensile Testing Machine

Fig2:Compression Testing Machine

Table 1. Table shows tensile strength of different samples

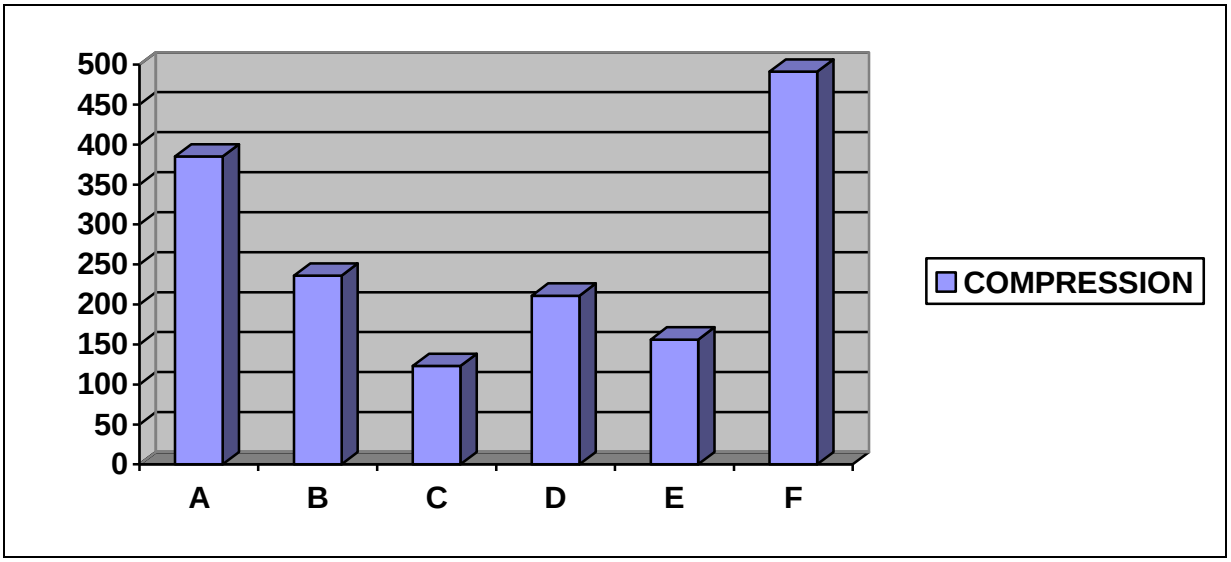
Material	Thickness mm		Load Kg	Modulus N/mm2	Tensile Strength N/mm2
Sample A	5.5 mm		140	522.2	691.3
Sample B	6.0 mm		115	264	482.6
Sample C	5.8 mm		124	294	356.2
Sample D	6.0 mm		126	951	451.3
Sample E	6.2 mm		118	654	522.3
Sample F	5.8 mm		135	752	786.3



Graph1: shows tensile strength of different samples

Table 2. Table shows compression strength of different samples

Material	Thickness mm	Load Kg	Deflection mm	Compression Strength N/mm2
Sample A	5.2 mm	156	4.2	385.2
Sample B	5.0 mm	125	2.4	236.3
Sample C	5.3 mm	136	1.3	123.8
Sample D	6.2 mm	127	1.6	211.3
Sample E	5.2 mm	122	2.0	156.4
Sample F	5.7 mm	146	3.6	491.3



Graph2: Shows compression strength of different samples

CONCLUSION

The hybrid composite materials using Corn Husk, Wood Powder and Paddy Husk are fabricated and the properties are examined in our paper. Generally the Wood powder has good capacity in load carrying. The output obtained by conducting the different test on the fabricated composite material, we found that the composite prepared by Corn husk and Wood powder has shown equally good results in tensile and compression test in comparison to the wood powder composite material. This material can be good replacement for wood powder composite material at an economical cost.

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