Tensile strength of Epoxy resin and Bagasse fiber reinforced composite materials

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Abstract. In this research, we are going to make a future material with the using of bagasse fiber and epoxy resin reinforced composite materials. It is use of waste of natural thing, which is not harmable to the nature and human being after it reformed in new materials. It can be recyclable easily. Today's everywhere use the light materials, and these composite materials give the light in weight materials with the high strength, and test perform on the w/p for it measure strength is tensile strength.

Key Requirement

Epoxy Resin, Bagasse Fiber, Reinforcement, tensile strength.

1. Introduction

The sugarcane bagasse fiber are highly generated in the agriculture area and it gone waste after take out the juice from sugarcane, so it has good mechanical property and it's also easy recyclable, and eco-friendly it is low cast, light in weight with good strength,Now a days use of agriculture crop is locate as substances improvement of fiber composite reinforcement and it is simple and secure recyclable product at the end of that provider and its maximum appropriate aspect to use of this agricultural crop like as: cotton, wheat, banana, bagasse, etc. it's far low price and mild in weight and its additionally have true properties. In these studies, look at approximately the mechanical conduct of bagasse fiber reinforced epoxy composite material, exceptional form of energy together with tensile strength take a look at of that reinforced composite and it is Dry pulpy stalky substances that remains after crushing sugarcane to bring out their juice. It is used as biofuel for the manufacturing of heat, energy etc. And manufacture of building materials. Its residences consisting of Cellulose: 45-55%, Hemicellulose: 20-25%, Lignin: 18-24%, Ash: 1-4%.Sandesh S Nayak et al, Issue 3 March 2020 Investigated on the use of bagasse fiber with polymer (epoxy resin) to make matrix composite and study its mechanical properties and performance for automobile (structural) application. Good bonding with epoxy resin. flexural strength. [1] V. Vidyashri et al. December 2019, waste of bagasse fibre using epoxy chemically ($KMnO_4$ + NaOH) treated to improve the capability and adhesion Scanning Electron Microscopy (SEM), X-Ray Diffraction (XRD) and Thermo Gravimetric Analysis (TGA), also find out mechanical properties by using tensile test. roughness of the surface improved. mechanical properties increase after using chemically treated with the help of reinforcement. [2]

*1.1.*Bagasse Fiber

It is dry mushy stalky substances that remains after crushing sugarcane to bring out their juice. It is used as clean-energy for the manufacturing of heat, energyetc. and manufacture of constructing materials. Its residences which include Cellulose: 45-55%, Hemicellulose: 2025%, Lignin: 18-24%, Ash: 1-4% . It additionally satisfies the greening necessities with the aid of using being biodegradable, recyclable reusable and additionally eco-friendly. Tensile electricity is round 290 MPa and Young modulus is set 17 GPa. (These facts taken from Google.)

*1.2.*Epoxy Resin

Epoxy is the own circle of relatives of simple additives or cured cease merchandise of epoxy resin. Epoxy resin is likewise called polyepoxides. It is very viscous liquid.

Epoxy resin properties:

High strength.
Low shrinkage.
Excellent adhesion to various substrates.
Low cost.
Low toxicity.

2.Method

In this method, first of all make the pattern by using of the wooden ply with the dimension of 165mm*15mm*10mm and made 3 pieces of wooden pattern. Each of the workpiece have different ratio of the epoxy resin, hardener and sugarcane bagasse fiber. The measurement of each parameter with the measuring instrument, after that mixed every one with measuring weight in glass till 3 to 5 min then filled in the pattern with prepared raw material, and kept them for 1 to 2 days in the pattern for dry.

Specimen

Specimen 1

Specimen 2

Specimen 3

Table No:1

S N	Specimen Designation	Bagasse fibre (grams)	Epoxy Resin (grams)	Hardener (grams)
1	A	4	32	4
2	B	5	30	5
3	C	3	34	3

5. Result

Hence, the value change with their variation in mixture of epoxy resin and bagasse fiber and result shown following:

In this study, observed the result of fibre reinforced composite materials.it is observed that the tensile strength varies from 8.314 MPa to 19.453 MPa.

The maximum value of tensile strength is gotten in (B) = 19.453MPa.

The minimum value of tensile strength is gotten in (C) = 8.314MPa.

The maximum value of yield stress is gotten in (B) = 18.291MPa

The minimum value of yield stress is gotten in (c) = 6.523MPa

Load at peak for the (A) =1.79 kN

Load at peak for the (B) =2.93kN

Load at peak for the (C) = 1.3kN

6. Discussion

The tensile strength of this reinforced composite materials is got using UTM machine. The tensile strength is varying with using the different type ratio of each other (epoxy resin, bagasse fiber) and hardener put same in each mixture. The tensile strength varies from 8.314MPa to 19.453 MPa. The tensile strength varies as shown in fig & table;

Table no:2

SN	Specimen designation	Tensile strength (MPa)	Yield stress (MPa)	Load at peak (kN)	Elongation %
1	A	11.115	7.416	1.79	5
2	B	19.453	18.291	2.93	5
3	C	8.314	6.523	1.3	5

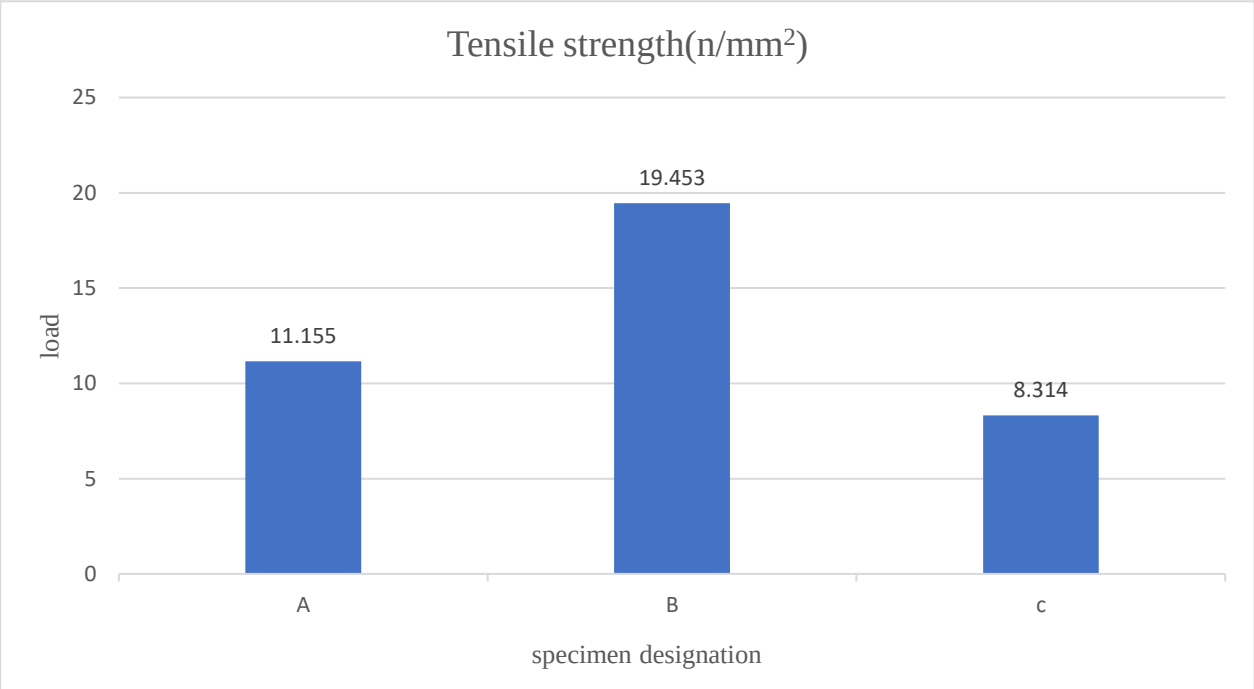

Figure 4: Tensile Strength chart

7. **Conclusion**

The investigation on tensile behaviour of bagasse fibre with epoxy resin reinforced composite materials with different ratio of each other. The conclusion drawn from this work are here,

The tensile strength of the composite varies from 8.314 MPa to 19.453 MPa. the maximum tensile strength is obtained for the composite with 5grams. This is the water resistance materials.

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