PERFORMANCE OF TENSILE STRENGTH OF REINFORCED COMPOSITE MATERIALS BASED ON BAGASSE FIBRE AND EPOXY RESIN

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Abstract

In this study, we will create composite materials that are reinforced using epoxy resin and bagasse fibre in order to create a new type of material. It involves the utilization of natural waste that, after being transformed into new products, is safe for both nature and people. It is readily recyclable. Nowadays, light materials are used everywhere. Composite materials provide lightweight materials with great strength, and tests are performed on w/p to determine its tensile strength.

Key words: Epoxy Resin, Bagasse Fiber, Reinforcement, tensile strength.

Introduction

The sugarcane bagasse fiber is abundant in the agricultural sector and is wasted when the sugarcane juice is extracted; as a result, it has strong mechanical properties, is easily recyclable, and is environmentally beneficial. It is low cast, light in weight, and has good strength. It is now common practice to employ agricultural crops such as cotton, wheat, bananas, bagasse, and others as ingredients in the enhancement of fiber composite reinforcement since the resulting product is straightforward, secure, and recyclable. It has real characteristics in addition to being far less expensive and lighter in weight. In these investigations, the mechanical conductivity of a special type of composite material made of bagasse fiber reinforced epoxy is examined form of energy together with tensile strength take a look at of that reinforced composite and it is Dry pulpy stalky substances that remain after crushing sugarcane to bring out their juice. It is used as biofuel for the manufacturing of heat, energy etc. And manufacture of buildingmaterials. 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 (KMnO4 + 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.

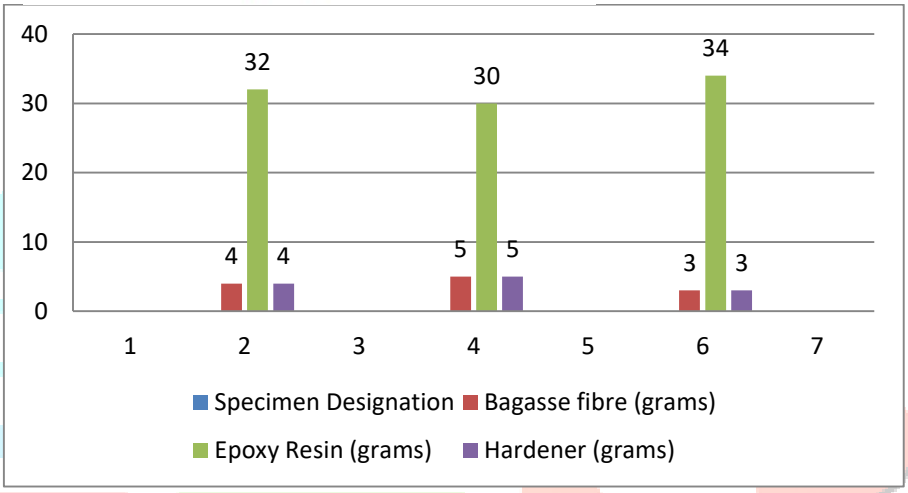
2.Method In this method, first of all make the pattern by using of the wooden ply with the dimension of 165mm*15mm*10mm and made 3 pieces of wooden pattern. Each of the workpiece have different ratio of the epoxy resin, hardener and sugarcane bagasse fiber. The measurement of each parameter with the 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



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

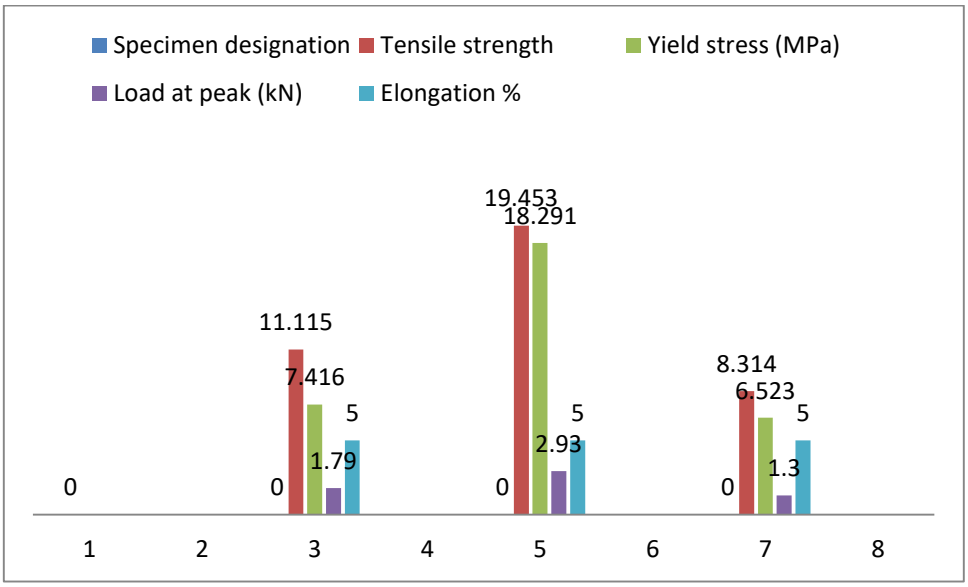
Load at peak for the (B) =2.93kN

Load at peak for the (C) = 1.3kN

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;

Figure 4: Tensile Strength chart



Conclusion

The examination of the tensile behavior of composite materials reinforced with epoxy resin and bagasse fiber at various weight ratios. The study's findings are shown here.

The composite's tensile strength ranges from 8.314 MPa to 19.453 MPa. The composite with 5 grammas has the highest tensile strength. The materials used to withstand water are these.

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