Organic Waste Brake Pad by using Luffa Cylindrical

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Abstract - In present year's natural fiber composite material locate a major role in industries like aerospace and automobile. The natural fiber is amplified by hook up with plastics. The ample availabilityof natural fibers such as luffa cylindrical, coir, flax, ramie, sisal, jute, banana, bagasse etc.

The composites formed by fibers gained attention due to their low cost, light weight, renewability, low density, high specific strength, non abrasivity, non-toxicity and biodegradability etc.

In this paper discussed the manufacturing of Break Pad by luffa cylindrical, with Epoxy composite and to evaluate the Mechanical properties and tensile, hardness, impact and Wear resistance properties.

INTRODUCTION

A composite material can be defined as a combination of two or more materials that results in better properties than those of the individual components used alone. In contrast to metallic alloys, each material retains its separate chemical, physical, and mechanical properties. The two constituents are reinforcement and a matrix. The main advantages of composite materials are their high strength and stiffness, combined with low density, when compared with bulk materials, allowing for a weight reduction in the finished part.

Particulate reinforced composites usually contain less reinforcement (up to 40 to 50 volume percent) due to processing difficulties and brittleness. A fiber has a length that is much greater than its diameter.

BRAKE PAD

Brake pads are the parts with certain friction and bound the surface facing the brake disk. By applying brakes, the pads which are pressed against the brake rotor convert the kinetic energy into thermal energy. The heat is dissipated during cooling of brakes and the vehicle is slow down.

Brake pads are a component of disk brakes used in automotive and other applications. Brake pads are steel backing plates with friction material bound to the surface that faces the disk brake rotor.Two brake pads are contained in the brake calliper with their friction surfaces facing the rotor. When the brakes are hydraulically applied, the calliper clamps or squeezes the two pads together into the spinning rotor to slow/stop the vehicle. Then providing the friction that stops the vehicle.

MATERIALS USED IN COMPOSITE BRAKE PADS

REINFORCEMENT MATERIALS AND FILLERS

Glass fiber, aramid fiber, iron powder, aluminium and copper are used as structural materials in composite brake pad. They provide hardness, strength, thermal stability; wear resistance and friction coefficient stability to main body. Most used fillers are BaSO4, potassium titanade, aramid fiber, CaCO3, Al2O3, mica and vermiculite. Fillers are used in brake pads to improve mechanical durability, hardness,

thermal and frictional stability and wear resistance. They are produced from steel wool, rock wool, glass wool, ceramic fibers such as silicon carbide and alumina fibers, aramid fibers, copper fibers and aluminium fibers. Fillers have effects on wear resistance, cost and production

MATERIALS USED

BRAKE PAD USED MATERIALS

Today, brake pad materials are classified as belonging to one of four principal categories, as follows:

1. Non-metallic materials
2. Semi metallic materials
3. Fully metallic materials
4. Ceramic materials

NON-METALLIC MATERIALS

These are made from a combination of various synthetic substances bonded into a composite, principally in theform of cellulose, aramid, PAN, and sintered glass. They are gentle on rotors, but produce a fair amount of dust and have a short service life.

SEMI-METALLIC MATERIALS

Synthetics mixed with some proportion of flaked metals. These are harder than non- metallic pads, and are more fade-resistant and longer lasting, but at the cost of increased wear to the rotor/ drum which then must be replaced sooner. They also require more force than non- metallic pads in order to generate braking torque.

FULLY METALLIC MATERIALS

These pads are used only in racing vehicles, and are composed of sintered steel without any synthetic additives. They are very long lasting, but require even more force to slow a vehicle and are extremely wearing on rotors. They also tend to be very loud.

CERAMIC MATERIALS

Composed of clay and porcelain bonded to copper flakes and filaments, these are a good compromise between the durability of the metal pads and the grip and fade resistance of the synthetic variety. However, because the ceramic materials causes the braking sound to be elevated beyond that of human hearing, they are exceptionally quiet

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PROBLEMS IDENTIFICATION

This system employs a number of components and one of the most important of these components are the brake pads. Brake pads sit inside your brake callipers and clamp down onto the rotors, acting as a source of friction and providing you with stopping power. Brake dust is the most obvious sign of brake pad wear.

The heavier the vehicle, the more brake dust you'll see on the front wheels versus the rear. In most cases a simple steel spring is riveted to the brake pad backing plate to serve this purpose. When the friction material wears to the point that replacement is necessary, the spring will contact the rotor, emitting a high-pitched squeal.

SELECTION OF MATERIAL

The experimental procedures followed for their mechanical characterization. The materials used in this work are

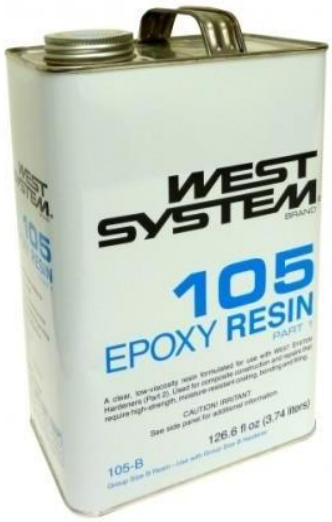
- **LUFFA CYLINDRICA**
- EPOXY

LUFFA CYLINDRICA

Luffa cylindrica fiber used in this present study was collected local market. The outer layer (bark) and seeds of luffa fruit were removed carefully. Then the luffa fibers were cut carefully to separate the outer core from inner core (central core). The outer core of luffa fibers were rolled to make mat like structure after washing them thoroughly with distilled water and air dried for 72h at room temperature. Then the outer core were cut to rectangular mat of size 140 mm x 100 mm by neglecting the end portion to keep the thickness same in all directions

EPOXY RESIN

Epoxy Resins Epoxy resins have been commercially available and are now used in a wide range of industries and applications.



Epoxies are classified in the plastics industry as thermosetting resins and they achieve the thermo set state by means of an addition reaction with a suitable curing agent. influence physical properties such as toughness and flexibility

MECHANICAL PROPERTY TESTS

- TENSILE TEST
- HARDNESS TEST
- WEAR TEST
- IMPACT TEST

ADVANTAGES

- High specific strength and
- High specific stiffness Long fatigue life
- Low density
- Low thermal conductivity
- Better temperature dependent behaviour.

APPLICATION

- Automobile components
- corrosion resisting areas
- Tidal power plant components

CONCLUSION

Traditionally natural fibers like luffa cylindrica are used to make light weighted component in South India. The results found that the mechanical properties have a strong association with the dynamic characteristics. The composite having a luffa cylindrica fiber and epoxy volume of showed a significant result compared to steel brake pad automobile application. It has been noticed that the mechanical properties of the composites such as tensile,wear test, hardness and toughness etc.

REFERENCE

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