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A REVIEW PAPER ON FIBRE REINFORCEMENT COMPOSITE

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ABSTRACT

The properties of fibre was the most useful technique in the improval of the other material when reinforced with the materials . natural fibres and other fibres are used as the different reinforced composites provide strength and rigidity the term composite may also describe newer technological products made from very strong fiborous materials. The matrix material can be polymeric matellaic ceramic or carbon. When the fibre reinforced into the matrix to form a composite they retain their individual characterstics and both have influence on composites final properties . today the most common man made compsites can be divided into three main groups (PMC's) (MMC's)and (CMC's)

1 INTRODUCTION

Natural fibres are fibres that are produced by plants animals, and geological processes. They can be used as a component of composite materials, where the orientation of fibers impacts the properties. Natural fibers can also be matted into sheets to make products such as paper, felt or fabric Natural Fibers are among the lightest (with densities below 1.2 -1.45 gm/cc) of any known fibers, that can provide reinforcement capable of imparting high specific mechanical properties to a composite made out of them when compared to those made of many man-made fibers like glass, carbon and kevla used in advanced applications made of polyurethane reinforced with a mixed flax/sisal material. Toyota developed an eco-plastic made from sugar cane and will use it to line the interiors of the cars

1.1**PRODUCTION**Wool forms the protective covering of sheep screening them from heat and cold, and allowing them to maintain even body temperatures. Silk is a continuous protein filament spun by the silkworm to form its cocoon Perhaps no other natural product has influenced the destiny of humankind as has cotton. It has clothed nations, enslaved men and women, monopolized labor, and given direction to entire industries. Leaf fibers come from the leaves of mono cotyledonous plants. They are primarily used for cordage Bast fibers come from the bast tissue of plant stem. They are primarily used for textiles thread, yarn, and twine. Miscellaneous fibers come from the sheathing leaf-stalks of palms stem segments, stems, and fibrous husks. They are used primarily for brush and broom bristles, matting, and stuffing.

1.2TYPESVegetable fibre: bast fibres, leaf fibres, seed and fruit fibres animal fibres: wool and filament fibres Minera fibres asbestos Regenerated fibres: rayon fibres , polysonic fibres. fibres Synthetic fibres : polyster fibres, acryclic fibres, nylon fibres ,vinlyon fibres, benzoate fibres ,aramid fibres Inorganic fibres; glass fibres ,metallic fibres ,carbon fibres

1.3APPLICATIONS Natural fibers reinforced composites are emerging very rapidly as the potential substitute to the metal or ceramic based materials in applications that also include automotive, aerospace, marine, sporting goods and electronic industries The German auto-manufacturers, Mercedes, BMW, Audi and Volkswagen have taken the initiative to introduce natural fiber composites for interior and exterior application so natural fibre composites are in automotive sector there are additional fields of applications of natural fibre composites mainly: textiles, medical, healthcare and pharmaceuticals, home and personal care, food and feed additives, construction and furniture, packaging, pulp and paper , bio energy and bio fuel

1.4 ADVANTAGES

When it comes to the properties if the natural fibres ,it is important to the state the difference the performance of the composite depends on the many factors such as structure ,mechanical ,cell dimensions fibre reinforced composites have much attention based on the different applications here the natural fibres contain low cost, density, and weight, les pollution during production resulting in minimla health hazards and eco friendly nature Composites reinforced with natural fibres also have a short life time when it comes to degradation with limited environmental changes and damage wheras synthetic fibres have a negative impact due to degradation pollution

2 EXPERIMENTS

2.1**Wenie Wang** [1] has experimentally checked the behaviour of coconut fibre reinforced concrete In this experiment coconut fibre reinforced concrete (CFRC) and plain concretewere used to check the impact strength and obtain the difference between PC and CFRC .specimens PC and CFRC were prepared and cured for 28 days CFRC specimen s were des ignned and static and impact test were carried out.

2.2 **N Amir** [2] has discovered the effects of fibre configuration on mechanical properties of banana fibre /PP/MAPP natural fibre reinforced polymer composite. In this resesrch high performance polypropylene composites, using banan fibre as reinforcement ,MAPP as the coupling agent to improve bonding, banana fibre configurations were varied and mechanical properties such as tensile and flexural strength of composites were studied and samples anaylsed via scanning electron microscope.

2.3 **A Baharin** [3] has done the production of the laminated natural fibre board from banana tree wastes and measured the mechanical properties .In this experiment the laminated boards are made up of banana stem as the core material and banana leaf tapes as a skin two types of laminated boards were prepared the leaf fibre layers aligned in parallel orientation and crisscross orientation , tensile test and impact test were carried out to check the strength

2.4 **P J Herrera-Franco** [4] has discovered mechanical properties of continous natural fibre reinforced polymer composites. In this experiment the fibres were treated with NaOH solution and tried at 60 degree Celsius and dissolved with the silane solution for fibre surface treatment. A 46% continous henequen fibre-HDPE composite was chosen in order to determine the effect of the different surface treatments on its mechanical properties. From these laminates, the specimens for the mechanical tests were obtained according to ASTM standards.

2.5 **Jacek Katzer** [5] has done experiment on optimization on fibre reinforcement for waste aggregate cement composite in this experiment the harnessed ceramic waste was sourced from a building site. The ceramic waste represents the waste produced in building construction during transportation and execution several elements. The portland cement an tap water were harnessed for composing all mixtures. Three types of engineered fibres were used to mix the composite

2.6 **Susanne Christ** [6] fibre reinforcement 3D printing. In this experiment the 3d printing of sample was performed on a Z printer310. All Fibres were separated sieving through a mesh size before mixing with powder. Sample for bending test were printed in two different orientations and half of the sample were further infiltered with a self setting polyurethane resin for additional reinforcement mechanical properties were tested by 4 point bending test using static mechanical testing device.

3 DISCUSSION

3.1 [1] The impact test shows the damage index of the PC and CFRC 50 SPECIMENS under impact loads with 40cm falls and 60cm and reductions of elastic moduli and damage of exterior of the specimens under the impact of 60cm and 80cm compared to the 40cm and PC Specimens

3.2 [2] The polymer composites reinforced with banana fibre processes better mechanical strength

than unreinforced PP.Banana yarn composite gave highest mechanical strength and tensile strength which is 294% from the unreinforced pp polymer, therefore banana yarn is the strongest when compared to other configuration , the flexural strength of the three different banana fibre reinforced PP composites are higher than the unreinforced PP which is 72% from unreinforced PP composite

3.3 [3] The increase in the viscous component will reduce the tensile strength of the board. The tensile strength of the laminated board with crisscross fibre orientation is lower than that of parallel orientation. The tensile strength is high in parallel orientation.

3.4 [4] the longitudinal strength is increased from 71.8MPa for untreated fibres to 79.3MPa for silane fibres I,e 10% increase , the tranverse tensile strength increases 43% , the tensile strength with incorporation of the henequen fibres results in a material 2.56 and 2.83% stronger in tension in fibre direction and in the transverse direaction flextural strength increased from 95.9 to 130.5 MPa from 6.2 to 15.6 MPa for the longitudinal fibre direction and for the transverse fibre direction respectively . such changes represents flextural trenght increases of approximately 36 and 251% in both directions with respect to matri strength

3.5 [5] The compressed strength varied from 32.6Mpa to 43.2Mpa for pure concrete and FRCC respectively. All 4 residial strength steel fibre 2 was the most effective type of used reinforcement on the other hand highest valued were achieved by composites modified by steel and polymer fibre reinforcement

3.6 [6] The results for flexural strength showed significantly increased values upto 180% for the most samples for only strength of PA fibres printed in Y direction. Fracture surfaces showed fibre full load as well as matrix residues on the fibre surfaces

Sl no	Tensile strength	Impact strength	Flextural strength	Shear properties
Paper 1	43% increased		251 % increased	
Paper 2	PP: 19.71 Banana fibre: 66.26 Banana yarn: 77.84 Banana mat: 33.27		PP: 30.82 Banana fibre: 33.72 Banana yarn: 52.88 Banana mat: 43.86	
Paper 3	Increased 400%	increased	Increased 500%	Not checked
Paper 4	longitudinal: 43% increased transverse: 2.83% increased		Increased 251% in both directions	
Paper 5		Compressive strength incresased		
Paper 6			Increased upto 180%	

Table representing the increased mechanical properties of material by fibre reinforcement

CONCLUSION

By adding the fibres and fibre reinforcement technique increases the tensile strength flexural modulus an the impact strength were increased an thus found that banana yarn composites possessed the highest tensile strength compared to other fibres and the silane treatment solution was much stronger surface was physically modified. Morphology study conducted tensile fracture surfaces proved homogenous and intact bonding the impact strength is dependent on the viscous component in laminated boards and finally more use of fibre reinforcement techniques is used for increasing mechanical properties and also bonding strength.

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