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Hemp Fiber Reinforced Composites: A Review

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Abstract*: *Engineering materials are classified into many varies and composites are those which are finding their role in all modern day engineering applications. Composites are those materials made out of two basic components; a polymer resin and fibers. It combines the physical enactment and high mechanical of the fibers and the look, bonding and properties of polymers. For these uses the natural fibers could be considered rather than synthetic types. Due to their high strength and modulus, reinforced polymer composites have started to play a key role in a wide range of applications. Due to high cost involved in production, the usage of synthetic fibers is restricted whereas natural fibers are cheap in cost, strong, less weight and largely available.

Keywords*: *Composites, Natural Fiber, Hemp Fiber, Review

I. INTRODUCTION

R.H. Hu et al. [1] and D. Sedan et al. [2] explained in their study that the hemp plant, in particular, produces high quality natural fibers that are inexpensive and exhibit excellent mechanical properties when compared to other natural fibers. Therefore, they are used in the automobile industry, mostly as interior components.

II. PROPERTIES OF HEMP FIBER

Girisha.K.G et al. [3] found that the alkalization treatment of fibers helps in improving the chemical bonding between the resin and fiber resulting in superior mechanical properties. Olusegun David Samuel et al. [4] in their study found the mechanical properties of hemp fiber composite laminate.

Table I. Mechanical properties of hemp fiber composite laminate.

Mechanical properties	Hemp fibre laminate
Compressive strength (MPa)	29.75
Tensile strength (MPa)	7.00
Bending strength (MPa)	0.0017
Impact strength (J/m^2)	7.41

III. APPLICATIONS OF HEMP FIBER

Girisha.K.G et al.[3] experimented to determine tensile, flexural and impact properties of hemp reinforced epoxy and polyester hybrid composites for 30°, 45° and 90° fibre orientations. Composites with polyester resin as matrix give more tensile, flexural and impact strength than epoxy based hybrid composites. The tensile, flexural and impact strength is observed to be maximum at 90° orientations in both epoxy and polyester based composites. Diagonal inclinations of the reinforcing fibres gives poor mechanical properties as observed in 30°, 45° oriented composites. Santulli C and Caruso AP [5] studied Epoxy / hemp fiber reinforced composites regarding the effect of fiber architecture on the falling weight impact properties. Stefania Manzi1 et al. [6] studied panels, obtained by bonding hemp hurds with different binders, characterized by a reduced environmental impact, exhibited very promising properties, both in the case of the low density panels, intended as composites for building thermal insulation, and high density panels, designed as possible substitutes for formaldehyde-bonded wood particle panels. Balciunas et al. [7] and Zampori et al. [8] found that in hemp-based composites for the building industry, hemp hurds are generally bonded with Portland cement, slaked lime or organic polymers. Julia Cigasova et al. [9] dealt with the use of hemp hurds as organic filler in building material. Properties of lightweight composites clearly depend on mean particle length of hemp hurds. Considerable influence on the properties composites has a chemical modification of hemp hurds slices. The hydraulicity degree of used binder's materials

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influences the mechanical properties.

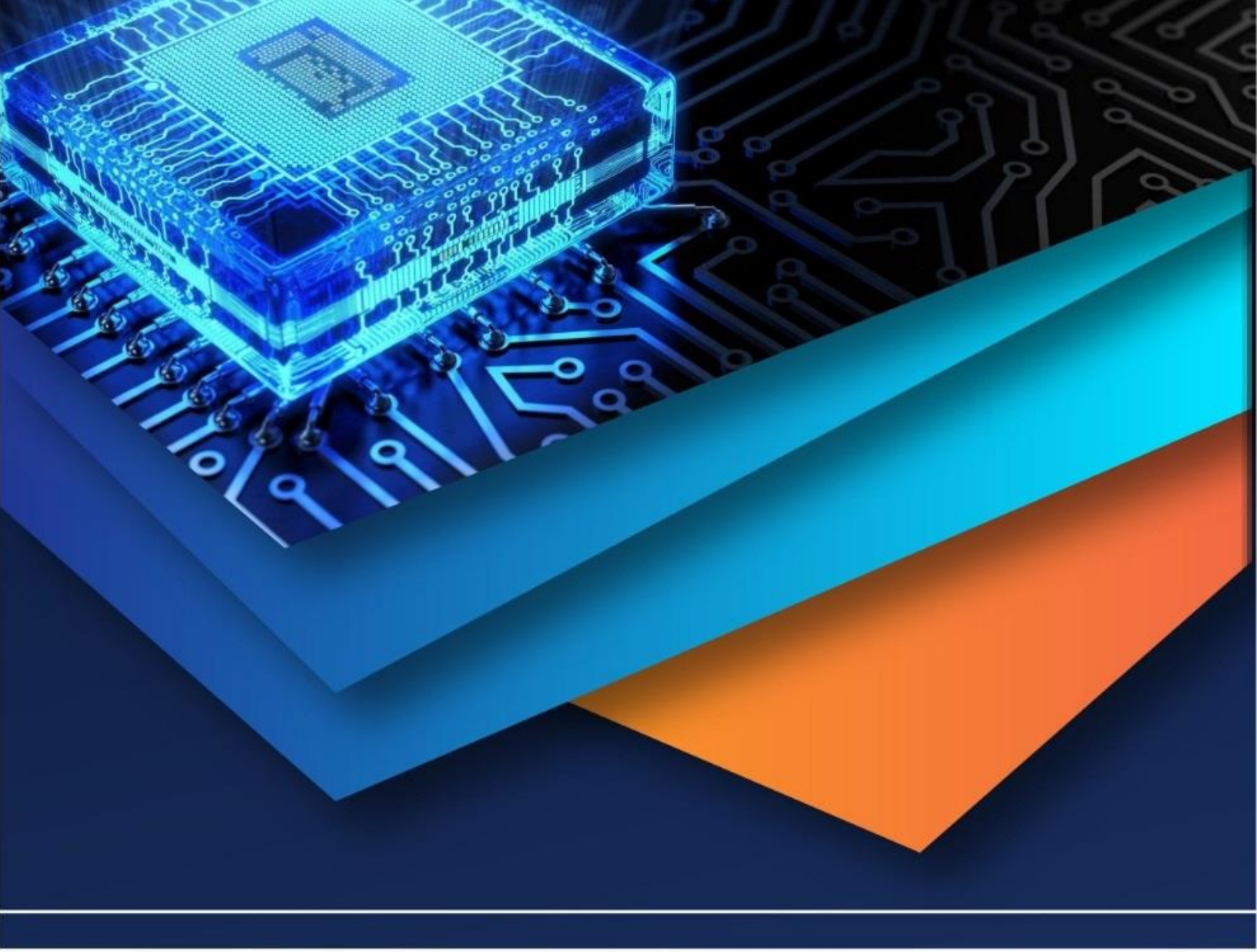
IV. CONCLUSION

This paper reviewed works related to hemp fiber reinforced composites and their properties. It also shown the dependability of such composites for various industrial applications.

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