NATURAL FIBERS RECYCLING OF THERMOPLASTICS FOR AUTOMOTIVE COMPONENTS

Tadikonda sai teja, Neelam Srikanth, P.jai rajesh

Dept.of Mechatronics Engineering,

Bharath Institute of Higher Education and Research

Abstract : **Use of natural fiber thermoplastic parts in the automotive industry can give the upsides of weight diminish, cost lessening and recyclability, in addition to eco-profitability and manageability diverged from designed standard materials. Basic strands have starting late ended up being speaking to auto industry as an elective fortress for glass fiber fortified thermoplastics. The best way to deal with extend the eco-agreeableness without surrendering prosperity is to use fiber strengthened composite materials in the body of the cars so weight lessening can be expert. The destinations are to assemble the execution of the poles and besides to find the response for reduce the cost of columns therefore prepared to decrease the creation cost. In any case the use of steel, Aluminum, Glass tangle thermoplastics (GMT), sheet metal portions (SMC) Bumpers winds up at higher cost than long fiber fortified thermoplastics. This investigation is revolved around enhancement to some degree eco-pleasing cream long fiber fortified thermoplastics with typical kenaf fiber to update the pined for mechanical properties for auto watch bars as auto fundamental parts.** ***Keywords— Bumper Beam, LFRT, GMT, SMC, KENAF FIBER, HYBRID.***

I. INTRODUCTION

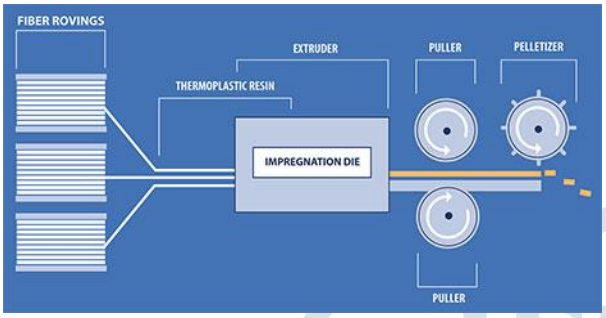
II. The interest in natural fiber-reinforced composites is becoming quickly because of their high regarding mechanical properties, minimal effort, handling focal points and low thickness. the accessibility of Natural filaments, for example, kenaf have a few points of interest over conventional Reinforcement materials, for example, glass fiber as far as cost, thickness, sustainability, recyclability, abrasiveness and biodegradability. The effectiveness of the fiber strengthened composites relies upon the fiber lattice interface and the capacity to exchange worry from the grid to the fiber. Characteristic fiber composites, for example, kenaf and polypropylene have just been connected in Automotive parts .Natural strands. for example, kenaf have a few favorable circumstances over customary Reinforcement materials, for example, glass fiber as far as cost, thicknesssustainability, recyclability, abrasiveness

III. stress from the matrix to the fiber. The advantages of natural fibers over traditional reinforcing materials such glass filaments and mica are low thickness, minimal effort, are earth safe and have great mechanical properties. Guard pillars are one of the key structures in traveler autos which cautious plan and appropriate material choice ought to be considered with the end goal to accomplish great effect conduct. Guard shaft is the fundamental structure for engrossing the vitality of impacts. With the presentation of the car wellbeing enactment, crash value and security ought to be considered as pre conditions in light weighting the guard bar. The car guard weight can be lessened by the utilization of composites. Thermo plastics composites are being utilized in an assortment of use, for example, mass travel, car and military structures. They have an edge over conventional materials, for example, steel and aluminum. In these applications because of their high particular quality, great damping limit and rectification obstruction. The lattice in thermo plastic composites is for the most part involved poly propylene (PP), poly ethylene (PE), nylon or other modest polymers. E glass fiber is a generally utilized fortified material.Long fiber thermoplastic composites have seen one of the most noteworthy development rates around 30% every year in the plastic business amid late occasions. The perspective ratio(ratio of fiber length to measurement of filaments in LFT is a request of extent more noteworthy than that of a short fiber ,regularly surpassing cover of 2000 and in this manner take full preferred standpoint of the quality of the strengthening fiber.LFT materials show their best execution when the poly propylene sap has maleican hydride joined poly propylene added to the network. The sum and normal for these added substances are all around archived in short glass poly propylene mixes . Be that as it may, are not all around detailed for PP LFT materials. The fiber length in long glass fiber chooses the mechanical properties of the long glass fiber thermoplastic .hybridization of characteristic fiber with glass fiber gives a technique to enhance the mechanical properties of normal fiber composites (16).In this examination we built up a cross breed material utilizing regular kenaf rather than manufactured glass fiber as fortifications. Kenaf is separated from the best of the yearly quickly developing plant named Hibiscus

cannabinus. The primary constituents of keafn are cellulose (45-57wt. %),hemicelluloses (21.5 wt. %), lignin (8-13wt.%) and gelatin (3-5wt. %). Kenaf fiber having great mechanical properties and warm properties contrast with alternate kinds of common strands when it's Blend with PP. Amongst eco-compatible polymer composites, unique consideration has been given to PP. yet PP assumes an imperative position in eco-composites materials to replace the glass fibers to natural fibers.

MATERIALS AND METHODS

A hot dissolve impregnation process was utilized to create impregnated kenaf fiber beds. For this exploration prepared kenaf were utilized, kenaf fiber was warmed up to 140°C



In this process kenaf fiber roving were used instead of synthetic glass .The natural kenaf twisted fiber was sent along through the die to make the PP impregnated matrix over the kenaf fiber. The Kenaf fibers were twisted manually to increase the strength. The twisted fiber had bundle of kenaf fibers twisted by hand the twisted roving were winded as a tows.

Kenaf fiber

PROPERTIES	KENAF	GLASS
Density	1.4	2.5
Strength	284-800	2000-3000
Modulus(Gpa)	21-60	70
Elongation at break	1.6	2.5

Mechanical properties of materials

Tested Specimens

III.RESULTS AND DISCUSSIONS

TENSILE TEST :

The tensile test were performed by the ASTM D3039 standard five arrangement of examples with prescribed measurements are made and tried by a aligned AUTOGRAPH - AGS-2003 testing machine with speed 5 mm/min. Five arrangement of examples with three distinct fortifications were utilized for testing .The rigidity and the youthful's modulus of the TKLFRT examples were higher than regular guard bar materials, for example, LFRT . Tractable modules of TKLFRT indicate sensational property enhancement with LFRT. Under a pliable load, the enhanced attachment at fiber/grid interface results in a more productive pressure exchange from the framework to the fortified filaments.

IMPACT TEST

Isod impact test methods were conducted according to the ASTMD256-04 standard . Six samples with specified dimensions and defined notches were prepared and the results were compared with LFRT material. The density of the hybrid is slightly higher than LFRT materials. while comparing the izod test results its proven that TKLFRT having challenging strength to LFRT. Impact strength of the TKLFRT has to be improved considerably to compete with LFRT, Though the poor impact strength of TKLFRT restricts their use in structural applications were high Impact strength is required, they can replace engineering plastics in applications where tensile and flexural properties are important than the impact strength.

IV.RECYCLING OF COMPOSITES

Agro based strands are less brittle and softer than glass fibers and are probably going to result in composites that are less demanding to reuse than mineral based filaments. The rate maintenance in pliable properties of LFRT and TKLFRT . Plainly quality of TKLFRT in the wake of regrinding and further infusion forming did not modify or decay, while joining of glass strands change the recyclability .quality of glass filaments diminished after the primary regrinding (l00 to 84%) itself and demonstrated further lessening (70%) after second regrinding and may because of glass debasement amid the granulating procedure. Modulus of the TKLFRT enhanced in the wake of regrinding and infusion forming while TKLFRT composites demonstrated a lower esteem contrasted with the first composites. These outcomes show the predominance of the regular fiber TKLFRT over LFRT regarding recyclability.

V. CONCLUSIONS

This examination concentrated on the mechanical properties of
a hybrid kenaf/glass strengthened composites for use in traveler auto guard bar. A turned kenaf half and half material, which is created by hot impregnation strategy present a decent mechanical properties. The examination diagrams demonstrates some mechanical favorable circumstances contrast with LFRT guard pillar material. This infers a half and half kenaf/glass strengthened material could be used in car basic segments, for example, guard shafts and front end modules. More over effect properties could be enhanced by streamlining the auxiliary parameters likethickness, pillar ebb and flow, and fortifying ribs.

REFERENCES

Owlan, C.," A formulation study of Long Fiber Thermoplastic Polypropylene" (part one): The effects of coupling agent, glass content an resin properties on the mechanical properties," ACCE Conference proceedings (2008)

Schweitzer R.A"Glass fiber length degradation in thermoplastics processing,"proc 36 th ann. spl conf (1981)

Cicero Ja, Dorgan JR, Dec SF, Knauss DM.Phosphite "Stailasation effect on two step melt spun fibers of polyactidepolym degrd stab" Mohanty A,Misra M,Drzl L T "Surface modification of natural fiber to improve adhesion as reinforcements for thermo set plastics" proceeding-2001 feb 25-28;wiliiamsurg,Virginia;2001 p.418-20

"American society for testing materials" ASTM; 2004 JUNE [256-04]

Mohanty AK, Mishra KM, "Biodegradle Polymers and bio composites. An overview macro mol mater eng ", I 2000; 276-7

Kumar, K.S., Naresh, Anup, K.G," Mechanical Properties of Injection Molded Long Fiber Polypropylene Composites, Part 2: Impact and Fracture Toughness", Polymer Composites (2008) pp.525-533.

Thomason, lL, "The influence offiber length and concentration on the properties of glass fiber reinforced polypropylene: 7: Interface strength and fiber strain in injection molded long fiber PP at high fiber content," Composites: Part A38 (2007) pp.2I-216

Chawla KK (1998) "Composite materials: science and engg.2 ed", Springer-Verlag, New York

Reid SR, Zhouu. "Impact ehaviour of fiber-reinforced composite materials and structures" England: wood head publishing; 2000

Maeda.R, UENO.S, Uda K."Strength test of aluminum alloy bumper for automobile" Furukawa review 1994 (13)

Thomason, lL, "The influence offiber length and concentration on the properties of glass fiber reinforced polypropylene: 7: Interface strength and fiber strain in injection molded long fiber PP at high fiber content," Composites: Part A38 (2007) pp.2I-216