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TO CONSTRUCT A COMPOSITE MATERIAL USING E- WASTE

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ABSTRACT

This paper presents a practical mechanical process of recycling E-wasted materials. The current scenario of the world is that the use of huge amount of electronic gazette which wastage is increase radiation. Radiation is harm full for human and animals. E-Waste contain most use full material like aluminium, copper, led, fiber etc. The objective of the project is to over come the e-waste and fabricate the composite material using recycled e-waste. The matrix metal aluminium alloy recovered from the manually. The matrix was mixed with copper, e-glass fiber and fly ash using stir casting method. To check the property increase or decrease using varrying form of ash. The E-glass fiber wuantity is constant 3 wt. % and fly ash are (0, 3, 6 and 9 wt. %). The composite material cast using stir casting technology. There are many sample cast which namely (1, 2, 3 and 4). After the cast of the sample are analyzed its mechanical properties such as light weight materials play vital role in structure application where strength and surface characteristics influence greatly on selecting choice of materials. The properties of composite material are light weight and high strength, sufficient ductility hardness, brittleness, toughness forms familiar group of aluminium alloy. The tests are tensile, compressive, hardness, impact and the test specimen is prepared as per the ASTM standards.

KEYWORDS: E-waste, Al alloy (6063), copper, glass fiber, fly ash, mechanical properties, stir casting.

I. INTRODUCTION

In recent year there has been increasing concern about the growing volume of end-of-life (EOL).We know that the electronic waste and scrape are huge amount present in our surrounding that could not be easily disposed in to agricultural land because it contained more valuable metal and non metal ike Al,CO, Led,...Etc and also contain hazardius and radiated material. There are also large amount of toxic materials present in it. The electronic scrap is very important subject of concern. All over the world, large amount of e-waste has been generated, because off using huge amount of electronic gazette like mobile phone to vehicle, satelite domestic refrigerator ....Etc.China manufacture huge amount of electronic gazette and also produce a lot of scrape of e-waste. This scrape recycled mechanically and chemically. India ,Japan ,China..Etc installed the recycling industry to recover the metals and non metals from e-waste .composite material is defined as a structural material because light weight ,specific strength .It is new generation technology metal which fulfill the rapid growth of industrial need. A composite material consists of two or more than two physically and chemically distinct, suitably arranged so it is usually harder and stronger. .The dumping of e-wastes finish the fertility of the soil and effect on the environment. To escape the above these the e-waste can be overcome through recycling and segregating the useful material and use in useful product .These materials cab be utilized at higher service temperature .These material rainforest into other material their mechanical property improve stiffness, hardness ,strength and dimensional stability .Mechanical properties of metal matrix composites are compared for Strength, stiffness and hardness of the material.

II. LITERATURE SURVEY

Shyong J.H [1] reported, the malformation of essence of aluminium alloy 6061 amplified with particulate SiC particulate 3, 10 and 30 micro meter size by varying the SiC Vol percentage(0.5, 10 and 20 %) using experimental numerical methods. The tensile strength and stiffness of the composite subjecting the matrix to dispersion content were noticed. The tensile strength and stiffness of the composites were found to increase with the increasing particle content (volume fraction) for heat treatment provided that it was over a limiting value.

The highest tensile strength, but the specimens had the greatest elongation to failure and the largest ratio of tension to yield strength. Good arrangement was noticed between experimental results and predictions of mechanical properties.

Cui Y Geng [2] investigated that, an aluminium matrix composite was successfully found using the self propagating high temperature SiC particulates as malformed material. The composite was found to be superior in mechanical performances to those of the composite malform with the conventional abrasive grade SiC particulates. High interfacial bond strength was noticed between SiC and aluminium matrix. The interfacial bond strength was essence the effective mechanical keying role and the atom match bonding with a crystallographic orientation relationship.

Choon Weng wong, Manoj Gupta, Lilu[3], studied aluminium based metallic matrices having varying weight fractions of copper(1 wt% Cu and 4.5 wt% Cu) were malformed with SiC particulates using a partial liquid phase casting technique. The results of their inspection knows smaller sized and higher weight percent of copper in the matrix.

Anilkumar.H.C.[4] aluminium alloy 6061 and fortified with fly ash was casted the composite by using stir casting method at different particle size and varrying percentage in weight fraction such as (4-25, 45-50, 75-100 µm) and (10, 15, 20 wt.%).Tensile &compressive strength decrease due to increase of particle size and ductility increase.

Deepak Singla. [5] Aluminium 7075 matrix and reinforced with Fly ash and Magnesiun composite is fortificated by stir casting at four various weight fraction like S1,S2,S3,S4. The samples are subjected to mechanical testing the S2 sample was higher strength at toughness, tensile, hardness strength and the grain size was decreased. So the amount of fly ash is increased up to S2 weight, that properties is increased.

Sachin Malhotra. [6] the effect of amplificant(Zirconia + Fly ash) with aluminium alloy 6061 matrix is amplificated at fixed percentage of fly ash (10%) and varying percentage of Zirconia (5% and 10%) in weight fraction by using stir casting method. From the result (fly ash10% + zirconia 10%) containing sample was having high tensile and hardness strength and the percentage elongation was decreased while comparing unreinforced alloy. **Vivekanandan.P [7]** the waste of fly ash is utilize in aluminium matrix .The varrying % of fly ash (5%,10%,15%,20%)used in stir casting during fortification of metal matrix composite .Increase of %of fly ash the hardness is increased.

III. METHODOLOGY

A. Procurement Of Materials:

Al 6063 alloy **:** 2kg of e-waste **ALUMINIUM 6063** were collected from E-waste

Copper **:** 250g copper

E-glass fiber **:** 500g E-glass fiber

Fly ash **:** 500g fly ash

B. Fabrication Of Test Specimens :

The E-waste Al alloy are placed in the crucible for melting the alloy, the weight of the materials are 2kg. The temperature which is required for melting Al alloy obtained from the electrical resistance furnace. The temperature of the furnace was execute by thermo couple the temperature of that heat crucible was maintained at 600° C.

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Fig-1: E-waste Al 6063(heat sink).

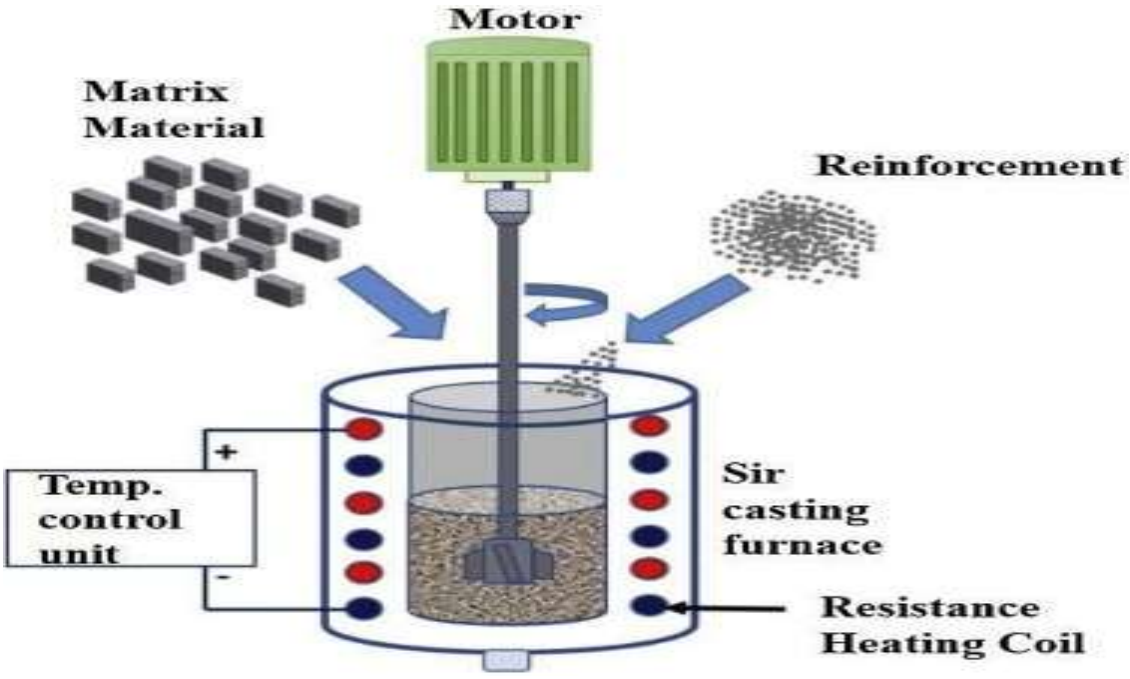

Fig-2: When the Al alloy melt , after that with the aid of mechanical stirrer the E-Glass fiber and flyash are reinforced to the molten metal. With the aid of this mechanical stirrer we obtained a mixed with the matrix. These are namely E-GLASS and flyash. The weight percentage of E-GLASS is 0.120kg and flyash is 0.09kg. After adding both in molten metal we obtained our requirements in the form of molten metal.

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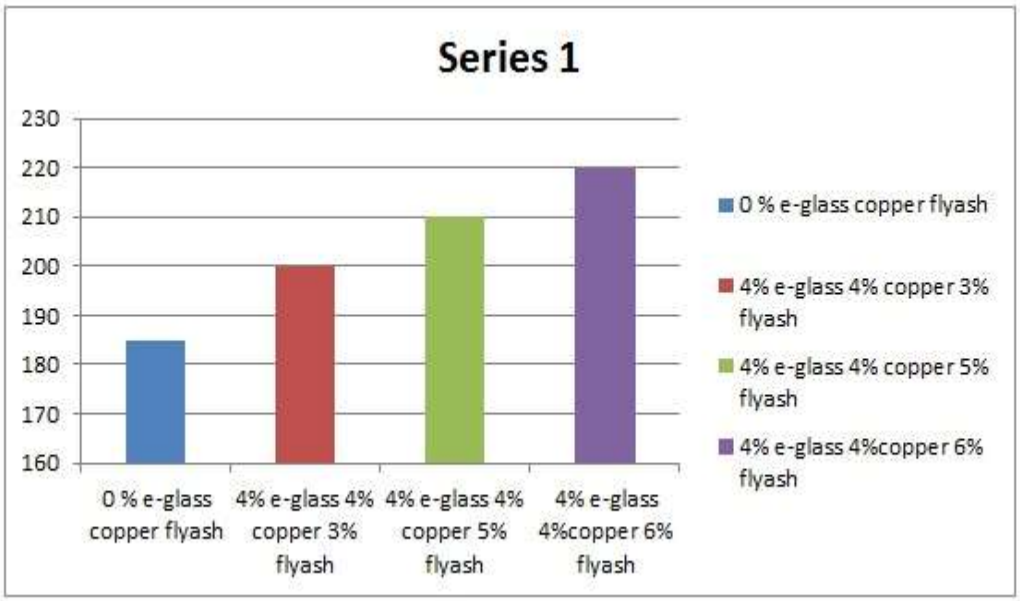
Fig-3: Pelting of molten metal into mould box .To get the required product through casting, then after 15 minutes of stirring, the liquid metal with reinforcement namely E-GLASS (0.120kg) and flyash (0.09kg) are pelted into the splitup types of dies to get the required shape of product through stir casting.(E-waste Al 6063 2 kg +copper 0.8kg+ E-glass fiber 0.12 kg + fly ash 0.15 kg).

Fig-6: Fabricated aluminium base alloy (composite).

IV. RESULT AND DISCUSSIONS

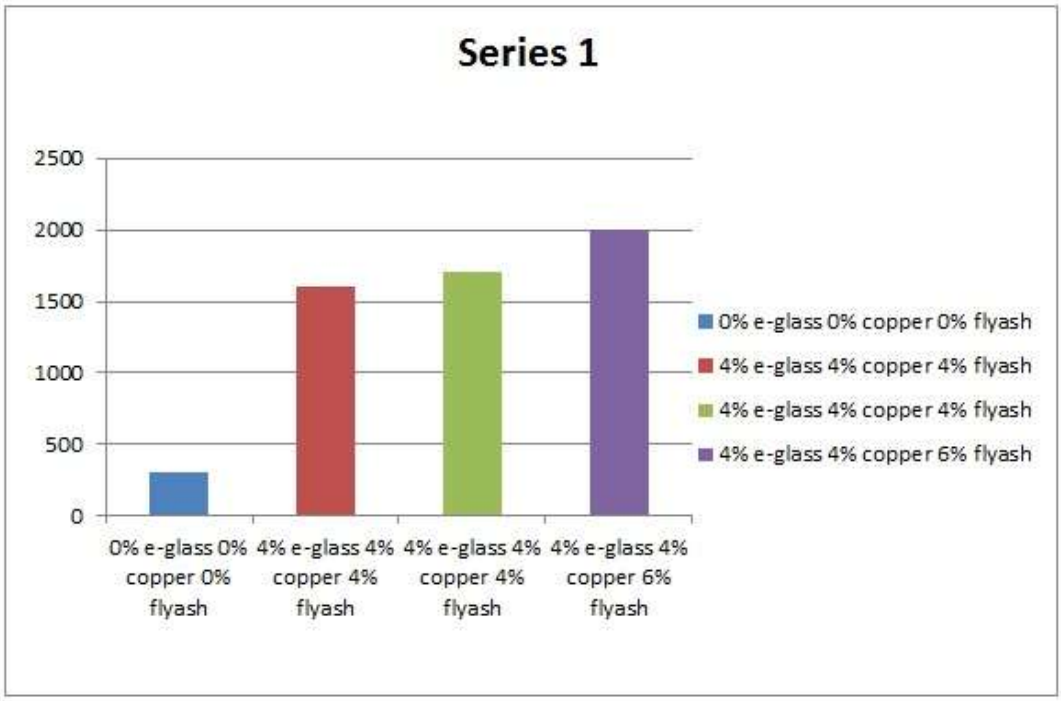
Tensile strength (N/mm^2)	% of e-glass	% of copper	% of flyash
185	**0**	**0**	**0**
200	**4**	**4**	**3**
210	**4**	**4**	**5**
220	**4**	**4**	**6**

- Tensile strength of al 6063+copper+4% E-glass +varying % of fly as



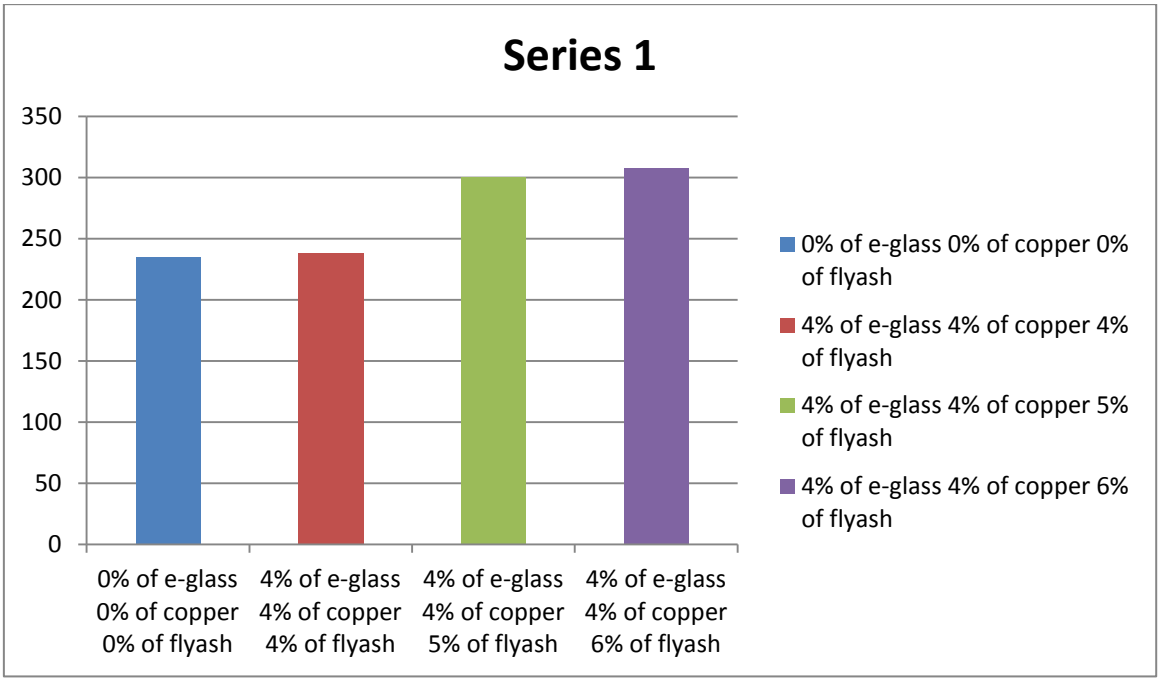
Compressive strength (N/mm^2)	% of e- glass	% of copper	% of flyash
300	**0**	**0**	**0**
1600	**4**	**4**	**4**
1700	**4**	**4**	**5**
2000	**4**	**4**	**6**

- Compressive strength of al 6063+copper+4% E-glass +varying % of fly as



BHN (KN)	% of e- glass	% of copper	% of flyash
235	0	0	0
238	4	4	4
300	4	4	5
308	4	4	6

- Hardness of al 6063+copper+4% E-glass +varying % of fly as



V. CONCLUSION

Above experiment represents the adding various volumetric fraction of e-glass and fly ash on the hardness, tensile and compression . The hardness of the composite material is obtained to be increased with increased wt% of fly ash content in the composite.

VI. FUTURE SCOPE

In futute the mechanical properties can be inhance by adding some other material having light weight.

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