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A Survey: Possibility of using Building Material Waste and Waste Tyre as a Construction Material

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Abstract **- The main objective of this study is to investigate the potential use of various solid wastes for producing construction materials. This paper is based on the review of available literature on the construction materials including different kind of solid waste. The traditional method for producing construction material is using the valuable natural resources. Besides the industrial and urban management system are generating solid waste and most probable dumping them in open fields. This activity poses serious detrimental effects on the environment. To protect the environment many efforts are being made for the reutilization of various types of solid waste with a view to utilize them in the production of various construction materials. This paper is about the environmental implications caused by the generation of various solid wastes. In addition, this paper shows the application of building material waste and solid waste based construction materials and identifies the research needs.**

Keywords- **Building material waste, Waste tyre, Cement, Environment Pollution.**

I. INTRODUCTION

The increasing amount of waste rubber generated from used tires has caused in an environmental problem. Recycling of waste tires has been extensively used in applications like waterproofing system, pavement of asphalt and membrane liners. The traditional construction materials such as concrete, bricks, solid blocks, pavement blocks and tiles are being produced from the existing natural resources.

This is damaging the environment due to continuous using and depletion of substitute such as high concentration of carbon monoxide, oxide of sulphur, oxide of nitrogen and suspended particulate matters are invariably emitted to the atmosphere during the manufacturing process of construction materials. The emission of toxic matter contaminates air, water, solid, flora-fauna and aquatic life and thus influences human health as well as their living standard.

The cost of construction materials is increasing day by day because of high demand scarcity of raw materials and high price of energy. From the standpoint of energy saving and conservation of natural resources the use of alternative constituents in construction materials is now a global concern, For this research and development work towards exploring new ingredients are required for producing sustainable and environment friendly construction materials. The present study investigates the potential use of various solid wastes in the production of construction materials.

In order to maximize the use of alternative construction materials produced from different type of waste and to make the lab based production processes feasible in real

world the technology enabling centres are needed to facilitate entrepreneurs for effective commercialization. Good mechanical and durability performance of newer products, dissemination of technologies emphasizing cost Benefit analysis and feasibility assessment report will significantly contribute to the successful Commercialization of innovative processes. Therefore its need to develop new products and processes using the building material waste and tyre as raw materials.

II. BUILDING MATERIAL WASTE

Huge quantity of construction and demolition debris is produced during the construction and development works. As the construction industry grows it generates more and more C&D debris which create a major portion of solid waste. The amount and type of C&D debris depend on many factors such as the stage of construction, type of construction, work and nature of construction practice on site.

Most of the building material waste are generally disposed of in landfills or openly dumped into uncontrolled waste pits and open areas and this continuous disposal causes serious problem. The use of building material waste could use the process of waste management. The building material waste generally comprises a larger portion of concrete rubber bricks, tiles, sand, timber plastics, cardboard, paper and metals are also

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the constituents of building material waste. After separation from building material waste concrete rubber can be crushed and used as a substitute for natural course aggregate. The process concrete rubber is now well known as recycled concrete aggregate. RCA can also be used for making good structural concrete with addition to other solid waste.

III. RUBBER TYRE WASTE

Rubber tyres are a ductile non-biodegradable material that can exist for a long time without any degradation. The growing amount of waste rubber tyres has resulted in an environmental problem [2].In several countries open burning fuels are considered the easiest way to get rid of the waste rubber tyres, even though these processes lead to a very serious health hazard. Since the waste rubber tyres cannot be bio-degradable even after a long period of landfall treatment, material and energy recoveries are viable alternative to the disposal of solid wastes [1].Several researches were carried out on the use of scrap tyre particles in cement concrete. The processed rubber tyres were used to replace fine and course aggregates depending on the fineness of particles[2]. As concrete has became the most widely used construction material , the incorporation of rubber tyre particles in concrete would be a very good and promising way to utilize the large quantity of waste rubber.

The use of scrap rubber tyre particle in concrete would not only make a good use of such waste materials but also help to improve some concrete properties. The rubberized concrete show excellent flexibility, ductility and energy absorbency as compared with the conventional concrete. Furthermore the tyre rubber is preferable for use in self consolidating concrete since it effectively interacts with cement matrix to produce high flow ability along with good cohesiveness. During different building and domestic activity quantity of tyre waste and building material waste are generated which causes major problem as well as occupy a large area of land for their storage and disposal there is a various scope for recycling and using quantity of building waste and tyre waste in the production of construction material. Environment friendly energy efficient and cost effective alternative material produced from solid waste will show a good market potential to fulfil people's needs in rural and urban area. The uses of construction waste management technique which rely on salvage, recycle and reuse of materials have proven have economic benefit of construction industry.

IV. LITERATURE SURVEY

According to Nuzib N gerg and et al. :
The purpose of this paper is to report on an experimental study that explores the effect of using recycled rubber powder as an alternative fine aggregate in concrete mixes. Natural sand in the concrete mixes was partially replaced by 5%,10%,15%,20% physical properties such as density, compressive strength, the fresh concrete properties, the split tension and the impact load capacity examined and results revealed a decrease in the compressive strength of concrete cylinders containing rubber.[1]

Valente M.et al : In this paper different amounts of waste tyre powder are combined with cement concrete mixtures to provide a final product with mechanical properties suitable for engineering applications. Previous work has shown that a good compressive strength can be achieved through replacing 30% of powdered tyre with crushed sand. [2]

OA abuzu et.al. This paper aims to explore the potential utilization of crumb rubber from used tyre in various types of Portland cement concrete for the production of non structural PCC with special application requiring attention to thermal and noise insulation and material electricity. Fine aggregate was replaced using the volumetric method by used crumb tyres at different percentages of replacements for various types of PCC (B-150,200,250,300 and 450 kg/〖cm〗^2).[3]

HS LEEet.al. : In this paper tyre added latex concrete (TALC) was incorporated recycled tyre rubber as part of concrete. Crumb rubber from tyres were used in TALC as a substitution of fine aggregates or styvene butadiene rubber (SBR) later, while maintaining the same water to cement ratio various static and dynamic strength of TALC were measured and compared to those of conventional and latex modified concrete. TALC showed higher flexural strength than those of Portland cement.[4]

G. SIRNGI et.al .: Tyre derived aggregate (TDA) has been proposed as a possible lightweight replacement for mineral aggregate in concrete. The role played by the amount of TDA replacing coarse aggregate as well as different treatment and additives in concrete containing TDA are compared by examining their compressive strength based on ASTM workability based on ASTM C143.[5]

MC Bignozzi et al. : In this paper rubberized self compacting concrete was prepared containing different amount of untreated tyre waste and their mechanical and micro-structural behaviour are investigated and discussed. The fresh and hardened properties of such materials are compared with those of a typical reference formulation of self computing concrete. A comparison the obtained compressive strength with literature data confirms that self computing technology helps binding rubber phases.[6]

1996 fattuhi et al. : It Cement paste mortar and (containing OPC or OPC and PFA) mixes were prepare using various properties of either rubber crumb or low grade rubber obtained from shredding scrap tyres. Properties examined for 32 mixes prepared included density, compressive strength of various mixes were

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reduced by the addition of rubber (rubber tyre had only marginal effect) density varied between about 1300 and 2300 kg/〖cm〗^3. Compressive strength reduced by 70% when the proportion of rubber to total solid content by mass of concrete reduced about 13%.[7]

Turansinze A bonnets et al. : Cement based materials suffer from their low tensile strength and poor strain capacity they are sensitive to cracking above all to shrinkage evoking. Enhancing the cracking resistance of cementious materials is the objective of a broad ongoing research program me. In this regard the aim of this work is the design of a cementious composite exhibiting high strain capacity before localized cracking.[8]

V. FIGURE AND CAPTION

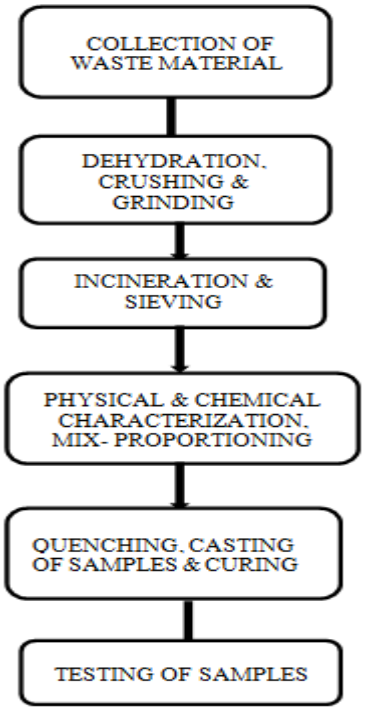

Fig.1 Block diagram of manufacturing of concrete.

VI. CONCLUSION

The goal of the this study is to utilize building material waste and rubber tyre wastes is in manufacturing composite materials for masonry applications. Utilization of these wastes in the construction industry in large quantities seems to be a reasonable solution for these environmental and economic problems .Finally, the use of rubber tyre waste and building material waste in composite materials provides an opportunity to recycle these wastes and thus to achieve environmental goal.

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