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# "UTILIZATION OF WASTE MATERIAL IN PAVER BLOCK CONSTUCTION"

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**ABSTRACT:** The increase of electronic waste in day to day life has turned into major threat to public health .Like that one of the biggest industry producing waste is the marble waste, which is generated during the cutting,polishing process of marble ,which is used as a decorative purposes in many places.In this paper, we are exchanging coarse aggregate with E-waste and marble waste in some proportion ,so that paver block with new technology will introduced having good compressive strength..

**INDEX WORDS :** Electronic waste, marble waste, paver block, compressive strength, flexural strength, split tensile strength.

## INTRODUCTION

The Paver block or paving surface which is one of the most popular flexible surface treatment mainly used in exterior part. A paver is a paving stone, tile or brick like pieces made up of concrete which is used as flooring mainly in exterior part of building or in parkings and on footpaths.An interlocking paver is a type paver which is also known as segmental paver ,used from past decades and is popularly used as best alternative to concrete, brick or clay.Paver block are covinient, pleasant, and can be maintain easily.Paver blocks can last for 20 years ,if they are adequately interlocked. Paver block are suitable for any weather, does not need suitable weather.Paver block are very easy to install, available in different shapes and sizes,and can be used in commercial as well as residential buildings and the biggest advantage of using pave block is that, if by any chance one of the block get damaged it can easily be replaced.In this paper, we are using paver block which had been made by using waste materials ,so that the pollution causing due to the waste materials,will also be reduced ,and hence paver blocks of new technology will also be obtained.

## MAETRIAL

ELECTRONIC WASTE : Electronic waste or e-waste describes discarded electrical or electronic devices. Used electronics which are destined for reuse, resale, salvage, recycling, or disposal are also considered e-waste. Informal processing of e-waste in developing countries can lead to adverse human health effects andenvironmental pollution.Compressive strength of paver blocks with different rates of waste steel aggregates and utilizing elastic cushions is examined.

MARBLE WASTE : Marble is used in different parts of construction of home. Some of genuine advantages with usage of Marble for construction are their permanence and durability. Because of increased use of Marble stone in house construction, amount of waste marble stone strips and pieces remains unused at site or in marble stone cutting industry. In Amravati MIDC so many industries producing such marble stone waste. So we have decided to use this waste for preparing concrete paving blocks.

SAND: Sand is of course occurring granular material that consists of mineral particles and finely divided material. The organization of sand shifts relying upon the local shake conditions and sources; anyway the premier constituent of sand in inside mainland settings and non-tropical beach front district is silicon dioxide (Sio2) at interims the kind of quartz. The second ordinarily used sand is that the carbonate, as an example mineral, that has largely been created, over the past 0.5 billion years, by numerous varieties of life, like coral and shellfish. Sand is currently utilized in all the development method. The properties of the River sand were obtained by various tests conducted in our college laboratory including Standard proctor test.

CEMENT: Portland bond is that the principal regular very bond commonly uses the world over as a fundamental element of solid, mortar, stucco, and non-forte grout. It had been created from totally various kinds of water driven lime in England at interim the inside nineteenth century, and normally starts from a stone. It's a fine powder, made by warming rock partner degreed dirt minerals in an exceptional home machine to make clinker, crushing the clinker, and including little measures of different materials.

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COARSE AGGREGATE: Coarse mixture shall go with the need of IS 383 as for as doable crushed mixture shall be used for making certain adequate sturdiness. The mixture used for production of block shall be Sound and free from soft and alveolate particle the nominal maxi size of coarse aggregate utilized in Production of paver block shall be 10 mm.

WATER: Water is a very important ingredient of environmental-friendly paver blocks and tiles using e- waste and fly ash because it is concerned within the chemical process with cement. Potable waterought to be used for mixing the cement, sand and e-waste. It ought to be free from organic matter and also the pH price ought to be between 6.5 and 7.5.

## DESIGN MIX

**E-WASTE:** The concrete is designed for M25 grade by using the procedure as per Indian standard (IS10262:2009). This proportion is used to prepare the samples. The mix proportions are shown in table.

**Design mix proportions**

| | W | C | FA | CA |
|---|---|---|---|---|
| By weight in kg/m$^3$ | 197 | 438 | 709 | 1108 |
| By volume (m$^3$) | 0.45 | 0.14 | 0.39 | 3/6 |

**MARBLE WASTE:** Material used for this study is traditional material such as cement, sand and aggregate along with additional waste material from marble stone industry. 53 grade Ordinary Portland Cement is used with local sand available and ½"- ¾" size aggregate are used. Marble stone industry waste is procured from the Marble stone cutting industry from Amravati MIDC area.

**CRUSHED SAND:** A concrete mix of 1:2:4 (cement: sand: stone chips) by volume may be used for cement concrete paving blocks with water to cement ratio of 0.60. The concrete mix should not be richer than 1:6 by volume of cement to combined aggregates before mixing. Fineness modules of combined aggregates should be in the range of 3.6 to 4.0. All the raw materials are placed in a concrete mixer is rotated for 15 minutes.

## CASTING AND CURING

In the mixing process of sample, the fresh mixes were fed into the Rubber moulds of cosmic type paver rubber mould. .The paving blocks were then kept for drying after compaction. The prepared sample were kept for drying for 24 hours and then kept for the curing for 7 days in the curing tank. Testing of casted paving block was carried out for checking water absorption, compressive strength and splitting tensile strength. Three block of each proportion are tested and average results of each proportion are considered.

## PAVER BLOCK

Paver block is a solid paving element, without reinforced pre-cast cement concrete paving units used in the surface of pavements, with a cross-section of 50mm minimum of the horizontal direction, aspect ratio (l/d) not greater than four which is used in footpath and road for a better look, easy laying and finish. Paver blocks which placed into one another on some or vertical faces, other names are called Interlocking or Denated or Inter-connected paver blocks.

CASTING SPECIMEN

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## FUTURE SCOPE

1. The big problem of E-Waste and Marble waste as permanent solution as well as it's help to save enivironment.
2. Polluction are going to decrease and dependency on natural resources are aslo decrease.
3. The value of paver block available at less price.
4. Use of different nominal types of E-Waste as course aggregate used for further studies.
5. The concrete embedded with E-Plastic can be used as a light weight material for constructing structures like storage room , office chamber , also for the load bearing structure etc.
6. The E-Plastic concrete can be successfully used as a pavement material in areas of low traffic like parking pavements in various school , colleges , hospital etc.
7. Also can be used to construct paver blocks , concrete bricks , kerbs ,etc.
8. Abrasive strength of E-Plastic material is very high , hence , can be used in construction works of gutter , manhole , manhole cover , pipes of low pressure flow , etc
9. Impact strength is very good thereby can be used in workshop and colleges as a pedestal for machine to absorb shock caused by impact.
10. As E-Plastic gives substitute for fine Aggregate( river sand ) the absorption of water in E-plastic concrete is less than that of conventional concrete thus providing a high workable concrete than conventional concrete thereby can be used as a self compacting concrete.

## CONCLUSION

1) The analysis concluded that the E-waste can be used paver block , saves natural resources,minimize pollution, lower landfill space.The replacement of aggregate with e-waste will reduce cost of construction and also helps to avoid the general disposal technique of waste.The e-waste and in the concrete helps to reduce the burden of the block upto 15%.The electronic waste is one of the biggest concern of the planet earth, using them in the blocks will be a global relief.

2) The analysis conclude that E-Waste , marble dust can replace to the coarse aggregate and Crushed Sand replace to fine aggregate, beacause strength of the paver block increases up to 40% replacement of fine aggregate with quarry dust. There was a slight decrease in the strength of the paver block at 50% replacement of fine aggregate. The binders present in the quarry dust increases the mechanical properties of the concrete. Paver block manufactured with waste plastic, stone dust and sand have shown better result.

3) Electronic & Marble industry produces large amount of waste during mining and processing stages. This waste are usually dumped in empty pits in the forest area; thereby creating huge amounts of waste. There is absolutely no method of systematic disposal of waste. This waste is dumped on to open land which creates a lot of environmental problems.

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