Comparative Study of Waste Material in Paving Block

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Abstract
Paver blocks, a non-traditional pavement material, are increasingly being used in open areas due to their ability to bear traffic and non-traffic loads. The construction industry has led to increased consumption of natural resources for cement production, contributing to the greenhouse gas effect. Additionally, industrialization has led to a significant production of waste materials. With the popularity of paver blocks and their growing demand, there is a potential to incorporate waste materials like glass Fiber and Fly ash into their manufacturing. Experimental works have shown successful waste incorporation in paver block manufacturing, with fly ash being a promising cement replacement material. Slag has also been used to replace up to 40% of cement with satisfactory results, resulting in a strength increase of over 3% compared to normal
Keyword- Paver Block, Waste Material, Non-Traditional, Replacement, Fly ash

INTRODUCTION:

The construction industry is facing a big challenge right now. People are realizing that the way we build things, like houses and roads, is not very good for the environment. We use materials like concrete and asphalt, which are not very friendly to the planet. We make a lot of pollution, use up a lot of natural resources, and create a lot of trash. But there's hope! This project has a cool idea to make things better. They want to make special paving blocks that are good for the Earth. These blocks are made from stuff that we usually throw away, like stone dust, rice husks (the outer part of rice), and bagasse ash (a waste product from making sugar from sugarcane).
These special blocks are much nicer to the environment. They don't make as much pollution, and they don't waste so many resources. Plus, they help get rid of some of the waste we have lying around. As more and more people realize that we have to stop hurting the Earth, the construction industry needs to change. This project is a step in the right direction. It shows that we can use things that we would normally throw away to build things that are better for the planet. It's like turning trash into treasure! So, in simple words, this project is trying to make the construction industry greener by using waste materials to make paving blocks. This is good for the environment because it reduces pollution and waste. It's a smart idea for a better, more eco-friendly future

1.FLY ASH:

The use of fly ash in Portland cement concrete (PCC) has many benefits and improves concrete performance in both the fresh and hardened state. Fly ash use in concrete improves the workability of plastic concrete, and the strength and durability of hardened concrete. Fly ash use is also cost effective. When fly ash is added to concrete, the amount of Portland cement may be reduced. Hence it gives economy for the project. Fly ash is a versatile material used in concrete, improving durability and workability while reducing permeability. It can form cement when mixed with water if its calcium content is high. It can also be mixed with lime and water to create a substance similar to Portland cement. Fly ash can be divided into Class F and Class C, with Class F containing melted glass particles to reduce concrete expansion risk and increase resistance to sulphates and alkali-aggregate reactions. Class C contains more calcium oxide, making it more effective in strengthening structural concrete.

2.GLASS FIBER:

Glass fibers added to the concrete mix boost the material's compressive strength by a small amount after 28 days. The amount of glass fiber used in concrete gives some positive effect on
the material's compressive strength, flexural strength, and splitting tensile strength. In the context of composite materials, glass fiber serves as a reinforcing agent due to its high strength, lightweight, and resistance to corrosion2. It's commonly used in various industries, including the marine industry, piping industries, and in the manufacturing of products like grouts, masonry products, cellular concrete, roofing tiles, and more.

I. OBJECTIVE:

1. To determine the suitability of constructional waste in the development of paver blocks
2. To evaluate the compressive strength of paver blocks.
3. Comparative Evaluation of Material Replacement.
4. Analysis of Cost Comparison of Paving Block with conventional block
5. To study of Comparison of Strength & weight of Paving Blocks

Conclusion :

- The utilization of waste materials in production of paver block has productive way of disposal of waste.
- Market paving block having cost of rs17 and paving block having is 15 Rs only
- Fly ash is polluted ingredient in the nature so used in the paving block to reduce the pollution in the area.
- The finishing, shape, interlocking and appearance of the paving block are good as compare to conventional paving block.
- As compare to the concrete paving block our paving block strength is lightly less but we can use this block in low traffic areas or where the intensity of traffic is less.

II. LITERATURE REVIEW:

1.1.Koli et al. (2016), Manufactured concrete paving block by using waste glass material. They investigated the density of concrete decreased with increase in waste glass content and making light weight concrete. The unit weigh of fine aggregate is also decreasing by use of waste glass content. Water absorption is also deceased with increase in waste glass content. A decrease in flexural strength can also be seen. Increase in compressive strength by increase in glass % from 15% to 30% glass replacement and after 45% glass replacement strength decreased. Due to internal voids strength reduced. A decease in cost of paver block is observed.

2.2. Joshi Rohit R. et al. (2015). A comparative study on compressive strength of blocks made by waste paper sludge as partial replacement of with cement, concluded that the mix proportion suitable for partial replacement of waste paper sludge is 5% to 10% strength obtained is 24.97% increased as compared to 20% & 30% replacement in 28 days. Water absorption increased by increasing waste paper sludge content. Weight of block also increased by 2.94% in waste paper sludge ratio 0% to 10% and weight decreasing 1.01% in waste paper sludge ratio 10% to 30%. Workability decreased by increase in waste paper sludge. Maximum use of waste paper sludge can be made with cement provides a solution to disposal of waste paper sludge and also helps in controlling harmful emission of pollutants by burning the waste paper.

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III. METHODOLOGY

Step-1: Material Collection and Preparation:

Step-2: Experimental Design
Step-3 Paving Block Production.
Step-4: Testing and Analysis
Step-5: Environmental Impact Assessment.

IV. RESULTS

- As concrete is strong in compression, it is seen that the results of the proportions which taken are comparatively good against the proportion of conventional mix.After 28 days of curing, the compressive strength is 19.46 N/mm2
- The finishing, shape, interlocking and appearance of the paving block are good as compare to conventional paving block.
- As compare to the concrete paving block our paving block strength is lightly less but we can use this block in low traffic areas or where the intensity of traffic is less.
- We use these blocks in surrounding

the temples, garden areas, foot path etc