



A GENERAL REVIEW ON INTERLOCKING PAVER BLOCKS

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Abstract

In India, interlocking paver blocks usage was highly improved from the past decades. Now these days parking, pedestrian and vehicle moving areas are filled by paver blocks. Some of issues have been studied in the paver blocks in earlier like weak in its strength and durable. By replacing the cementitious materials by fly ash or rice husk ash and changing aggregates by fibre it was fulfilled. This paver blocks carries over the extraneous of aggregates and the binding materials used in paver blocks. Comparing with the natural fibre the artificial fibre plays a very optimum role in strength characteristics and absorption of water seems to be medium in level.

Keywords: paver blocks, weak – strength and durable, fly ash, rice husk ash, fibres

Introduction

Now a day's interlocking concrete paver blocks are playing a vital role in the construction field. Exterior landscapes, pedestrian footpath, and roads were filled with the paver blocks. Because of its reliability and constancy, it is widely preferred in any kind of area.

There is a different kind of histories were given by the previous literature as it was developed in Giza, Egypt before 4500 years but some of the researchers were said that paver blocks were initiated in Holland. It brings to the notice that after Second World War, the Europeans were started to reconstruct the roads by using these types of blocks.

A German Engineer Fritz Von Langsdorff has developed the shape & introduces colored

concrete paver blocks. In earlier these blocks were made by natural stone and clay, from the past six decades only we insisting of concrete pavers.

The main advantages of paver blocks were it should be flexible and it can avoid cracks by maintaining the good strengthen properties.

Several studies have been carried out in paper blocks by replacing the aggregate and by reusing the aggregate. Tiles, Clay, GGBS, Foundry sand and M-sand has been replaced the normal materials used in paver blocks. Strengthen characteristics, abrasion and skid resistance of the pavers has been monitored by the researchers. This paper aims to deliver the fundamental materials that suit for exiting good strength by the literature study.

Literature Study

Several of studies have been done by replacing of materials used in paver blocks. Fly ash, Rice husk ash and foundry sand were used to replace cement, like wise kadapa stones, tiles, Groundnut husk ash, fibres like coir, nylon and steel balls were used to replace aggregates.

Anji reddy et al. (2015), have a study in M 35 grade of block by 60 mm thickness, nylon fibre replaces the fine aggregate in various percentage like 0.1%, 0.2%, 0.3%, 0.4% & 0.5% and Rice husk ash of 10%, 20% & 30% replaces the cement. Good enough of compressive strength has been seemed in replace of 0.3% of nylon fibre and 20% replacement of Cement. Nearly 18% of the strength was improved by replacing these materials.

Dixit N. Patel and Jayeshkumar R. Pitroda (2014), whispered that Partial

replacement of cement (PPC 53 grade cement) in bottom layer in different percentage as like 10%, 20%, 30%, 40% and 50%. The compressive strength, flexural strength has been determined at the end of 7, 14 and 28 days and water absorption test has been determined at 28 days. The paper also shows the cost comparison per block for the paver block mix proportion.

G. Navya and J. Venkateswara Rao (2014), supposed that Coconut fibers were added in proportions of 0.1%, 0.2%, 0.3%, 0.4% and 0.5% in volume of concrete. The compressive strength, flexural strength and water absorption were determined at the end of 7 and 28 days. Test results indicate that addition of coconut fiber by 0.3% paver block attains maximum compressive strength. Test results indicate that addition of coconut fiber gradually increases flexural strengths and water absorption at 7 and 28 days.

Yeole R. C. and Varma Dr. M. B. were accomplished that a parametric experimental study for producing paving blocks using waste steel aggregates (the form of rounded bearings of size 6.35 mm) is presented. Waste steel bearings are added in concrete of paver blocks in various percentages. Rubber pads are also used below the paver blocks. Impact strength of paver blocks with various percentages of waste steel aggregates and using rubber pads is investigated. Test results show that combination of using rubber pads and adding various percentages of waste steel aggregates in paver blocks gives upto 50% more impact strength than ordinary paver blocks.

Experimental Program

Materials Used

Ordinary Portland Cement (OPC) of grade 53 conforming to IS: 10262-2009 was used for the

studies. While replacing the cement fly ash based geopolymers mix in addition of alkali activators plays the role as binding agent. Locally available fine aggregate with a maximum size of aggregate of 20mm with a specific gravity of 2.59 was used, otherwise Semi grit is the heavier sand than normal sand and is very versatile sand used for many different tasks and jobs, The size of the semi grit is less than 9.5 mm and Quarry dust particles having size less than 4.75mm was added. Purely drinking water below the level acidity is used in this concrete mix. In number of research is added by natural fibre of coir with 0.01mm diameter and 6mm in length and the synthetic polymer fibre, nylon with 20mm length is added in concrete. Foundry sand is high-quality uniform silica sand that is used to make moulds and cores for ferrous and nonferrous metal castings.

Mix Proportions

Several mix proportions has been gone through the researchers, depending upon the materials added in concrete the mix proportions got varied. M20 & M40 grade of concrete was casted by the researchers.

Specimens

Rubber based moulds of size 215 x 170 x 55 mm or 200x100x80 mm (Fig.01) were used for the preparation of I shaped paver block. The materials used for the casting of paver blocks such as cement, water, groundnut husk ash, fine aggregate and coarse aggregate were mixed together properly before placing into the moulds. After de-molding paver blocks were kept in under shade for one day and after that samples were kept in water for 28 days and then it is used for further testing.



Fig. 01



Fig. 02



Fig. 03



Fig. 04

Testing Methods

Compressive strength, Water Absorption, flexural strength, slip resistance and skid resistance tests of the blocks were also deliberate by the researchers. Most of recent test have been

done to finding and improving of the strength of Paver blocks. For determining the compressive strength samples were tested in compressive testing machine and flexural strength test was conducted using universal testing machine. The

compressive (Fig.02), flexural (Fig.03) and water absorption (Fig.04) tests are conducted as per IS: 15658:2006. In each category three cubes were tested and their average value is reported.

Conclusion

01. Compared to conventional mixture; and Nylon Fiber makes the blocks more opaque as compare to other paver blocks and the optimum dose of 20 % of Rice Husk Ash (RHA) gives maximum strength of paver block.
02. A high volume fly ash based geopolymer concrete used for bricks and high volume ground granulated blast furnace slag based geopolymer concrete used for pavers blocks.
03. The addition of coconut fiber by 0.3% paver block attains maximum compressive strength. Test results indicate that addition of coconut fiber gradually increases flexural strengths and water absorption at 7 and 28 days.
04. Groundnut husk ash is suitable in making paver blocks as the water absorption is less than 7%.
05. In comparison to control mixes, the compressive and flexural strengths of the fly ash based mixes are found to be slightly less at 7-days and 28 days and a little more at 90 days.

Future Work

It is well noted that the strength parameter were well achieved by replacing the aggregates as well as the cement. So the future work is going to initiate in no fine concrete paver blocks. Because skid resistance of the paver block is little low and water penetration to the ground level will be improve.

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