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Review on Effect of Shapes on Strength of Paver Blocks

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ABSTRACT: Solid unreinforced pre-cast cement concrete paver blocks square measure a flexible, esthetical enticing, functional, price effective and needs very little or no maintenance if properly factory-made and ordered. Paver blocks are often used for various traffic classes i.e. Non-traffic, Light-traffic, Medium-traffic, Heavy-traffic and extremely serious traffic. During this project totally different shapes, eighty-millimetre paver block of M-40 grade is casted in step with specification given beneath IS 15658: 2006 and tested for compressive strength. During this project in the main study of result of various shapes of paver blocks on compressive strength of paver blocks is completed.

KEYWORDS: Paver Blocks, Size, Shapes, Traffic, Strength, Compressive, Deformation, Interlocking.

I. INTRODUCTION

Cement concrete tiles and paving blocks square measure formed solid merchandise created out of cement concrete. The merchandise is formed in numerous sizes and shapes viz. rectangular, sq. and spherical blocks of various dimensions with styles for interlocking of adjacent tiles blocks.

Concrete paving blocks square measure ideal materials on the footpaths for straightforward parturition, higher look and end. Whereas the tiles notice intensive use outside the big building and homes, uncountable these materials also are employed in flooring within the open areas of public offices and business buildings and residential flats.

II. RELATED WORK

Objectives

1. To find the most optimum shape paver block among the others which will prove to best in respect to strength.
2. To find the compressive strength of different types of paver blocks.
3. To determine the deformation number of paver blocks.
4. To determine the best shape which interlocks with other identical shapes without any binding material.

Contributions

This thesis consists of study from various publications and an introductory part with literature survey.

1. The aim of the thesis is to determine the effect of shape of paver blocks on its strength.
2. The main aim of this thesis is to collect the information of paver blocks based on their size and shapes which will help in selection of economical pavement design accordingly.
3. This thesis consists of various problems faced in the interlocking concrete block pavement and their justifications followed by appropriate solutions and preventive measures.
4. This thesis describes the various advantages of using paver blocks while constructing pavements.
5. The classification of paver blocks is described in this thesis, which will help in selection of appropriate paver blocks depending on the situation.
6. Various types of paver block laying patterns are discussed in this thesis along with their technical measures and features which may be found useful while selecting laying patterns depending on the different aspects and requirements such as location, purpose, traffic and etc.

III. METHODOLOGY

Analysis of paver blocks to find the effect of strength on their shapes is the basic need of this study. In this project analysis of different types of concrete paver block shapes is a need of concern, and thereby establishing a comparison between their strength. There are many methods and tests for analysis of paver blocks such as compressive strength test,



water absorption test, tensile splitting test, abrasion resistance test and many more but among these laboratory tests only compressive strength test and abrasion resistance test is adopted.

IV. EXPERIMENTAL RESULTS

Compressive strength test results for different types of paver blocks-

By compressive strength it has been observed that rectangular paver blocks (A) give maximum strength, but shapes of paver block does not affect much on its strength. Whereas rectangular type paver blocks possess better compressive strength. Result of compressive strength is given below in table

Paver Block Shape Name Given	Compressive Strength (N/mm ²)		
	7 Days	14 Days	28 Days
A	37.22	41.54	47.12
B	35.41	38.5	44.89
C	38.1	42.02	48.36
D	34.75	37.84	44.21
E	36	39.89	45.72
F	36.89	40.56	46.1

Table 1: Compressive Strength Test Result

Where,

1. A is I-Shape
2. B is Crown Shape
3. C is Rectangular Shape
4. D is Colorado Shape
5. E is Europa Shape
6. F is Rectangular Eta Shape

The data obtained in above table is according to 7, 14, and 28 days compressive strength test results and only slight difference can be seen in the compressive strength of the said paver blocks.

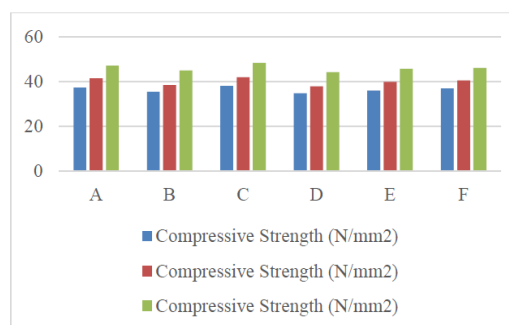


Fig.1 Compressive strength graph for 7, 14 and 28 days

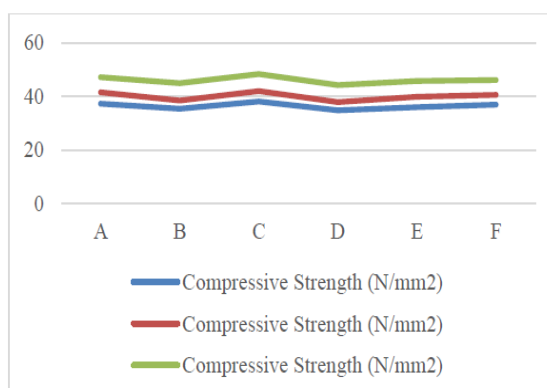


Fig.2 Compressive strength comparison graph

Deformation result-

The results of the deformation of paving block at three different thickness. Figure show that rectangular and hexagonal has the most minimum deformation number which can be concluded that hexagonal and rectangular are the most optimum paving shape.

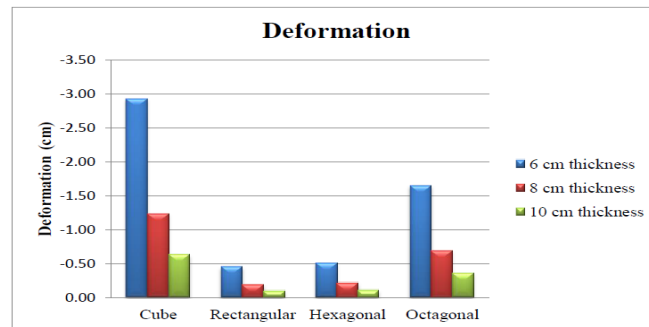


Fig.3 Deformation number of four major shapes

Interlocking aspect results

From interlocking aspect and installation process due to advantage and disadvantage from the field survey, hexagonal is the most optimum shape and hence gives maximum strength. The interlocking of different shapes is shown in figure

Following results are obtained from present study-

- By compressive strength it has been observed that rectangular paver blocks give maximum strength.
- But shapes of paver blocks do not affect much on its strength. Whereas rectangular type paver blocks possess better compressive strength.
- From interlocking aspect and installation process, hexagonal is the most optimum shape as it gets interlocked with other same units with or without any binding material.
- Hexagonal shape has most minimum deformation amongst the other shapes.

V. CONCLUSION

Different shapes of paver block square measure analyzed during this gift analysis to seek out the result of shapes on their strength. The shapes square measure compared with one another on the idea of their compressive strength, deformation range and interlocking aspects to get the specified results and to work out the foremost optimum form. Following observations square measure complete from gift study: -

- 1) A straightforward laboratory-scale take a look at setup are often utilized to assess the behavior of concrete blocks with relevance their form, thickness and parturition pattern, etc.
- 2) Formed blocks perform higher than rectangular and totally different blocks of comparable thickness put in in same parturition pattern.
- 3) Rectangular paver block offers most compressive Strength.
- 4) Shapes of paver blocks doesn't have an effect on a lot of on compressive Strength on paver blocks.
- 5) {Hexagonal|hexangular|polygon|polygonal form} shape has most minimum deformation amongst the opposite shapes.
- 6) {Hexagonal|hexangular|polygon|polygonal form} is that the most optimum shape with relevance interlocking aspects.
- 7) Blocks with larger size manufacture lower deflection.



- 8) Strength of block has no important influence on deflection.
- 9) Block pavements stiffen a lot of more and more with a rise in load repetition, however gain full elastic properly once some repetitions.
- 10) The effectiveness of load transfer depends on the surface space of individual blocks.
- 11) Block form influence the deflection of blocks. Formed block performs higher than rectangular blocks of comparable thickness put in in same parturition pattern.

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