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Water Absorbent Concrete Pavement

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***Abstract** In an general way on the street and parking lots storages the water in very large amount. And parking is major problem during monsoon due to the storage of storm water because the pavements and parking lots are impervious . And we are tryin solving that problem by uses of water absorbing concrete pavement besides this there are many other problems on the pavement parking lots due to water logging in such situations it is important to provide the economical solution. And water absorbent concrete pavement is the economical and best solution for the problem of water logging on the pavements and parking lots and some other areas .*

I. INTRODUCTION

water absorbent concrete pavement is the perfect solution for the water logging on pavements and parking lots and near pavements and India is a developing country and in India water logging problem and some other problem are very common on the pavements and parking lots water absorbent concrete pavement is very unique and effective means This technology helps in different ways basically it's help to provided solution to the storm water. According to this technology storm water absorb by the pavements and surface of parking lots because these pavements and parking lots are made up water absorbent concrete pavement .

This dissertation analyses the effectiveness o Permeable concrete is pavement .This was achieved by analyzing the properties and characteristics of Permeable concrete .The performance of Permeable concrete was compared with a concrete sample that is comparable to the material used for the construction of conventional concrete road pavements.

Permeable concrete is mostly used in non-pavements applications, limited use in pavements applications. This is to assess the suitability for Permeable concrete to be used for the construction of road pavement. It was found that Permeable concrete pavements possess some positive features like increased skid resistance and high permeability but lacks the high strength required for highly traffic areas . Permeable concrete has proven to have properties suitable for use in low volume traffic areas. The properties found may change depending on the aggregate particle chosen, however this aspect requires further investigation. Nonetheless, if Permeable concrete pavements can be implemented, it will have numerous positive effects on the environment.

II. LITERATURE REVIEW

Malhotra (1976), found that the density of permeable concrete is generally about 70 percent of conventional concrete when made with similar constituents. The density of permeable concrete using conventional aggregates varies from 1602 to 1922 kg/m3.

Adequate vibration is imperative for strength of conventional concrete. The use of permeable concrete is different and is a self-packing product. Malhotra (1976) suggests that the use of mechanical vibrators and ramming is not recommended with permeable concrete. A light rodding should be adequate and used to ensure that the concrete reaches all sections of the formwork. This is not a problem with conventional concrete since it has greater flow ability than permeable concrete. The light rodding ensures that the concrete has penetrated all the areas impeded by reinforcing steel. Ghafoori et al (1995) , undertook a considerable amount of laboratory investigation to determine the effectiveness of permeable concrete as a paving materiall . The curing types were investigated to determine if there was any difference between wet and sealed curing. There appeared to be only a negligible difference in strength between the different curing methods. It was clear from the test results that the strength development of permeable concrete was not dependent upon the curing conditions. The indirect tensile test conducted by Ghafoori et al found that the sample tests varied between 1.22 and 2.83 MPa . The greater tensile strength was achieved with a lower aggregate-cement ratio. Ghafoori at all (1995) explained the more favorable properties obtained by the lower aggregate- cement ratio by an improved mechanical interlocking behavior between the aggregate particles.

Ghafoori et al produced permeable concrete with a compressive strength in excess of 20 MPa when using an aggregate-cement ratio 4:1 .

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III. MATERIAL USED

Material are used in this project cement, coarse aggregate, fly ash, concrete and water as per required and in this project used M 20 grade of concrete tasted in the laboratory .

1) *Cement* – The cement was used PPC 53 grade all properties cement according to the IS 1489.1.1991 and other properties are standard.
2) *Coarse Aggregate*- The coarse aggregates with nominal maximum size of aggregates as 20mm (60%) and 10mm (40%) as per Indian standard were used. The physical properties of the coarse aggregates are as per required.
3) *Fly Ash*– The fly ash was used class F with specific gravity 2.1.
4) *Water* – Water used as per required of the Material in the project

IV. METHODOLOGY

The aim of the project study is to increase water absorbing quantity of the pavement with respect to normal concrete pavement . And we are casted total 12 cubes , in all 12 cubes 6 cubes are fly ash , cement ,concrete and water and other 6 cubes are casted cement, concrete , sand and water. And all 12 cubes are casted at same material ratio and the ratio is 1:1.5:3 . and all cubes are same size and the size is 150mm x 150mm x 150mm and the curing of the cubes 7 days and 28 days. And after curing of cubes we are perform the test 7 days test and 28 days test .

1) *Tests*– WE are perform three test on the cubes
a) Compressive Test
b) Abrasion Test
c) Water Absorption Test

V. COMPRESSIVE TEST

A. It is test used to determine load any concrete specimen can resist (compressive strength)
B. This test is carried out for 7,28 days.
C. Compressive strength of concrete depends on many factors such as water-cement ratio, cement strength ,quality of concrete material, and quality control during production of concrete etc.
D. Compressive strength test is carried on cube of size 15cm×15cm×15cm
E. Loading rate of compressive testing machine is 4 tonne /min

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VI. ABRASION

1) It is used to determine the abrasion value of coarse aggregates.
2) Aggregates on tested for absorption till Los Angles Abrasion Testing Machine
3) The test sample should consist of clean aggregates which has been tried in oven at 105c to110 c
4) Aggregates are made to pass through 1.7 mm IS sieve.
5) 12 no. of abrasive charges are used.

A. Water Absorption

Water absorption by immersion gives an estimation of total percentage of water absorbed by the cubes .

VII. FUTURE SCOPE

We can use 25 mm aggregate size for future study or analysis. Water absorbent concrete pavement is a special type of concrete with a high porosity used for concrete pavement applications that allows water from precipitation and other sources to pass directly through it, thereby reducing the runoff from a site and allowing groundwater recharge .

VIII. RESULTS

Each set three cubes of M20 grade of concrete were teat on water absorption test and compressive strength test on the cubes with the curing of 7 days and 28 days . the curing of 7 days we were perform compressive strength test and the value of compressive strength is 10.26 N/ mm and after that we were perform water absorption test and the value of water absorption test 8.769%. after that we were perform 28 days curing test and first of all we were perform compressive strength test and the value of this test 16.46 N/mm and again we were perform water absorption test and the value of water absorption test was 15.24% .And according to these test compressive strength of water absorbent concrete pavement was little less and the water absorption test on water absorbent concrete pavement absorb the more amount of water in compare to the normal cement concrete .

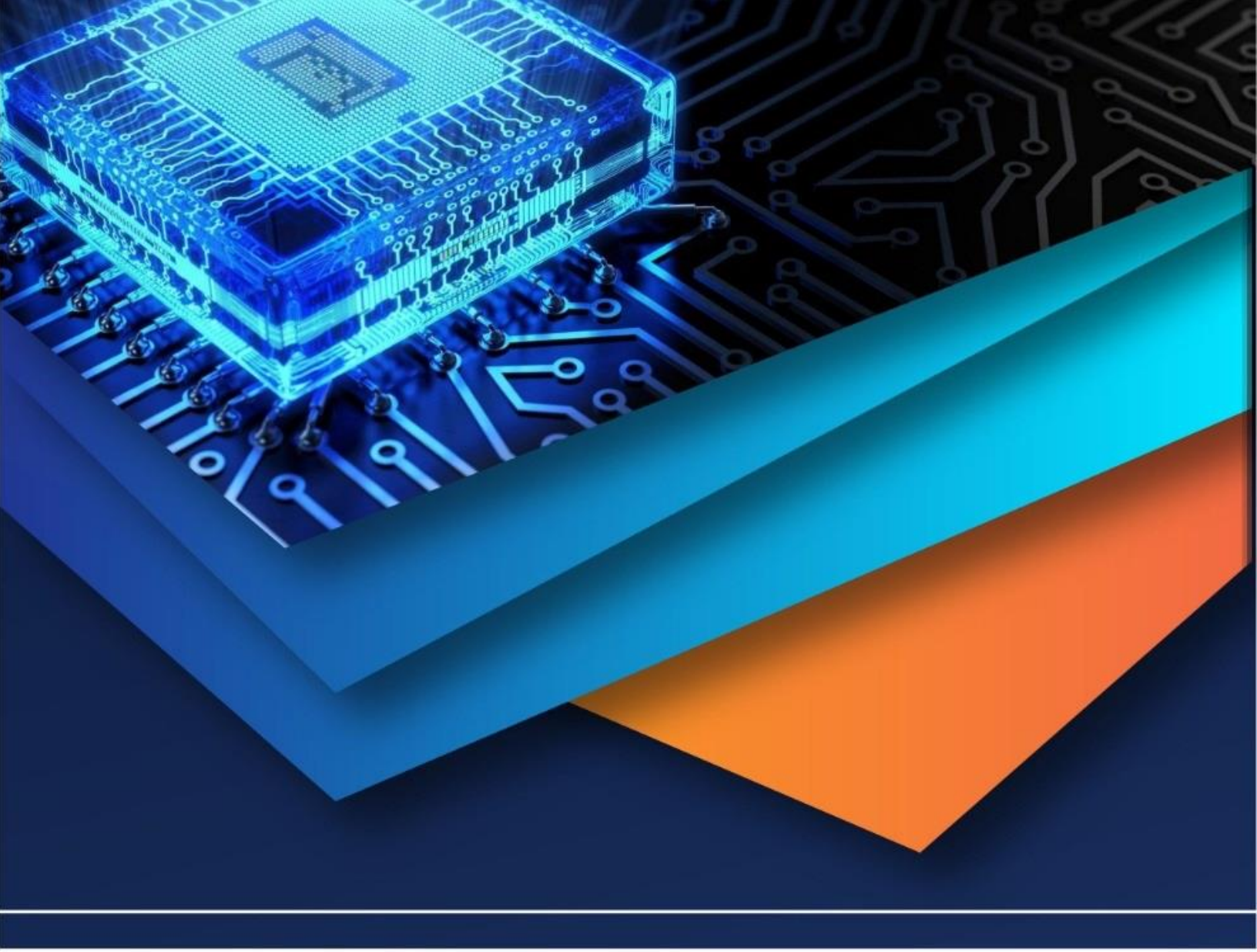
IX. CONCLUSIONS

From the experimental work carried out for M20 grade of concrete by partial replacement of cement with fly ash, the following conclusions were drawn .

A. The increase in fly ash content also leads to retardation in the setting time of concrete. It was observed as the compressive strength for normal concrete with no fly ash at 7 days was 67% of characteristic compressive strength, whereas the compressive strength for concrete with 30% fly ash at 7 days was 60% of characteristic compressive strength.
B. Not more than 30% of cement should be replaced with fly ash; otherwise it may lead to significant reduction in the compressive strength of concrete .
C. And the water absorbing properties in water absorbent concrete pavement higher in compare to normal cement concrete .

REFERENCE

[1] Malhotra, V. M. 1976. “Permeable Concrete – Its Properties and Applications”, Journal of the American Concrete Institute. Vol 73. No. 11. pp 628 – 644.
[2] Er. Neeraj Kumar Gupta, 2016, “Self Compacted Concrete”, International Journal of Recent Research Aspects, Vol. 3, Issue 2 June 2016
[3] A.B. Mark, A.M. Christine, F. Dale, Making Pervious Concrete Placement Easy – Using a Novel Admixture System. Retrieved February 18th, 2014, Information on http://www.nrmca.org/research/cif%2006-4%20pervious.pdf
[4] pecifier’s Guide for Pervious Concrete Pavement Design, Colorado Ready Mixed Concrete Association. Retrieved November 7, 2013, Information on http://www.crmca.org/technical-information
[5] A.S. Agar Ozbek, J. Weerheijm, E. Schlangen, K. van Breugel, Dynamic behavior of porous concretes under drop weight impact testing, Cement and Concrete Composites 39 (2013) 1-11.



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