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NO-FINES CONCRETE

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Abstract: -

No-fines concrete is used nowadays as special concrete. This concrete is eliminating the use of fine aggregates in normal concrete. It is specially used in pavement blocks which are used in Industrial area. Its higher porosity helps in permeating rain water directly helps in refreshing groundwater aquifer. This concrete has high porosity due to this behavior relative density is lower than normal concrete. This is also reducing dead weight in the structure. The compressive strength of this concrete is also lower than normal concrete. This concrete is mix with different ratios of aggregate/cement and it helps find different properties like chemical, physical and mechanical.[4]

Keywords: No-fines concrete, Compressive strength, Tensile strength, porous concrete.

1. INTRODUCTION: -

The pervious concrete is a special type of concrete consist of a gap graded system generally contains cement coarse aggregate admixtures and water. In pervious concrete slump value is nearly to be zero. This type of concrete with highly porous properties used for constructing various types of flatworks that should allow water drains easily it is made using large size aggregates. the cement concrete paste then coats the aggregate and allows water to pass easily through the concrete slabs. It is mainly used in parking lots. In a low traffic area educational campus, commercial infrastructures pedestrian's waterways and garden way, etc.

Nowadays we should face many problems regarding highly demand of probable water in that cases in rain season with the use of such type of no fines or pervious concrete aquifer accordingly also it plays vital role in flooded storm water management. According to American Concrete Institute there are lots of researches ongoing on pervious concrete. Pervious paving systems, especially those with porous surface require maintenance order to keep pores clear of fine aggregate as it no under the system ability to highly infiltration storm water. It someplace very important role in Sustainable Urban Drainage System Such type of system more compatible with components of the natural water cycle such as storm surge overflows soil percolation and bio filtration etc. It may give urban frees the roofing space they need to grow full size.[2]

2. MATERIALS

Materials along with specification which were used for this project are summarized below-

Cement

Ordinary Portland Cement (OPC) of 53 grades is use in this concrete. Cement can be stored in air tight room before use. It should be fresh cement means it should use under three months after manufacture. It should satisfy the requirement of IS: 456; 10262. The normal consistency and initial setting time of cement was 29% and 32 minutes respectively.

Properties of OPC 53 grade cement

Specific gravity	3.15
Normal consistency	30%
Initial setting time of cement	30 min
Final setting time of cement	600 min

Coarse Aggregate

The coarse aggregate is the main component of this concrete on basis of strength. It reduces the drying shrinkage and other changes on occurring of moisture. The coarse aggregate used passes in 20 mm and retained in 10 mm sieve.

Properties of coarse aggregate

Specific gravity	2.74
Water absorption	1.25%
Aggregate crushing value	27.19%
Aggregate impact value	17.65%

Water

Water is important component of concrete. It chemically reacts with cement to form a cement paste, it serves as lubricant by making concrete workable, it also helps in adhesion of cement, sand and aggregate. Extra amount of water is not good for this concrete at the time of hydration it acquires some space and while evaporating leaves voids in structure. water making concrete porous thus it makes weaker in strength.

3.METHODOLOGY: -

Collection of materials-

As per requirement we should always take various fraction of aggregates. Cement OPC53 grade. Portable water free from chemical it means clear water. especially materials should free from any quite defects and in proper specification.

Various Test on Aggregates & Cement

1.Crushing Value: -

The aggregate crushing fee gives the resistance of combination to crushing of aggregate under progressively carried out load. Crushing value could also be a measure of the mixture. The aggregates should therefore have minimum crushing value.

2.Impact Value: -

The mixture impact fee offers the measure of resistance of mixture to unexpected shock or effect on aggregates,
then a few aggregates differ from there resistance of slowly carried out compressive load

3.Abrasion Value: -

Test helps to figure out the abrasion value of coarse aggregates as per IS: 2386 (Part IV) – 1963.The apparatus utilized during this test are Los Angles abrasion testing machine, IS Sieves of 12 nos. cast iron or steel spheres approximately 48mm dia. and each weighing between 390 and 445g ensuring that the entire weight of charge is 5000 +25g and Oven.

4.Flakiness Index: -

The total amount passing the gauge shall be weighed to an accuracy of a minimum of 0.1 percent of the load of the test sample. The Flakiness Index is that the whole weight of the fabric passing the various thickness gauges or sieves, expressed as a percentage of the entire weight of the sample gauged.

5.Elongation Index: -

Elongation index test of an aggregate is that the share by weight of particles whose greatest dimensions is bigger than 1.8 times their mean dimensions. This take a look at is additionally relevant to aggregates having length larger than 6.3 mm.

6.Finess of cement: -

The fineness of cement could even be a measure of the dimensions of particles of cement and is expressed in terms of the precise area of cement. The fineness of cement is

measured because the load retained on a 90µm IS sieve over the whole weight of the sample.

7.Consistancy of cement: -

Consistency is mentioned because the facility to flow of a freshly mixed cement paste or mortar. The consistency of cement is additionally called as a typical consistency or normal consistency. a typical consistency test of cement is performed to hunt out the water content required to supply a cement paste of ordinary consistency.

8.Settingtime of cement: -

Setting time of cement doesn't match or compare cement setting time with which the concrete is formed. The concrete setting time mostly depends upon the w/c ratio, temperature conditions, quite cement, use of mineral admixture, use of plasticizer, especially, retarding plasticizer.

Mixing Of Materials

Mixing of materials in two types are as follows

1.Manual mixing method-In this type all work should be done by hand.

2.Mechanical mixing method-

In this method there are specific electrically operated rotating drums with blades for better work of material mixing should be used.

The casting of cubes-

Use 15x15x15cm size cubes which are properly fixed and apply oil neatly inside the cube. Fill the concrete without tamping.

Curing of cube specimen-

Rest the cube in the curing pond for 7,14 & 28 days. Before curing, please make sure that mark of days on cubes & note down the date of actual cube casting.

Tests on specimens: -

Compressive Strength-

This test gives us a thought about all the characteristics of concrete. With the assistance of this test, we will make sure whether Concreting has been done properly or not. and compressive strength is that the ability of fabric or structure to hold the hundreds on its surface with none crack or deflection. A material under compression tends to scale back the dimensions, while in tension, size elongates.

Split tensile strength-

It is necessary to work out the lastingness of concrete to work out the load at which the concrete members may crack. Furthermore, splitting lastingness test on concrete cylinder may be a method to work out the lastingness of concrete.

Flexural Strength-

Flexural strength of Concrete, also referred to as Modulus of rupture, is an indirect measure of the lastingness of unreinforced concrete. Modulus of rupture also can be defined because the measure of the acute fiber stresses when a member is subjected to bending. Apart from external loading, tensile stresses also can be caused by warping, corrosion of steel, drying shrinkage and gradient.

4.ADVANTAGES:

- In no fines, concrete shrinkage is very less as compared to other concrete
- Due to high porosity, there are less capillary action in this concrete,
- It is useful in lightweight structures.
- Thermal insulating properties are better than other concrete.
- No kind of especially making equipment is used in this concrete.

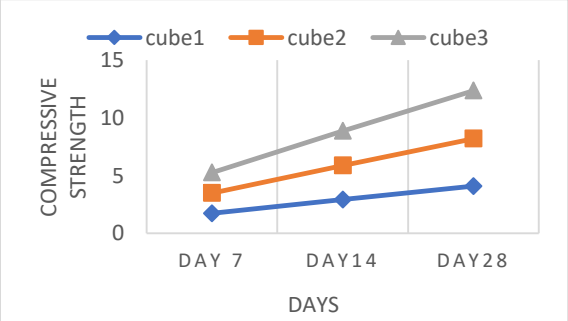
5. DISADVANTAGES:

- Difficult in providing the reinforcement.
- Frequent maintenance is required.
- Compressive strength is comparatively less.
- Required more time and experimental workers for the construction.
- It can’t be used for the construction of bridges, buildings and dams.
- Pervious concrete is not ideal for high traffic/speed areas.

6.RESULTS: -

Table 6.1 Compressive Strength of Block at 0.35 w/c ratio

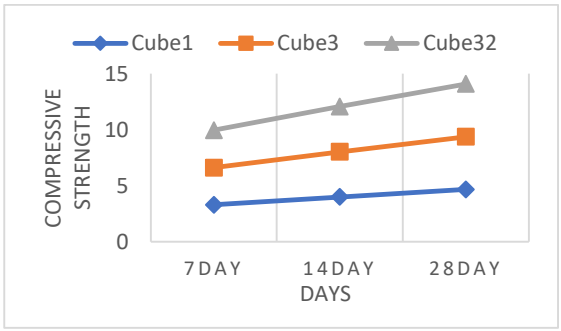
Mix proportion		Compressive strength (N/mm2)		
aggregate/cement Ratio	water/cement Ratio	7 Day	14 Day	28 Day
10.1	0.35	1.73	2.93	4.09
		1.76	2.95	4.12
		1.78	2.99	4.16



Graph1.Graph represents the Days/Compressive strength at 0.35 w/c ratio

Table 6.2: Compressive Strength of Block at 0.41 w/c ratio

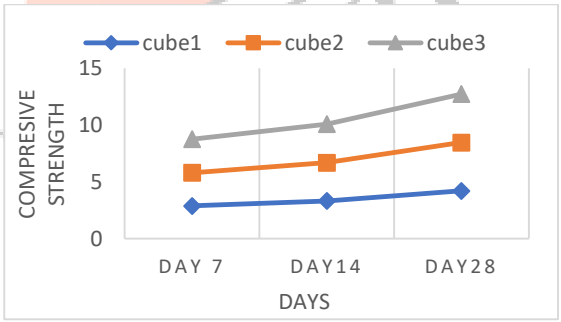
Mix proportion		Compressive strength (N/mm2)		
aggregate/cement Ratio	water/cement Ratio	7 Day	14 Day	28 Day
10.1	0.41	3.29	4.00	4.67
		3.32	4.03	4.70
		3.35	4.05	4.72



Graph2.Grapgh represents the Days/Compressive strength at 0.41w/c ratio

Table 6.3: Compressive Strength of Block at 0.45 w/c ratio

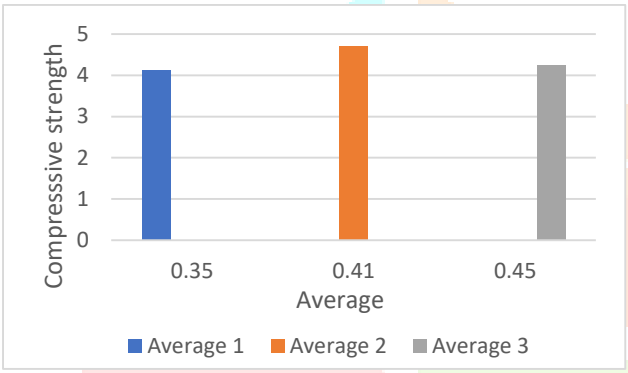
Mix proportion		Compressive strength (N/mm2)		
aggregate/cement Ratio	water/cement Ratio	7 Day	14 Day	28 Day
10.1	0.45	2.89	3.33	4.22
		2.92	3.37	4.25
		2.96	3.40	4.27



Graph 3. Graph represent the Days/Compressive strength at 0.45 w/c ratio

Table 6.4: Compressive Strength of Block at Average

Mix Proportion	Compressive Strength (N/mm2)				
aggregate/cement Ratio	water/cement Ratio	28 Days			Average
10.1	0.35	4.09	4.12	4.16	4.12
	0.41	4.67	4.70	4.72	4.7
	0.45	4.22	4.25	4.27	4.24



Graph 4. Graph represents the Average strength/ Compressive strength of block

7.CONCLUSION:

- The effect of water cement ratio has greater impact over the strength of no fine concrete as 0.41% water content gave more strength the other water content used in this study. Strength of no fine concrete increases with increase in water/cement ratio. From this study, 0.41 water/cement ratio was observed to be ideal for no fine concrete.[3]

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