



An Experimental Study on No Fines Concrete in M20 Greade 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. In this project the concrete cubes of (150x150x150mm) are casted with no fines and compressive strength of concrete should be evaluated. 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. 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. The compressive strength of this concrete is also lower than normal concrete. This concrete is mix with different ratios of aggregate and cement.

Keywords: Nofines concrete, pavements, pervious layer

Introduction

No-Fines concrete is a mixture of cement, water and a single sized coarse aggregate combined to produce a porous structural material. It has a high volume of voids, which is the factor responsible for the lower strength and its lightweight nature. No-fines concrete has many different names including zero-fines concrete, pervious concrete and porous concrete. No-Fines concrete consists of an agglomeration of coarse single sized aggregate covered with a thin layer of cement paste approximately 1.3 mm thick (Neville 1997)

Materials and Apparatus

- Cement
- Water
- Course aggregate
- Concrete moulds
- Tamping rods
- Weighing machine
- Hydraulic machine
- Slump cone
- Pichnomeeter
- V-cat apparatus

Methodology

Collection of materials:

Cement: The M20 grade of concrete is commonly used in various structural applications due to its balanced mix design, offering adequate strength and durability for typical construction projects.



Water: Water is the most important & least expensive ingredient of concrete. It plays an important role in mixing, laying, compaction, setting & hardening of concrete.



Aggregates: Aggregates are frequently applied as the raw material in concrete mixtures. Sand, gravel or crushed stone are considered as the most vital materials in the concrete mix and cover roughly 60% to 75% of the total volume of the concrete. The main objective of aggregate is to unite the concrete.



Physical tests on materials



Preparation of mix design

The mix design in this case was the determination of the ratio of aggregate, cement and water that possessed the most favorable properties. For this particular situation four trial mixes were designed.

Preparation of cubes



Testing of cubes



Experimental analysis and Results

Test Result of w/c ratio 0.4 for 7 Days compressive strength of No Fines Concrete [1:4]

SL.NO	AGE IN DAYS	WEIGHT OF BLOCK	LOAD IN KN	COMPRESSIVE STRENGTH (N/mm ²)	AVG COMPRESSIVE STRENGTH (N/mm ²)
1	7	7.980	260	11.555	11.555
2	7	8.060	240	10.666	
3	7	7.890	280	12.444	

Conclusion

The main conclusions that can be with draw from the study are as follows

- No-fines concrete with water/cement ratio ranging from 0.34 to 0.41 and aggregate/cement ratio of 4–8 were subjected to fast carbonation showing that these materials rapidly fail to provide alkaline conditions able to promote passivity of embedded carbon steel. The time of initiation of corrosion may be only few weeks when the material is exposed to the atmosphere.
- As far as the subsequent propagation of corrosion is concerned, electrochemical measurements showed that the corrosion rate can be.
- No fines concrete has emerged as a viable solution in the construction industry, offering several advantages such as thermal insulation, cost-effectiveness, and sustainability.
- Its unique composition, characterized by the absence of fine aggregates, makes it an attractive option for various applications, particularly in projects where lightweight and thermal properties are crucial considerations.

References

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