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AN INVESTIGATION ON STRENGTH AND DURABILITY OF CEMENT CONCRETE PARTIALLY REPLACED WITH GRANITE SLURRY

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Abstract: *Granite quarry slurry is the waste from rock preparing in quarries and crusher units. The fines are at introduced arranged by filling in infertile land causing genuine natural issues. On the off chance that this material is conceivable to be utilized for partial concrete replacement it is of benefit both economically and naturally. The impact on strength properties of concrete in replacing some bit of cement by quarry dust acquired from a nearby crusher unit is investigated. The examination work did incorporate a test examination on strength properties of concrete made with 5% to 20% substitution of concrete by quarry dust of under 75 micron molecule estimate. The tests were done to locate the compressive strength and flexural strength. Results demonstrated that up to 10 % substitution of concrete by quarry dust there was no decrease in compressive strength, flexural strength.*

Key words : concrete , granite slurry, compressive strength, flexural strength etc.

1.INTRODUCTION

Quick modern advancement causes major issues everywhere throughout the world. As of now India has taken a noteworthy activity on building up the frameworks, for example, express thruways, control ventures and modern structures and so on., to meet the prerequisites of globalization, in the development of structures and different structures.

Concrete assumes the key part and a substantial quantum of cement is being used in each development hones. Waterway sand, which is one of the constituents utilized as a part of the generation of customary cement, has turned out to be extremely costly and furthermore winding up rare because of consumption of stream bed. In the present examination, the solidified and sturdy properties of solid utilizing stone slurry were explored. Additionally, the utilization of stone slurry as substitution of bond diminishes the cost of solid creation. In the development business stream sand is utilized as a vital building material and the world utilization of sand in solid era alone is around 1000 million tons for every year making it rare and constrained. The exorbitant and non-logical techniques for mining sand from the waterway beds has prompted bringing down of water table and sinking of scaffold wharfs.

2. MATERILAS

2.1.1 Cement

In this experimental study, Ordinary Portland Cement 53 grades, conforming to IS: 8112-1989 was used. The different laboratory tests were conducted on cement to determine the physical and mechanical properties of the cement used are shown in.

TABLE 1

Physical properties	Results
Fineness	8%
Normal consistency	31.5%
Vicat initial setting time(minutes)	43mins
Vicat final setting time (minutes)	256min
Specific gravity	3.15
7-days compressive strength	39.65
28-days compressive strength	54.86

2.1.2 Aggregates

Locally available natural sand with 4.75 mm maximum size confirming to class II- IS 383 was used as fine aggregate, having specific gravity, fineness modulus and unit weight as given in Table 3 and crushed stone with 16mm maximum size having specific gravity, fineness modulus and unit weight as given in Table 3 was used as coarse aggregate. Table 2 gives the physical properties of the coarse and fine aggregates

Table 2: Physical Properties of coarse aggregate and fine aggregate

property	Fine aggregate	Coarse aggregate
Specific gravity	2.66	2.95
Fineness modulus	3.1	7.96
Surface texture	Smooth	--
Practical shape	rounded	angular

Table 2.3 Physical properties of Coarse Aggregate

Properties	**Values**
water absorption	**0.2 to 0.4 %**
Fineness modulus	**3.43**
Specific gravity	**4.05**
bulk density (gm/cc)	**2.20**

2.1.3 Water

Ordinary potable water available in the laboratory has been used.

3. Testing Procedures

3.1Compression Strength Test

A standout amongst the most essential properties of cement is the estimation of its capacity to withstand compressive strength. This is alluded to as a compressive strength and is communicated as load per unit range. One technique for deciding the compressive strength of cement is to apply a heap at a steady rate on a block (150×150×150 mm), until the point that the specimen comes up short. The pressure tests performed in this venture were finished as per IS standard 516 "Strategies for Tests for Strength of Concrete". The device used to decide the compressive strength of cements in this exploratory work was an all inclusive testing machine (UTM). For this investigation tests were tried for pressure testing at 28, 56,90 days of curing. The compressive quality of the solid regarding weight was then ascertained utilizing the Equation

$$fc=P/A$$

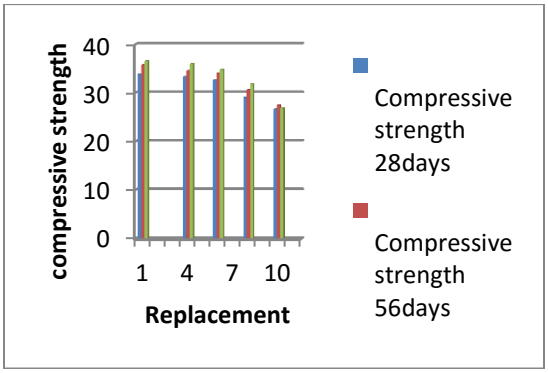
Where,
fc = Compressive Strength of Concrete, (Kpa or psi)
P = Maximum load applied (KN or lb), and
A = The cross-sectional area of sample (mm2 or in2)

3.2 FLEXURE TEST ON CONCRETE:

At the season of testing the cured barrel shaped examples are surface dried. It is then set along its length over the lower plate of the all inclusive testing machine (UTM) for flexure. The best plate is brought down till it touches the best surface of the example. The example is subjected to a 2 point stack by working the flexure testing machine at expanding rate. The dial gage perusing is noted when the example yields. From the quantity of divisions acquired from the dial gage understanding, we see the diagram gave by the producer to get the power connected in kgf. – "P"Flexure strength: ($P \times l/bd^2$).

RESULTS AND DISCUSSION

Compressive strength of concrete in N/mm2at different curing periods



SBA	flexural strength		
	28days	56days	90days
0	7.15	7.45	7.52
5	7.01	7.17	7.20
10	6.57	6.71	6.75
15	6.35	6.42	6.55
20	6.14	6.21	6.23

Flexural strength at different curing periods with w/c ratio is 0.44

GCS	Compressive strength		
	28days	56days	90days
0	33.92	35.76	36.60
5	33.36	34.56	35.96
10	32.72	34.10	34.84
15	29.16	30.69	31.93
20	26.7	27.55	26.98

5. CONCLUSIONS

1. From the consequences of the compressive strength the 5 % substitution level gives the more rough esteems for the solid with w/c proportion 0.44 and 0.45 when contrasted and the ostensible (0%) mix concrete. from this we can reason that the substitution level is protected.
2. The compressive quality of mortar arranged with Granite cutting slurry as incomplete supplanting of concrete reductions with increment in level of Granite cutting slurry .
3. The consequences of solid work uncovered that, the compressive quality, split elasticity, flexural quality and thickness of cement containing Granite cutting slurry have indicated diminishment. As the water concrete proportion expands, they diminishes somewhat.
4. Since Granite cutting slurry is a result material, its utilization as a concrete supplanting material diminishes the levels of CO2 outflow by the bond business and furthermore spares a lot of virgin materials. What's more its utilization settle the transfer issues related with it in the sugar enterprises.
5. Concrete with incomplete substitution of bond by Granite cutting slurry were prudent and have marginally less thickness in this way can be utilized at the place at which quality is of less significance and economy and low thickness solid thickness is required.

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