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EFFECT OF QUERY DUST AS A SAND REPLACEMENT IN PROPERTIES OF CONCRETE

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ABSTRACT -Common river sand is expensive due to excessive cost of transportation from natural sources. Also, large-scale depletion of these sources creates environmental problems. As environmental, transportation and other constraints make the availability and use of river sand less attractive, a substitute or replacement product for concrete industry needs to be found.Concrete assumes the vital part and huge quantum of cement is being used in each development rehearses. Normal stream sand is one of the critical element of cement is becoming costly because of unnecessary expense of transportation from sources. Likewise huge scope consumption of sources makes natural problems.To beat these issues there is a need of practical other option and inventive materials. Quarry dust is a waste gotten during quarrying process it has as of late acquired great consideration regarding be utilized as a viable filler material rather than fine total. Additionally, the utilization of quarry dust as the fine total reductions the expense of substantial creation as far as the incomplete substitution for regular waterway sand. Configuration blend of M40 grade concrete with substitution of 25%, ,50%,100% of quarry dust. For Laboratory examination droop test ,compressive strength, split-rigidity and flexural strength of hardened concrete are carried out. In this paper, the properties of hardened concrete using quarry dust were investigated.

***Key words* :** Compressive strength, quarry dust, hardened concrete, workability ,

I. INTRODUCTION

River sand has been widely used in Eldoret as a construction material for the manufacture of concrete. Quarry dust as a waste product from crusher operations, is considered by most construction sites as non-marketable and no environmentally friendly material.The overall

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economy of the concrete greatly depends on the cement content of the particular mix. Different researchers have established that the replacement of natural sand with crushed stone sand can result in reserve funds in concrete. Substitution of a piece of regular sand with Quarry dust in the development of cement is suggested provided that the degree of the subsequent fine total blend adjusts to the predetermined standards.In concrete, fine and coarse totals comprise around 80% of the all out volume. It is, subsequently, essential to acquire the right kind and great quality totals at site. The totals structure the primary grid of the substantial blends. The greater part of the totals utilized in Eldoret as fine totals are stream sand. Fine totals utilized for cement ought to adjust to the prerequisites for the recommended reviewing zone according to BS: 882 - 1982. The stone particles containing the sand ought to be hard and sound. . Total qualities of shape, surface, and reviewing impact usefulness, finish capacity, dying, siphon capacity, and isolation of new concrete and influence strength, firmness, shrinkage, creep, thickness, penetrability, and sturdiness of solidified concrete. Development and strength issues have been accounted for because of unfortunate blend proportioning and variation on grading. Fine aggregates should also not be covered with deleterious materials like clay lumps and should be clean. They should not contain organic or chemically reactive impurities. Natural or river sand may not conform to all the above requirements and may have to be improved in quality by washing, grading and blending.

II. OBJECTIVES

To establish the benefits of using quarry dust over river sand

Compressive strength

- Workability
- Durability
- Economic considerations

2.1 MATERIALS USED FOR THE WORK

CEMENT :- Ordinary Portland cement is used for this study. This cement is the most widely used one in the construction industry in India.

Sr.no.	Test	Reading
1.	Fineness Test	7.2%
2.	Initial and Final setting time	44min&114min
3.	Soundness	1.7mm
4.	Specific Gravity	3.15

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2.2 Aggregate And Fine Aggregates :- Course aggregates of 10mm and 20mm size is used for this study.

Sr.no.	Test	Reading
1.	Fineness modulus	6.86
2.	Specific Gravity	2.67
3.	Water Absorption	0.50%

2.3 Quarry Dust :- Quarry dust is obtained from sawargaon plant.

Sr.no.	Test	Reading
1.	Fineness modulus	2.90
2.	Specific Gravity	2.50
3.	Water Absorption	0.5%
4..	Surface texture	Rough
5.	Practical shape	Fine powder

III. EFFECT OF QUARRY DUST ON PROPERTIES OF CONCRETE

MIX	7 days In N/mm^2	14 days In N/mm^2	28 days in N/mm^2
CC	27.71	33.32	42.93
20SBA+80 S	27.92	33.85	44.78
30SBS+70 S	28.34	34.36	45.47
35SBA+65 S	28.48	34.52	45.69
40SBA+60 S	26.74	32.42	38.02
60SBA+40 S	23.27	28.21	32.20
80SBA+20 S	2.65	24.50	31.25
100 SBA	19.81	2351	22.72

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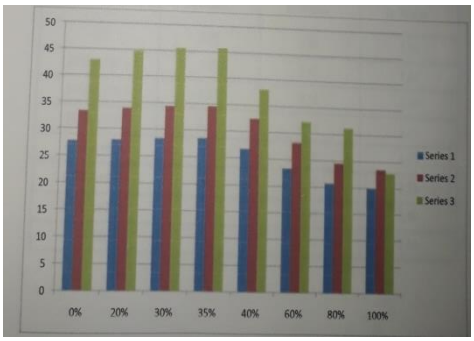

$$compressive\ strenght\ (N/mm^2 = \frac{\text{Ultimate load in N}}{\text{area of creoss section (mm}^2)}$$

a) Effect of quarry dust on split tensile strength :-

MIX	7 days In N/mm2	14 days In N/mm2	28 days in N/mm2
CC	3.07	3.26	3.92
20SBA+80 S	3.27	3.47	4.24
30SBS+70 S	3.32	3.35	4.30
35SBA+65 S	3.87	4.10	5.12
40SBA+60 S	2.91	3.09	4.27
60SBA+40 S	2.62	2.78	3.28
80SBA+20 S	2.34	2.42	2.80
100 SBA	1.80	1.91	2.56

$$Splittensilestrength\ = \frac{2PI}{\pi D}$$

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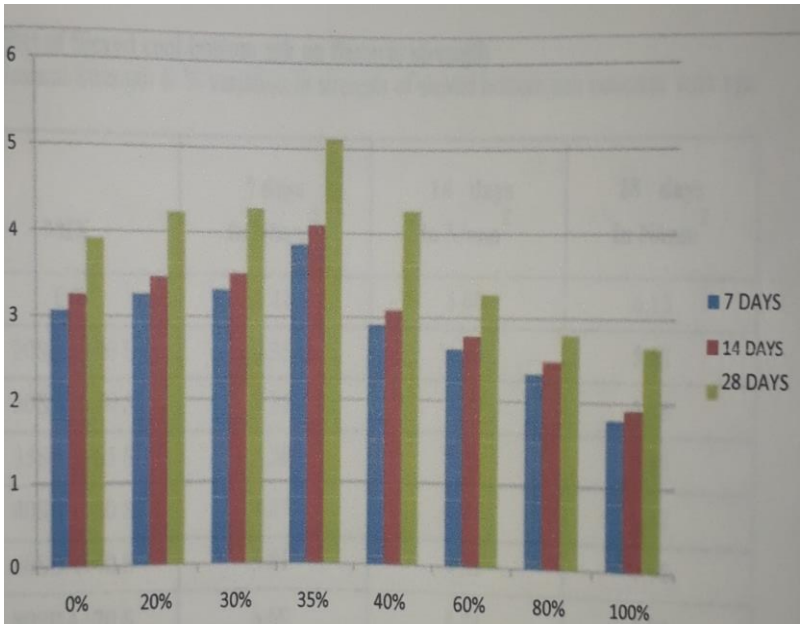

Fig. 1 Effect of quarry dust on split tensile strength

b) Effect of quarry dust on flexural strength:-

MIX	7 days In N/mm2	14 days In N/mm2	28 days in N/mm2
CC	4.44	5.00	6.31
20SBA+80 S	4.35	4.90	5.62
30SBS+70 S	4.35	4.97	5.58
35SBA+65 S	4.58	5.23	5.87
40SBA+60 S	4.27	4.87	5.42
60SBA+40 S	3.81	4.35	4.98
80SBA+20 S	3.69	4.21	3.90
100 SBA	2.77	3.16	3.01

$$Flexuralstrength\ (F) = \frac{\mathrm{PL}}{\mathrm{bd}^2} - 3$$

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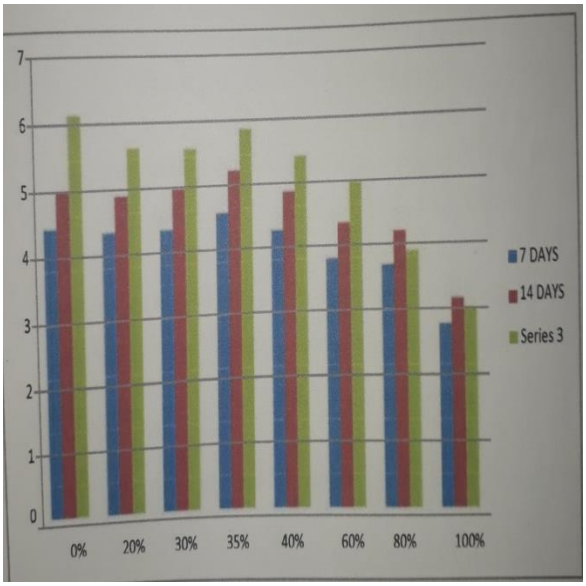

Fig. 2 Effect of quarry dust on flexural strength

IV. CONCLUSIONS

The research was carried out successfully considering the stated objectives and was completed within the time frame stipulated. From the analysis and design procedures carried out in this work, a few ends could be drawn as given underneath.

For a steady W/C proportion, concrete delivered with stream sand was 23% more grounded than the substantial delivered with quarry dust .This was basically because of the limit of stream sand to have the option to make up for the shortcomings in substantial better than quarry dust. Anyway with mixing of quarry dust with stream sand, the distinction in compressive strength was exceptionally negligible. The outcomes show that quarry residue can be utilized really to supplant normal sand in concrete and the utilization of a specific level of quarry residue can additionally upgrade its quality. Further examination ought to be directed on substantial class 30 and 40 to lay out on the off chance that the discoveries adjust to the consequences of this exploration. The quarry dust from sawargaon quarry has a higher sufficiency esteem contrasted with waterway sand and subsequently it is prescribed to be used in road construction because, since it is more durable, it will resist abrasion effectively. It is recommended that the organic test should be done on both quarry dust and river sand to determine the amount of

organic content in each.In the production of concrete, it is highly recommended that quarry dust be blended with river sand to improve on its workability and compressive strength.

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