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Partial Replacement of Aggregate by Utilization of Waste Stone Dust and Coconut Shell

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Abstract: ***The large amount of red sand stone dust waste during its production for industrial purposes as an available construction resource has not only diminished but also created a threat to our environment. Indeed, the dumped waste negatively affects the aquifers. Therefore, a better way of its recycling may be its use in the manufacture of concrete products during construction as a substitute for sand in a fixed and safe proportion. The current work is an explanation of experimenting with concrete mix of grades M15 and M20 by replacing approximately 30% sand. A constant water/cement ratio was followed during the experiment and by comparing the compressive strength results. With the help of this project report, we can find an appropriate operation for a particular sample of red sandstone dust. This reduces the need for a large area for disposal of redstone dust which in turn causes significant environmental damage. The usefulness of red sandstone powder in a particular work of mixing grades M15 and M20 of concrete as a replacement for cement and sand has been proven within the framework of the significant results obtained.***

Workability of concrete is the ease with which concrete can be handled, placed and transferred. The workability of concrete depends on many factors, but water plays a major role. The amount of water added a little more or a little less can affect the workability of the concrete. Industrial waste such as red stone powder can replace sand in the event that the availability of sand is less and far from the site. Therefore, redstone powder can be used by replacing a fixed percentage of sand, not only to maintain project economy, but also to manage industrial waste.

Keywords: conventional concrete, lightweight concrete, coconut shell, coconut fibre, red stone dust.

I. INTRODUCTION

Powdering of red sand stone from stone crushing zones leads to the problem of its meaningful disposal. The most effective way is to substitute the cement and sand with it in M-15 and M-20 (i.e. 1:2:4 and 1:1.5:3 proportions) grades of concrete which facilitates the solid waste management of Redstone powder and its recovery. From open area where it can be the cause of environmental pollution. Selection of concrete with their amounts in order to produce a concrete of required strength, durability and workability as inexpensively as possible, is what we called as concrete mix design the necessary performance of concrete in its plastic and hardened states governs the proportioning of its ingredients. Non workable plastic concrete cannot be properly placed and compacted .Hence workability exercises prime importance. The compressive strength of hardened concrete being and index of its other properties are affected by the factors like quality and quantity of cement, water and aggregates, batching and mixing, placing, compaction and curing. The cost of materials, plant and labour make up the cost of concrete .cement, several times costly ingredients than the aggregate, its create always the cost variation. Thus the mixture produced should be as lean as possible. Rich mixes result in high shrinkage and consequently the cracking in the structure. Cracking is caused due to high heat of hydration evolved.

The cost of materials required to produce a minimum mean strength (i.e. characteristic strength which is specified by designer) depends upon the actual cost of concrete. It‟s aquality control measure this measure may be an economic compromise depending upon the size and type of job .The cost of labour may increase in case of a concrete mix with in sufficient workability because the high expenditure of labour arises to obtain a degree of compaction with available equipments.

II. OBJECTIVE

In this project our objective is to study the influence of partial replacement of cement with red sand stone powder, and to compare it by the compressive strength of ordinary M15 and M20 grades of concrete. We are also trying to find the percentage of red sand stone powder replaced in concrete that makes the strength of the concrete maximum. The aim has to be achieved through addressing the following.

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The above goal was achieved with the following specific objective.

1) Study the engineering properties and characteristics of the red stone dust samples collected.
2) Investigation into the strength increase of composite material aspects connected with the one of the red stone dust specimen collected.
3) Establishment of greater suited combinations of red stone –lime composition for compressive strength test under laboratory conditions.

III. EXPERIMENTAL METHODOLOGY

A. Los Angeles Abrasion Test On Coarse Aggregates

1) Collect the 5 kg sample of locally available aggregate of 10.00-14.5 mm size grade of "A" this aggregate sample dried in oven at 1080C.
2) The sample is put in the drum of the los angels testing machine and put 12 steel balls in the drum.
3) The drum is rotated for about 500 revolutions at 30-30 rpm. Sample is indifferent from the drum and sieved on no. 12 after being rotated.
4) The retained sample on the sieved is washed and dried at the temperature of 1070C.after the sample cool down weight of the sample are taken.

In this experiment the weight of sample taken is 5 kg after testing the sample weight reduces to 4.190 kg and loss of weight is taking place is 0.81 kg from this test the percentage abrasion is 16.2 is calculated which is suitable for making the concrete sample for further experiment



FIG.; - 1 Los Angles Apparatus

Aggregate size (mm)	Weight of sample before testing(kg)	Weight of sample after testing(kg)	Loss in weight (kg)				
14-12.5 mm 12.5-9.5mm	5	4.190	0.81				

PERCENTAGE ABARASION	$\frac{0.81 \times 100}{5}$	16.2%

B. Impact Test On Coarse Aggregates By Impact Testing Machine

Firstly collect the sample of locally available coarse aggregate of size 20mm. This aggregate passed from 12.5mm IS sieve and retained by 10mm IS sieve. the weight of material which is passed by 12.5mm sieve and retained 10mm sieve is W_1 350gm i.e. W_1
The cup of impact testing machine fixed in lower end properly.
the cup is filled with this aggregate in three layer by proper tamping with tamping rod.
After placing sample 25 strokes should be apply .
The sample is passed by IS sieve of 2.36mm .
The sieved material weighed the weight of material is 123gm. i.e W_2
In this experiment the sample of aggregate is taken of 3.50kg after placing in impact testing mould and testing the sample weight reduces to 1.23kg and the loss of weight is taking place 2.27 kg from calculation the value of impact in percentage is 35. This is suitable.



FIG. :-2 Impact Test Appratus

Aggregate size (mm)	Weight of sample before testing(kg)	Weight of sample after testing(kg)	Loss in weight (kg)
In between 10mm to 12.mm	3.50	1.23	2.27

Impact value	$\frac{1.23X100}{3.50}$	35%

IV. DISCUSSION

Utilization of waste red sand stone powder in construction industry reduces the use of fine aggregates and thus reduces the construction cost and storage material with mixing of this material by replacing the sand in cement concrete give higher compressive strength compared to other ordinary cement concrete.

In this work red sand stone was researched as supplementary development materials. Concrete blends have been set up by including this material. Concrete blends shaped are tried for compressive quality and contrasted and normal bond concrete values.

V. CONCLUSION

Following are the conclusions of the present work –

1) When 30% of red sand stone powder blended by supplanting sand in M15 evaluation of cement the compressive quality is minimizes around 70%.

2) At the point when 30% of red sand stone powder is blended by supplanting sand in M20 assessment of concrete the compressive quality augmentation around 25%.

3) Hence from the above result it is recommended to replace sand about 30 percent with red sand stone for higher compressive strength in M20 grade of concrete.

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VI. FUTURE SCOPE AND STUDY

Couple of more properties for looking at the execution of sand made utilizing waste material that is red sand stone material with normal Portland bond is required to be tried. Monitoring the impact of waste material over the distinctive physical and substance properties of sand is required to evaluate as suitable material among the accessible materials.

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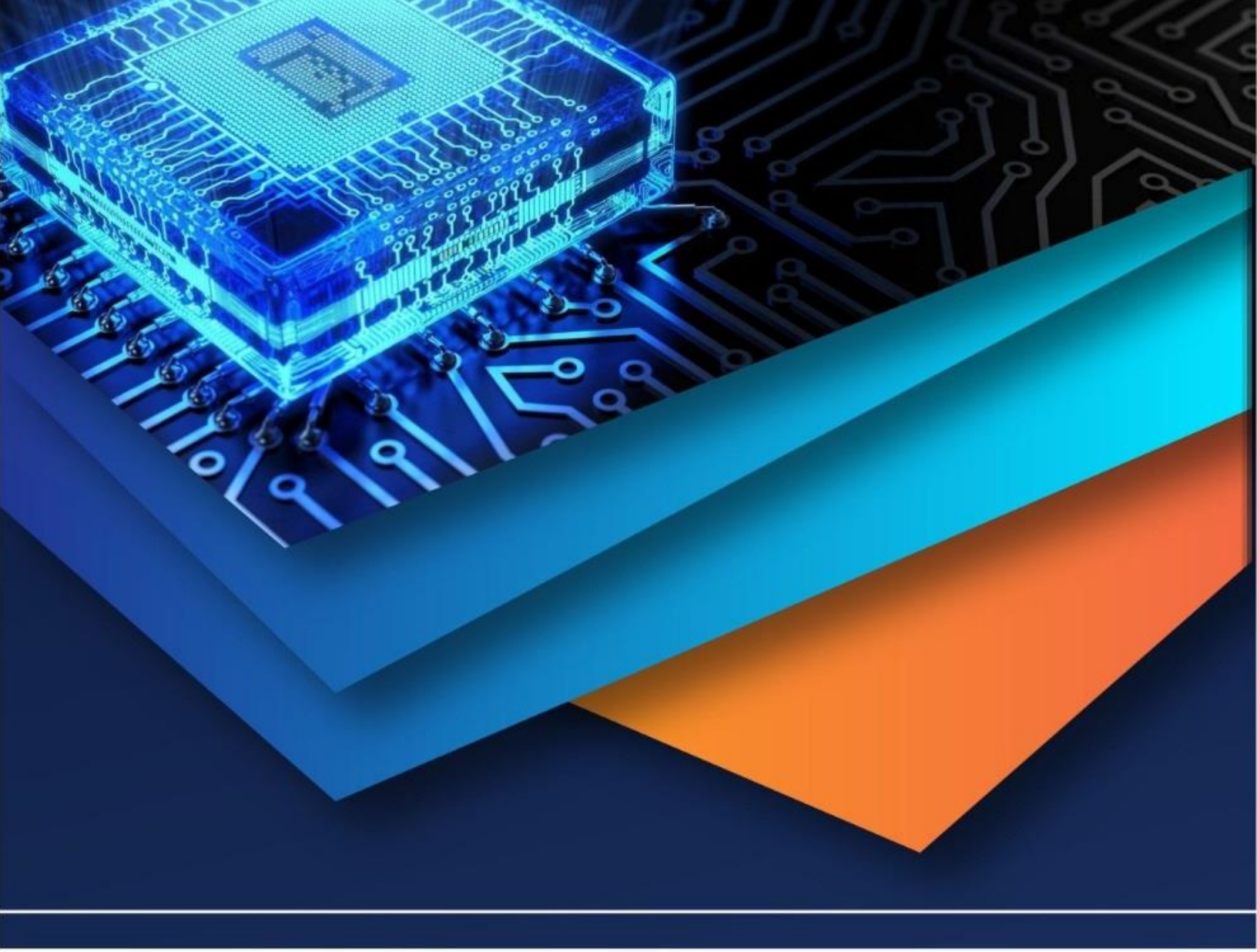
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