

REPLACEMENT OF FINE AGGREGATE WITH SAWDUST

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ABSTRACT

This experimental study is aimed to create a concrete mixture consisting of sawdust which replaces the fine aggregate. It is also used to analyze the effect of sawdust concrete in terms of workability, adhesion of aggregates and etc. After preparing the concrete block, the difference in weight between the original concrete and the sawdust concrete block is also tested. The sawdust is mixed in definite proportions with the concrete. And then various tests are conducted for fresh concrete as well as hardened concrete. The results might indicate that both the density and the compressive strength may decrease with respect to the percentage of sawdust mixed in the concrete. The sawdust can be used as an aggregate in both non- structural lightweight concrete and structural concrete.

Keywords: - Sawdust, lightweight concrete, waste utilization, slump cone, Vee bee, flow table, compression factor test

I NTRODUCTION:-

Concrete is the most widely used construction material all over the world .with innovations in science and technology in construction industry, the scope of concrete as a structural material has widened. Concrete is strong compression but it is weak in tension and flexure, The utilization of concrete is increasing at a higher rate due to development in infrastructure and construction activities all around the world. River sand has been the most popular choice for the fine aggregate component of concrete in the past, but over use of the material has led to environmental concerns, Attempts have also been made to reduce the cost of the total construction cost by investigating and ascertaining the usefulness of sawdust. Generation of wood wastes in sawmill is an unavoidable environmental pollution and hence a great efforts are made in the utilization of such waste .Thus, this research investigates the potential use of wood sawdust wastes to produce a low-cost and lightweight composite for construction and engineering purpose.

Objectives:

- Our experimental research tries to implicate that sawdust-cement-gravel mix has an equal advantage like the standard mix of cement-sand-grave
- To cast specified number of cubes, cylinder and beams by replacing fine aggregate with sawdust by 1%, 2%, 3% & and to compare their property with standard mix(M20)

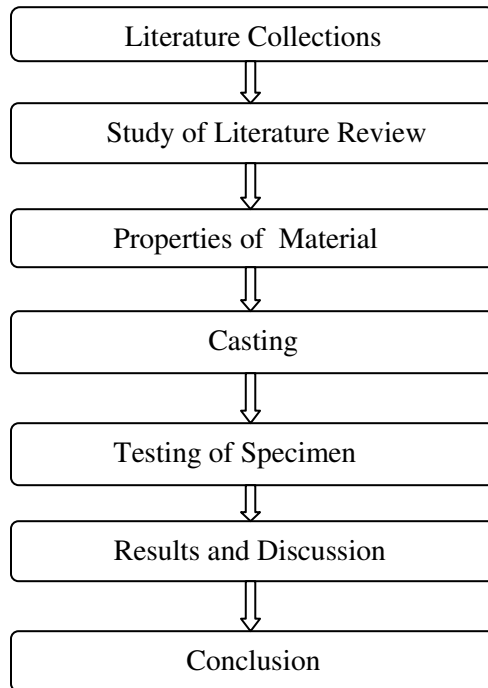
- To compare the strength characteristics of normal concrete and concrete with Quarry dust and Saw dust.

Scope:

- 1) To provide an alternate light weight material
- 2) To compare the compressive strength of the saw dust with the conventional mix.

METHODOLOGY

The methodology clearly shows the process which have been carried out in this work. The step by step process of this project is explained in the flow chart.



Work Methodology

Properties	Coarse aggregate	Fine aggregate	Saw dust
Max size mm	20	4.75	4.75
Specific gravity	2.69	2.62	0.27
absorption	0.5	1	2

Physical properties of materials

CEMENT:-

Ordinary Portland cement grade 53, conforming to IS11269-1987[12].Cement must develop appropriate strength :

S.NO	PHYSICAL PROPERTY	TEST RESULTS
01	Standard consistency	25.2%
02	Fineness of Cement(%)	6.4
03	Specific Gravity	2.14
04	Initial setting time	40MINUTES
05	Final setting time	240MINUTES

WATER:-

Water used was normal water from the tap which was free from the salt and conforming the requirement of IS:456-2000

MIX PROPORTION MIX DESIGN:-

In this experiment the mix proportion is calculated for M20 grade of concrete for w/c ratio of 0.50 respectively by using IS:10262:2009 method of mix design maintaining a constant w/c ratio for control mix and by replacing 0,1%,2% and 3% of sawdust in concrete as shown in the table

MI X NO:	MIX DESIGN	W/C RAT IO	CEME NT (kg)	FINE AGGREGAT E (kg)	Sawdus t (kg)	COARSE AGGREGAT E	WATER(lit)
M1	Convexional concrete	0.5	1.95	4.1	0	5.44	0.97
M2	1% of saudust& 99% of opc	0.5	1.9305	3.69	0.41	5.44	0.97
M3	2% of sawdust &98% of coir	0.5	1.911	3.28	0.82	5.44	0.97
M4	3% of sawdust & 97% of coir	0.5	1.8915	2.87	1.23	5.44	0.97

RESULT AND STRENGTH:-**FRESH CONCRETE:-**

The test for the fresh concrete are slump cone test, compaction factor, vee bee consistency and flow test.

Below table is shown for this experimental investigations and the results as follows

MIX NO:	SLUMP(mm)	COMPACTION FACTOR(%)	VEEBEE (SEC)	FLOW %
M1	77	0.77	7.6	2.7
M2	72	0.74	8	34
M3	80	0.78	8.5	31
M4	70	0.82	8.7	30

HARDENED CONCRETE TEST:-

Here we are just doing only compressive strength test.To find the strength of the concrete.

CURING	0%	1%	2%	3%
7DAYS	15.21	16.25	17.40	17.42
14DAYS	18.5	22.15	21.93	22.62
28DAYS	20.23	23.25	23.72	25.25

CONCLUSION

Concrete produced using sawdust as partial replacement of sand has influence on the properties of the concrete. The result of the analysis carried out shows that the workability of concrete with partial replacement of sand with sawdust reduces at constant water-cement ratio; The compressive strength of saw dust upto 15% is almost similar to that of control mix. Weight of the sawdust concrete was reduced as compared with normal concrete and also become more economical. The compressive strength of cubes and cylinders of the concrete for all mix increases with age of curing

Literature review

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