International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 06 Issue: 06 | June 2019 www.irjet.net p-ISSN: 2395-0072

EXPERIMENTAL ANALYSIS ON COMPRESSIVE STRENGTH OF CONCRETE WITH TWD AND RCA

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ABSTRACT:- In this project main objective is to study of the compressive strength of concrete with the partial replacement of the coarse aggregate by recycled aggregate and fine sand with Teak Wooden Dust with the various proportion and to check the different properties of the concrete by comparing with the controlled concrete. The replacement of Fine aggregate (sand) with certain Teak wooden dust in concrete that makes the structure more light in weight. For making M20 grade of concrete replacing of the coarse aggregate by recycled aggregate and fine sand with Teak Wooden Dust in 0%, 15%, 25%, 35% and 45%. The Workability, strength and durability test are studied in this project. The most important properties of concrete is the strength against compression. Also, increasing the teak wooden dust incorporation caused decreases in unit weights and strength values of mortars with a parallel increase in water absorption values at all ages.

Key words: Teak Wooden dust, fine aggregate, Recycled aggregate, Workability Test, Compressive Strength Test and Split Tensile strength Test

UNIT I INTODUCTION

Over recent years a speedy development within the field of concrete technology has taken place. Concrete has become the most popular construction material. Even folk have started exploitation concrete in a very huge means. Thus, supported natural minerals combination it's currently attainable to provide concrete with compressive strengths of up to 230 MPa. If natural mineral aggregate is replaced by high quality ceramic aggregate, compressive strengths upto 500 MPa can be achieved. Also over recent years but several comparatively new concrete structures and industrial product have shown a poor performance. It is great challenge, therefore both to utilize and apply and also further develop existing technology on high performance concrete to the benefit of both the concrete industry and the society. In recent study several new material ar use as a partial replacement material in concrete which may increase its properties of the concrete such material as sedimentary rock, marble dust, wooden husk, rice husk etc.

Fig 1. Formation of Recycled Aggregate

Teak is tall evergreen tree. It has yellowish blonde to reddish brown wood. It attains the height of about 30 meter. The fruit is a drupe. It has bluish to white flowers. The side of the tree is rough to the touch and also the inner surface has hairs. The fruit is closed by the bladder like ringlet, which is light brown, ribbed and papery. It is employed in the piece of furniture creating, boat decks and for indoor flooring. It is wide accustomed create the doors and house windows. It is resistant to the attack of termites. Its wood contains scented oil that is that the repellent to insects. The leaves yield the dye that is employed to color the garments and edible. Teak is perhaps the simplest protected industrial species within the world. This is the light weight material which can be carried easily. The chemical and physical properties of one tree to another tree saw dust will varies from one tree to another tree. In this project, the saw dust is carried out from sawmill in two forms

1. Powder form
2. Chips form

The powder form wooden dust is used for replacement of fine aggregate (sand) with a treatment, this is named as Dry TWD. The chips form or skin form of TWD is used to replacement for cement after a burning process this form of TWD is named as TWD Ash.

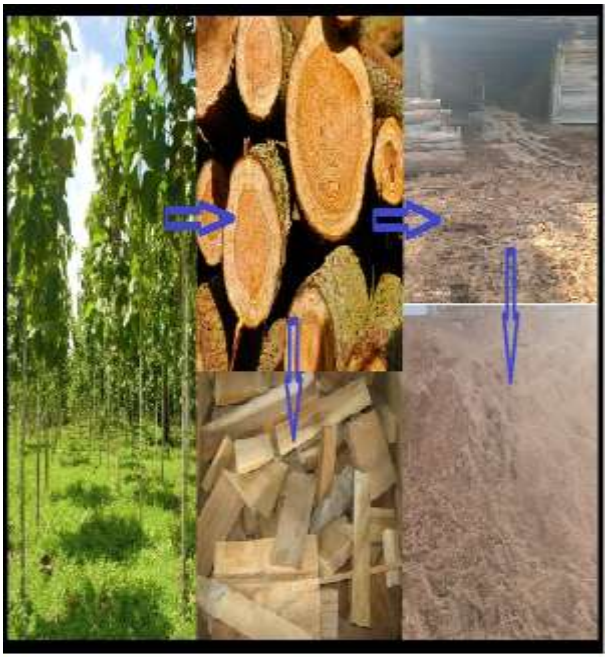


Fig. 2 Formation of Teak Wood Dust (TWD)

Now in this work we use Teak Wood Dust in Place of fine aggregate and Recycled Aggregate is used in place of Coarse aggregate. And applying test on following material and find the compressive strength of material with different percentage mixing material.

UNIT II LITERATURE REVIEW

For the work we are studied many of research papers but some papers are very useful so we are adopting following papers for work as a reference As per Mr. Goudappa recycled aggregates concrete utilizes materials from concrete and masonry constructions. Reuse of demolition waste avoids the problem of waste disposal and is also helpful in reducing the gap between demand and supply of fresh aggregate. Mix designs can be made using recycled aggregate for structural concrete elements instead of disposing off the recycled concrete to achieve economy. Based on the results Mr. Goudappa obtained from the experiment, the compressive of the recycled aggregate concrete is found to be lower than the natural aggregate and the strength of recycled aggregate concrete can be improved by the water and acid treatments. after experiment result Mrs. Thivya and Mr. Yokesh found that, with 10% and 20% replacement of coarse aggregate by recycled aggregates a maximum compressive strength which is more than the conventional concrete was obtained. Further augmentation of concentration of Bacillus Subtilis to the % of Recycle Aggregates could further raise the strength of concrete. As per Mr. Gopinath, Prof. K. Anuratha etal For same grade of mortar, Compressive strength achieve 91%, 80% and 78% for 5%, 10% and 15% replacement of Sawdust Ash. As per Ushama Z etal Flexural strength increased about 8% when using 50% limestone waste and 15% as admixture enhancement the compressive strength. The substitute of the limestone in place of coarse aggregate is probable without admixture then it can diverse upto 50% but after that the strength reduces and with admixture it can be beyond the 50%.

UNIT III MATERIAL AND METHODOLOGY

CEMENT

Cement is a binding material, a substance that sets and hardens independently, and can bind other materials together. OPC is used.

SAND

Sand is a naturally occurring granular material composed of finely divided rock and mineral particles. In terms of particle size as used by geologists, sand particles range in diameter of 2 mm.

AGGREGATE

20mm ranked combination of irregular shape is employed.

TEAK WOOD DUST

Teak Wood Dust (TWD) is the waste material from the timber saw mills. Where the timbers are sawed for the specific purpose and the waste powder which extract from them is called saw dust. The TWD is acquired in abundance in tropical countries. This TWD is used as fuel limitedly. The main method of disposal is by open burning method. In some countries, the usage of TWD for the construction has been in process for several years ago.

UNIT IV RESULT AND DISSCUSSION

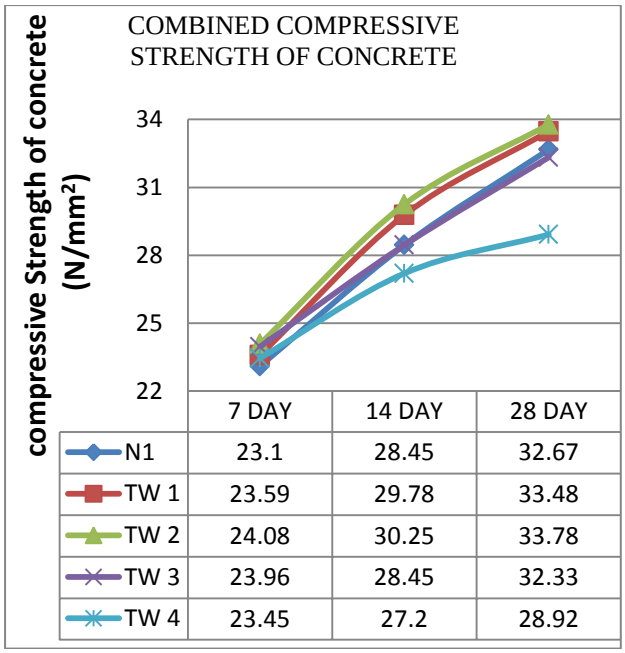
COMPRESSIVE STRENGTH OF CONCRETE

Compressive Strength Of Sample - 1: Sand replaced by Teak Wood Dust with different percentage

S.No	Name	Teak Wood Dust		Average Compressive strength In N/mm sq		
		%	QTY	7 Days	14 Days	28 Days
1	N_1	0	-	23.1	28.45	32.67
2	TW_1	15	92.1	23.59	29.78	33.48

3	TW 2	25	153.5	24.08	30.25	33.78
4	TW 3	35	214.9	23.96	28.45	32.33
5	TW 4	45	276.3	23.45	27.2	28.92

as per test result graph is ploted between compressive strength and number of days



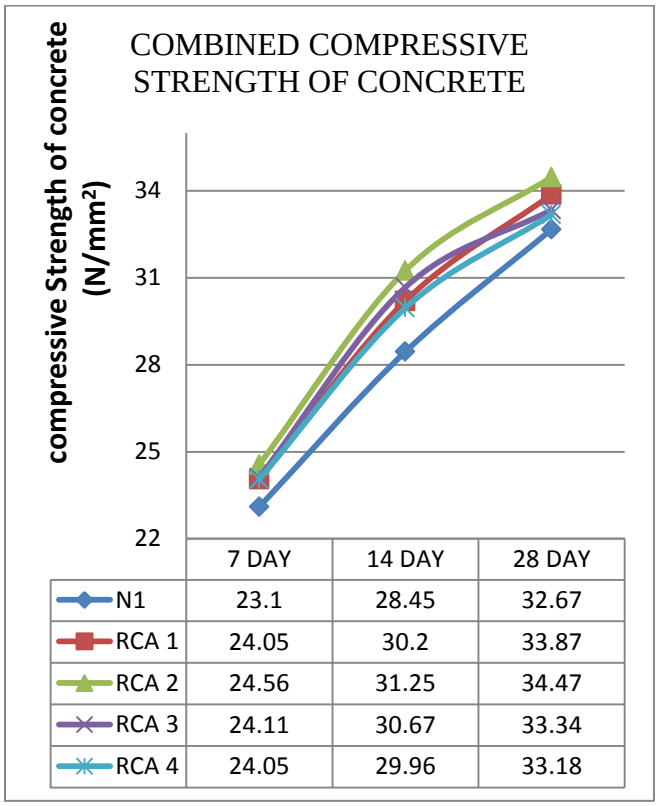
Graph 1. Combined compressive strength of concrete for Sand replaced by Teak Wood Dust with different %

It is noted that the replacement of sand with teak wood dust in various proportions gives the variations in results. The graphical representation of compressive strength results shows that the strength increases upto a limit, then it starts decreasing. At 25% of replacement of sand with teak wood dust gives the maximum result. By using teak wood dust the strengths increases by 2.28% with respect to normal concrete.

Compressive Strength Of Sample - 2: Coarse Aggregate replaced by Recycled Aggregate with different percentage

S.No	Name			Average Compressive strength In N/mm sq		
		RCA		7 Days	14 Days	28 Days
		%	QTY			
1	N_1	0	0	23.1	28.45	32.67
2	RCA 1	15	190	24.1	30.2	33.87
3	RCA 2	25	316	24.6	31.25	34.47
4	RCA 3	35	442	24.1	30.67	33.34
5	RCA 4	45	569	24.1	29.96	33.18

as per test result graph is plotted between compressive strength and number of days



Graph 1. Combined compressive strength of concrete for Coarse Aggregate replaced by Recycled Aggregate with different percentage

It is noted that the replacement of aggregate with recycle aggregate in various proportions gives the variations in results. The graphical representation of compressive strength results shows that the strength increases up to a limit, then it starts decreasing. At 25% of replacement of sand with teak wood dust gives the maximum result. By using teak wood dust the strengths increases by 2.18% with respect to normal concrete.

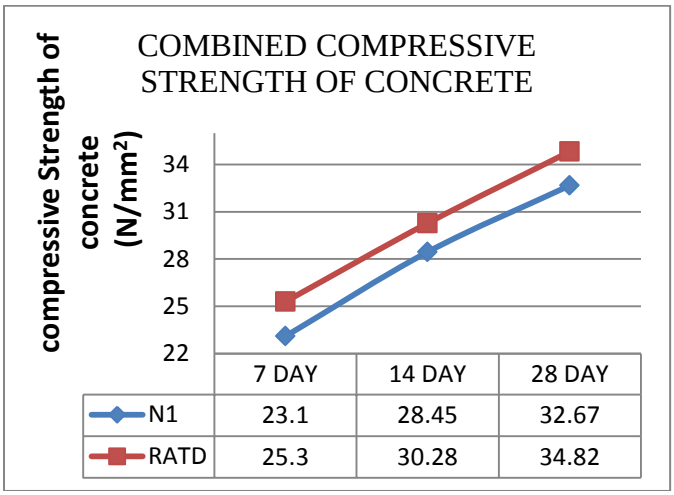
Compressive Strength Of Sample - 3: Sand replaced by Teak Wood Dust and Coarse Aggregate replaced by Recycled

From all the above results it is found that at 25% replacement of sand with teak wood dust and 25% replacement with coarse aggregate with recycled aggregate gives maximum strength. Thus by using both the

combination the new concrete is made and compared with normal concrete at 7th day, 14th day and 28th day.

S.No	Name	Quantity per cubic meter (Kg)		Average Compressive strength In MPa		
		Teak Wood Dust	RCA	7 Days	14 Days	28 Days
1	N	0	0	23.1	28.45	32.67
2	RATD	153.5	316	25.3	30.28	34.82

As per test result graph is plotted between compressive strength and number of days



Compressive Strength of New Concrete

It is noted that the new combination of concrete has more strength than the normal concrete. The strength of normal concrete and new concrete at 28th day of curing is 32.67 MPa and 34.82 MPa respectively. The strength is increases by 6.17%.

UNIT V CONCLUSION

1. From the test result it is observed that the Workability of concrete with partial use of teak wood increases.
2. The Compressive Strength of partially replaced sand by teak wood in concrete of grade M 20 for proportions of 0%, 15%, 25%, 35% and 45% are 32.67 MPa, 33.48 MPa, 33.78 MPa, 32.33MPa and 28.92 MPa respectively at 28th day of curing. The Compressive Strength increases upto 35% of use of teak wood further it starts decreasing.
3. The Compressive Strength of recycled aggregate by aggregate in concrete of grade M 20 for proportions of 0%, 15%, 25%, 35% and 45% are 32.67 MPa, 33.87 MPa, 34.47 MPa, 35.34MPa and 34.18 MPa respectively at 28th day of curing. The Compressive Strength increases upto 35% of use of recycled aggregate further it starts decreasing.
4. From the above result, we understood that 25% of partial replacement of teak wood dust as well as recycled aggregate gives good result. Thus by using both material with 25% replacement is compared with conventional concrete.
5. The compressive strength of concrete with new combination is 34.82MPa whereas the strength of conventional concrete is 32.67MPa. The strength is increased by 6.17%.

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UNIT V BIOGRAPHIES

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