RECYCLING OF CONCRETE WASTE AGGREGATE

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Abstract - *The protection of the environment is a basic factor, which is directly connected with the survival of the human race. Parameters like environmental consciousness, protection of natural recourses, sustainable development play an important role in modern requirements for construction works.*

Consumption of high amounts of energy for the production, transport, use of raw materials and final ones, as cement and concrete. The objectives of this study are to check the effects on properties of concrete due to reuse of old coarse aggregate such as compressive strength. To check the utilization of old coarse aggregate for casting of concrete. Consumption of fresh coarse aggregate from the it conclude that after using old used aggregate there is no change in compressive strength of concrete that means we gat desired strength of concrete mix.

The result shows that the effectively utilization of old used aggregate up to 25% there is consumption of fresh aggregate achieved . Reduction of cost of purchasing fresh aggregate. If the old concrete is nearby site, the transportation cost also minimized

***Key Words*: Casting beam ,Breaking,HCL,Wash,Test**

1.INTRODUCTION

Waste concrete:-The protection of the environment is a basic factor. Which is directly connected with the survival of the human race, parameters like environmental consciousness, protection of natural recourses, sustainable development play an important role in modern requirements for construction works. Construction materials are very significant in our lives, because we spend 90% of our time in buildings or Infrastructure (roads, highways, bridges, etc.). Takes 50%of raw materials from nature;

- Consumes 40% of total waste.
- Creates 50% of total waste.
- Use of high amounts of raw materials

which result in the decrees of available natural resources which is continuously sub- graded.

Consumption of high amounts of energy for the reduction, transport, use of raw materials and final ones , as cement and concrete.Hence we try for avoid this reasons recycled of aggregate from casted beam.First we crushed the casted beam and sorted out aggregate and washed out with HCL and then tested for their basic properties.Then casted again beam with these recycled aggreagate and then final again tested for their basic properties.Compare the both testing reading .

Objective of the study

To check the effects on properties of concrete due to reuse of old coarse aggregate such as compressive strength. To check the utilization of coarse aggregate for casting of concrete. Consumption of fresh coarse aggregate.

1.1Reuse concrete

The growing environmental concerns, increasing scarcity of landfills, rapidly depleting sources of quality aggregate in some regions coupled with the increasing haulage and growing landfill costs are the driving forces promotion the recycling of concrete demolition waste in new concrete. . Out of the over 2 billion tons of aggregate consumed each year in the us , only 5% comes from recycled sources such as demolished concrete. About 300 million tons of construction and demolition (Cand D) waste is generated in the us each year. About 50% of this is recovered for recycling, and the rest is land filled. A considerable proportion of recycled aggregate is used as road fill. The broad use of recycled aggregate in concrete is hindered by its higher water absorption (two to three times that of normal aggregate) and the increased shrinkage of the resulting recycled aggregate concrete. these drawback result largely from the old mortar/cement past clinging to the surface of recycled aggregates as shown schematically in

according to the volume percentage of the old mortar attached to the surface of aggregate varies between 25% and35% when concrete with natural gravel is reduced to 16-32 mm practice size, about 40% in the case of recycled aggregate with 8-16 mm particle size, and near 60% in recycled aggregate with 4-8 mm particle size According to Japanese studies, approximately 20% of cement paste is attached to the recycled aggregate with 20-30mm particle size. Nixon has concluded that the most significant difference between recycled aggregate. Found that the water absorption capacity of recycled aggregate reflects aggregate and virgin aggregate is the markedly higher water absorption of the recycled aggregate reflects on the amount of cement paste adhering to the surface of the aggregate particles.

1.2 Studies on Recycled Aggregate

Recycled aggregate concrete passing 4.76 mm sieve is not recommended for general use in concrete because it usually has an adverse effect on water demand and may contain increased levels of contamination. in specific circumstances where there is a high degree of control (e.g. fines from reclaimed product at a precast concrete works), 10% replacement of natural sand can be made without adverse effect on the product. Recycled aggregates, particularly recycled masonry aggregates, typically have a higher porosity than natural aggregates. Because of this, concrete with recycled aggregates absorbs a higher amount of moisture than ordinary concrete. The relatively high water demand of recycled aggregates well has their impact on shrinkage. However, due to the moisture absorption in the initial stages of hydration. In case of total replacement of natural aggregates by recycled masonry aggregates, ultimate shrinkage may on average be about 40% higher. Concrete with recycled masonry aggregates also presents an increased creep (15-40%) and a decreased modulus of elasticity (10-30%). The recycled aggregate concrete can provide strength equivalent to a corresponding concrete with natural aggregates, provided the cement content is increased, typically by 7.2% for 40 MPa concrete. Compressive strength of concrete containing recycled aggregate is dependent upon the strength of the original concrete from which the recycled aggregate was made. Concretes compressive strength gradually decreases as the amount of fine recycled aggregate increases. The reduction is reported to be between 5% and 24% when just coarse recycled aggregate was used and between 15% - 40% when all of the recycled aggregate (including the fine fraction) was used. Strength reduction become more significant when the fine recycled aggregate content surpasses 60% of the total fine aggregate. Recycled aggregate concrete has around the same or 10% less flexural strength than concrete containing natural aggregate

2.METHODOLOGY

Compressive strength rest of concrete

Title- To determine the compressive strength of concrete .

- Stepwise procedure (as per IS : 4031)

Preparation of test specimen

For tree cubes , take the quantities of material as follows-

Cement -4.5

Sand - 6 kg

Coarse aggregate – 12kg

Water – according to requirement

Mix the comet , sand and conies aggregate with trowel. Then add water to the mixture of cement, sand and coarse aggregate and mix it until the mixture is obtained.

1. Apply thin layer of oil to the interior faces of the mould.
2. Place the entire quantity of concrete in the hopper of the cube mould and compact the same by tamping rod.
3. Keep the filled mould in the atmosphere offer 24 hours.
4. At ends of this period. Remove cubes from the moulds and immediately submerge in clean fresh water for 7 day and 14 days

- Testing :

1. Place the test cubes on the platform of compression testing machine.
2. Apply the loads on smooth surface on the cone steadily and uniform starting till the cubes fails.
3. Test one such cube at the end of seven days of curing. One cube at the end of fourteen days of

curing and if needed tree cubes after 28 days of curing .

4. Record the crushing load.
5. Calculate the compressive strength of each cube by deciding crushing load by crushing area of the cubes. The compressive strength shall be average strength of the three cubes for each period of crushing.

Test for 7 day of concrete

Type 1 – in these proportion of concrete 1:2:4 means 1 part of cement 2 parts of sand and 4 parts of coarse aggregate .

In 1st type, cement is 4.5 kg sand is 6kg and coarse aggregate is 12 kg.

		Preparation of Manuscript			
SR No.	Type	Proportion	Observation	Load KN	Strength in N/mm2
1	1	1:2:4	1	450	20

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		Preparation of Manuscript			
SR No.	Type	Proportion	Observation	Load KN	Strength in N/mm2
2	2	1:2:4	2	475	21.11

Type 3 : in 3rd type , cement is 4.5 kg , sand is 6 kg and fresh aggregate is 10.8 kg and old aggregate is 1.2 kg

		Preparation of Manuscript			
SR No.	Type	Proportion	Observation	Load KN	Strength in N/mm2
3	3	1:2:4	3	485	21.56

Test for 14 day of concrete

Type 1 – in these proportions of concrete 1:2:4 means 1 part of cement 2 parts of sand and 4 parts of coarse aggregate.

In 1st type, cement is 4.5 kg sand is 6kg and coarse aggregate is 12 kg.

		Preparation of Manuscript			
SR No.	Type	Proportion	Observation	Load KN	Strength in N/mm2
1	1	1:2:4	1	500	22.22

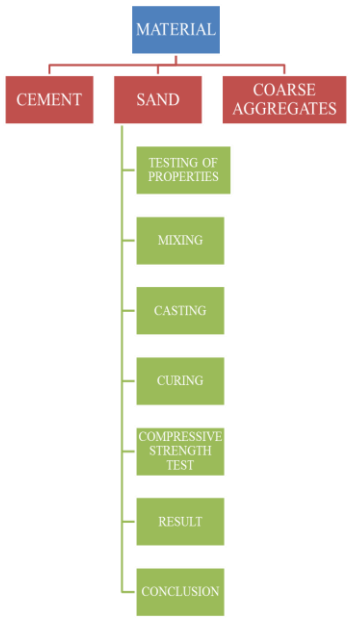
Type 2 – in 2nd type , cement Is 4.5 kg , sand Is 6 kg and fresh aggregate is 11.94kg and old aggregate is 0.6 kg

		Preparation of Manuscript			
SR No.	Type	Proportion	Observation	Load KN	Strength in N/mm2
2	2	1:2:4	2	475	21.11

Type 3 – In 3rd type, cement is 4.5 kg sand is 6kg and coarse aggregate is 10.8kg and old aggregate is 1.2 kg.

		Preparation of Manuscript			
SR No.	Type	Proportion	Observation	Load KN	Strength in N/mm2
3	3	1:2:4	3	550	24.44

Chart -1: Flow chart



3. CONCLUSIONS

From the result it conclude that after using old used aggregate there is no change in compressive strength of concrete that means we get desired strength of concrete mix.

The result shows that the effectively utilization of old used aggregate.

Up to 30% consumption of fresh aggregate.

Reduction of cost of purchasing fresh aggregate.

If the old concrete is nearby site, the transportation coat also minimized.

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