

Experimental Study on Concrete by using Seashell Powder as Partial Replacement for Fine Aggregate and Coconut Shell Powder Partial Replacement for Course Aggregate

Srinandhini.V.P.
PG Student

Sree Sastha Institute of Engineering Technology,
Chembarambakkam, Chennai, Tamil Nadu

Abstract:- In the construction, the cost of building materials are rising day by day, use of alternative material is a partial replacement of course aggregate and fine aggregate in solving part of natural materials. The waste materials are used coconut shell, sea shell, egg shell, ceramic waste, wood waste, marble waste, etc. Leaving these waste materials to the environment directly can cause environmental problems and affects the plants, affects the human body and disease. So here in our project we will use coconut shells powder waste as replacement of course aggregate and sea shell powder as replacement of fine aggregate. The grade of concrete M-20 with a ratio of proportion (1:1:2). The concrete made from coconut shells waste as course aggregate and sea shell powder as fine aggregate will be studied for compressive strength, tensile strength, and flexural strength, the percentage replacement will be 0%, 20%, and 40%. The use of sea shell powder and coconut shells powder in concrete reduces the cost of raw materials with high strength durability and light weight of concrete. So in our concept of the project is replacing the sea shell powder and coconut shells powder on concrete to achieve the required strength of concrete.

Keywords:- Compressive strength split tensile strength, flexural strength, coconut shell powder, sea shell powder.

I. INTRODUCTION

Concrete is the commonly used building material in the world. Concrete is the second most used substance in the world after water, and is the most widely used building material. The production of concrete is increasing to high infrastructure development and developing construction work in the world.

II. SEA SHELLS

The empty shell of a small animal that lives in the sea. A seashell or sea shell, also known simply as a shell, is a hard, protective outer layer usually created by an animal or organism that lives in the sea. The shell is part of the body of the animal. Empty shells are often found washed up on beaches by beachcombers. Seashell powder with 1700mm size. Seashell is an organic substance which is abundantly available in the seashores. Some common

examples of seashells include those from mollusks, barnacles, horseshoe crabs, brachiopods, sea urchins, and molted shells from crabs and lobsters.

III. COCONUT SHELLS

Coconut shell is the strongest part covered in coconut fruit. Coconut shell is located in between the coconut flesh and coconut husk. This shell is naturally created to protect the inner part of coconut. Shell is used to produce various handicrafts and other applications. Numerous industrial uses for coconut shell and coconut shell powder exist, such as additives, fillers, aggregates, reinforcement, water filtration, and energy production. The product is manufactured in sizes ranging from 80-200 mesh.

IV. MATERIALS COLLECTED



Fig. 1: Seashell powder



Fig. 2: Coconut shell powder



Fig. 3: Cement



Fig. 5: Course aggregate



Fig. 4: Fine aggregate



Fig. 6: Water

V. MIX PROPORTION

Material	kg/cum	ratio
Water	191.61	0.50
Cement	383.25	1
Fine aggregate	508.63	1.32
Course aggregate	1223.81	3.19

VI. TESTS



Fig. 7: Cubes of concrete replaced with seashell powder and coconut shell powder

A. COMPRESSIVE STRENGTH

The compressive strength curing days 7, 14, and 28 days. Test results details shown in table.

CONCRETE CLASS	COCOUNT SHELL POWDER REPLACE	SEASHELL POWDER REPLACE	AVG CS (mpa) 7 day	AVG CS (mpa) 14 day	AVG CS (mpa) 28 day
1	0%	0%	14	18.67	23.87
2	20%	20%	12.8	17.23	23.00
3	40%	40%	8	14	18.8

B. FLEXURAL STRENGTH:

The flexural strength curing days 7, 14, and 28 days. The results details shown in table

CONCRETE CLASS	COCOUNT SHELL POWDER REPLACE	SEASHELL POWDER REPLACE	AVG CS(mpa) 7 days	AVG CS(mpa) 14 days	AVG CS(mpa) 28 days
1	0%	0%	2.31	3.33	4.78
2	20%	20%	2.40	3.18	4.7
3	40%	40%	2.0	2.70	3.35

C. TENSILE STRENGTH:

The compressive strength test only 28 days for tensile strength.

CONCRETE CLASS	COCOUNT SHELL POWDER REPLACE	SEASHELL POWDER REPLACE	CS IN 28 days(mpa)
1	0%	0%	2.50
2	20%	20%	2.40
3	40%	40%	2.35

VII. CONCLUSION

The testing and 7, 14, and 28 days curing process are completed. After this partial replacement by required strength and light weight concrete can be achieved.

REFERENCES

- [1.] Research paper on IRJET-V61376.
- [2.] Research paper on coconut shell as a course aggregate replacement.