

# Evaluation Of Strength of Concrete by Partial Replacement of Fine Aggregates with Coco-Peat

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**Abstract:** In this project, it is proposed to study the behavior of concrete while adding coco-peat as partial replacement for sand. Generally waste materials obtained from industries are used as a replacement material. Like this, coco-peat is an organic material which is a waste material obtained from coconuts. Like a sponge, coco-peat can hold large quantities of water; it will reduce the rate of curing. The features of using the coco-peat in concrete are reduction in construction cost, minimum curing rate, light weight concrete, thermal insulating property etc. The M25 concrete specimens of conventional are made and the comparison of compressive strength between conventional concrete to the coco-peat concrete at 28 days of curing is also done in this project.

**Keywords:** coco-peat, eco-friendly, light weight concrete, compressive strength, Organic material,

## I. INTRODUCTION

Conventional concrete consist of sand as fine aggregate and gravel or limestone as coarse aggregate. Using there is a growing interest in materials as alternative fine aggregate materials and significant research is made on the use of many different materials as aggregate substitutes such as coal ash, blast furnace slag, coconut fibers and coco-peats. This type of use of waste material can solve problems of lack of aggregates in various construction sites and reduce environmental problems related to aggregate mining and waste disposal. The use of waste aggregates can also reduce the cost of the concrete production. The coco-peat has the capability to holds water itself for a long period of time. Using this property the curing time and amount of water required for curing process may become decrease. Compared to sand, coco-peat is a light weight material and hence the light weight concrete has to be made while using this coco-peat, as a partial replacement of sand. The river sand is one of the non-renewable source. But the coco-peat is one on the waste material. Hence it is eco-friendly in nature.

## LITERATURE REVIEW

1. An Experimental Study On Behaviour Of Concrete With Coco-Peat V Shenbaga Kumar, K Udhaya Kumar, R Ramesh, R Ram Kumar, Mrs. N. Venkateshwari
2. Improvement Of Strength Of Concrete With Partial Replacement Of Course Aggregate With Coconut Shell And Coir Fibres Anju Mary Ealias , Rajeena A P , Sivadutt S , Asst. Prof. Life John And Asst. Prof. Anju Paul
3. Coconut (Cocos Nucifera L.) Waste As Partial Coarse Aggregate Replacement For Concrete Hollow Blocks Jasper Milo T. Dela Cruz<sup>1</sup>, Anjelamari H. Dela Rea, Caryl Anne S. Magalong, Kristine Ann K. Poyaoan, Christian Michael P. Velarde, Christopher Malay
4. Durability Properties Of Concrete With Coir Pith As A Partial Replacement For Sand V. Priyadarshini
5. The Potential Of Recycled Aggregates And Coconut Fiber In The Production Of Concrete Stephen Adeyemi Alabi

## II. PROBLEM ANALYSIS AND LIKELY BENEFITS BASED ON LITERATURE REVIEWS

- A large amount of aggregates i.e. sand is required for construction work. But sand is nonrenewable and there is shortage of sand.
- Cost of sand is also high. Using coco-peat as a partial replacement of sand can be economical and eco-friendly.

## OBJECTIVES

- To evaluate the strength of concrete with partial replacement of fine aggregates by coco-peat.
- To check the possibility of use of coco-peat to partially replace fine aggregates in concrete.
- To study the conventional and modern mix design with various percentage of coco-peat as replacement of fine aggregates.

## METHODOLOGY USED

1. In this project, it is proposed that the fine aggregates will be partially replaced by the coco- peat by 5%, 10% and 15% by weight.
2. M25 concrete 15 cm cubes of conventional concrete and the concrete with coco-peat will be casted.
3. Then compressive strength of all the cubes will be found out after 28 days.
4. The comparison of compressive strength between conventional concrete to the coco-peat concrete at 28 days of curing will be done.
5. The comparison of split tensile strength between conventional concrete to the coco-peat concrete at 28 days of curing will be done.

## III. PLACE OF WORK AND FACILITIES AVAILABLE / REQUIRED

We worked on this project in our college laboratories. For this project we require tray Cube Mould, Mixing Tray ,Curing Tank. For compressive testing we require CTM (Compression Testing Machine).

## IV. FACILITIES REQUIRED

- a) Facilities:

• CTM (Compression Testing Machine)	: 40 tonne
• Cube Mould	: 15 cm x 15 cm x 15 cm
• Mixing Tray	: 2 M x 1 M (M.S.)
• Curing Tank	: 400 Ltr.

## b) Resources:

• Cement	: Ultratech, 53 grade , PPC (Fly ash based)
• Aggregates	: Crushed Stone Aggregates size ranging from 10 mm to 25 mm
• Fine aggregates	: Natural Sand, size less than 4.75 mm
• Coco-peat	: Consists of fined coconut husk and coir fibers, size ranging from 4mm to 5mm

**V. CONCLUSION**

- The use of coco-peat as partial replacement of fine aggregates should be encouraged for sustainable and eco-friendly construction.
- By the utilization of agricultural waste materials in concrete tends to low construction cost and waste management is also imparted.

**VI. REFERENCES**

1. An Experimental Study On Behaviour Of Concrete With Coco-peat By- V Shenbaga Kumar, K Udhaya Kumar, R Ramesh, R Ram Kumar, Mrs. N. Venkateshwari
2. Improvement Of Strength Of Concrete With Partial Replacement Of Course Aggregate With Coconut Shell And Coir Fibres By- Anju Mary Ealias , Rajeena A P , Sivadutt S , Asst. Prof. Life John And Asst. Prof. Anju Paul
3. Coconut (Cocos Nucifera L.) Waste As Partial Coarse Aggregate Replacement For Concrete Hollow Blocks By-jasper Milo T. Dela Cruz1, Anjelamari H. Dela Rea, Caryl Anne S. Magalong, Kristine Ann K. Poyaoan, Christian Michael P. Velarde, Christopher Malay
4. Durability Properties Of Concrete With Coir Pith As A Partial Replacement For Sand By V. Priyadarshini