

# Effect of Coconut Fibre in Concrete

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**Abstract**—The overall goal of this research is to investigate the influence of coconut fibre in concrete. A sustainable fibre of composite material, due to some specific mechanical property which can be compared to artificial fibre. In this experimental study, determination of the compressive strength, split tensile strength and flexural strength are carried out using different coconut fibre length of 10cm to 15cm respectively at the age of concrete 7days and 28 days and replacement of coconut fibre. replacement range of 2% , 4%, 6% with cement. different percentage as 2%, 4% and 6%.

**Keywords:** Coconut Fibre, Composite, concrete.

## 1. INTRODUCTION

Presently, numerous researches are made on the characteristic fiber which are effortlessly accessible in substantial amount and are exceptionally shabby. Among this normal fiber which can be utilized for development object is coconut fiber which can likewise be referred to with different names as Coir, Cocos nucifera, Arecaceae (Palm) .They are accessible industrially in three structures ,specifically decorticated (blended fiber),bristle (long fiber),mattress(relatively short fiber).They can be taken being used by prerequisite and the cocoa fiber are for the most part utilized which are acquired from full grown coconut .According to the official site of International Year For Natural Fiber 2009 the development of coconut tree are around 12 million worldwide which produces 5,00,000 tons of coconut fiber every year. This coconut fiber can be utilized as a part of the solid which is imperative part of any development .Normally, in convectional strengthened solid we utilize steel bars which expand the weight and in addition the expense of the solid which can't be effortlessly moderate to all rulers and also urban regular folks.

As we realize that solid which is typically made by blending concrete, water, fine and coarse total and once in a while admixture in their right extent is real development material. As everybody realized that we live in solid age, then branch of Civil Engineering "Solid Technology" turns into the spine for advancement of base of each nation. However, because of expanding in rate of bond it turns into an impediment for infrastructural improvement in the creating nations. Furthermore concrete systems nursery impact which dirty the air and add to natural and also human risky. In any case, to conquer this, numerous examines has been made on coconut

fiber influenza cinder likewise which decreases the utilization of convectional bond and lessens the expense of concrete too. The general objective for this exploration is to make increasingly mindfulness about the points of interest and employments of coconut fiber and presenting it as a modest and effortlessly accessible common fiber which did not influence the earth.

## 2. LITERATURE

J.Rahaya Ruben has been studied in the experimental study of coconut fibre as concrete reinforcement material incement based composites. In this paper the experimental study of 28 days the compressive strength and split tensile strength are carried out using different coir fibre length of 20mm, 25mm, 30mm respectively of different percentage as 0.5%,0.75%, and 1%.this paper results that the usage of coir fibre in civil constructions reduces environmental pollution factors and resistance of concrete from sulphate attack.

In this experiment strength properties of coir fiber concrete was studied by D.M. Parbhane. In this study, M 20 evaluation of concrete was delivered by including coconut fiber (coir). Forty five cylinders were threw and their split tensile.quality and workability's were assessed at 7, 14 and 28 days. The workability and elasticity of cement expanded to some degree as the coir expanded. Concrete delivered by 1%, 2%, 3%, 4% and 5% expansion achieved 28 days rigidity of 2.68, 2.90, 3.11, 3.25, 2.33 individually. These results demonstrated that Coir Fiber Concrete can be utilized as a part of strengthened cement.

Experimental Study on the Mechanical Properties of Coconut Fibre Reinforced Lightweight Foamed Concrete studied by M.A. Othuman Mydin. This research describes experimental studies on the use of coconut coir fiber as mechanical properties enhancement of foamed concrete which focuses on 3 parameters which are compressive strength, flexural strength and splitting tensile strength with different percentages of coconut fibre (0%, 0.2% and 0.4%). The addition of coconut fiber significantly improved all the properties investigated. The results of the test showed that the compressive strength, flexural strength and splitting tensile strength of the foamed

concrete increase as the fiber volume percentage of the coconut coir fiber increased in the concrete mix.

### 3. SCOPE OF WORK

- Mix Design calculation for M25 grade of concrete.
- Casting of cubes, cylinders and prisms specimens for 7 days and 28 days.
- Testing of casted specimens for finding compressive strength and flexural strength at the age of 7 days and 28 days.

### 4. MATERIALS AND METHODS

Coir is an inexpensive fiber among the natural fibers available in the world. Furthermore, it possesses the advantages of a lignocelluloses fiber. In the present study brown coir fiber is used. The important properties of the natural fiber are listed in the table1. In this experiment M25 grade concrete is used. Concrete was made with 53 Grade cement with sand and 20mm and down coarse aggregate. The quantity of materials used as per mix design as follows. Cement = 383 Kg/m<sup>3</sup>, fine aggregate = 571Kg/m<sup>3</sup>, coarse aggregate = 1241Kg/m<sup>3</sup>, Water = 191.6 Kg/m<sup>3</sup>, water/cement ratio =0.48

**Table1. Typical Properties of coconut fibre**

S. No.	Properties of Fibre	Parameter
1.	Colour	Brown
2.	Length	10-15 cm
3.	Diameter	0.2-0.35 mm
4.	Bulk Density	140-150 kg/m <sup>3</sup>
5.	Ultimate tensile strength	80-120 N/mm <sup>2</sup>
6.	Modulus of elasticity	18-25 N/mm <sup>2</sup>
7.	Water absorption	30-40 %

#### Preparation of Composites

Coir substance and other undesirable materials are isolated from the coir fiber. It is then slashed to about various length of 10cm to 15cm . Fiber were taken out, over and again washed with water and dried noticeable all around.

### 5. CASTING OF SPECIMEN AND TESTING

Cubesthat have a size of 150mm x150mm x150mm are casted with M25 grade concrete as a control specimen. Then different percentage of coir fibre is added to the concrete. First 2% of

10cm to 15cm coir fibre is added with concrete and specimens are casted. Then 4% and finally 6% of 10cm to 15cm coir is added with concrete for making specimens. After 24 hours the specimens are removed from the mould. For curing the specimens were kept in the water. After curingCompressive Strength of Concrete Specimens is tested in the 7<sup>th</sup>. and 28<sup>th</sup> days using compression testing machine and flexural testing machine.

### 6. RESULT AND DISCUSSION

The outcome demonstrates that coir fiber expand the compressive quality up to certain level. Expansion of coir fiber likewise capture the miniaturized scale breaks present in the solid. Quality properties like compressive quality are appeared in the accompanying chart. The diverse rate of coir fiber with various length gives distinctive quality worth. At first the quality step by step expanded up to 0.75% of coir fiber then the quality is diminished. The greatest compressive quality is achieved utilizing 25mm length fiber with 0.75% expansion of coir fiber.

### 7. CONCLUSION

Utilizing coir fiber as a part of common development diminishes ecological contamination calculates and may likewise acquire a few changes solid qualities. Coir fiber utilized as a part of bond improvesthe resistance of cement from sulfate assault. Compressive quality is additionally enhanced up to certain rate. Expansion of coir fiber additionally captures the miniaturized scale splits present in the solid.

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