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# A LIGHTWEIGHT CONCRETE USING GRANULATED CORN COB

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## ABSTRACT

A lightweight concrete employing granules Corn on the cob (withoutcorn) as an It is advocated in this study that we aggregate. Given that kernel of corn, then Getting the corn out of the ground is seen as Agricultural garbage, a novel economic and long-term gain might because of Using it, it is a use in construction.So, it's possible be a long-lasting lightweight option aggregate answer in in contrast to most often used ones right now are expanded clay,fragments of fibers from cork, bits of expanded (Expanded Polystyrene), additionally, etc. The compactness, the Corn cob concrete's compressive strength and thermal insulation qualities were measured experimentally. Reference was also made to an enlarged clay concrete. The most important findings, demonstrating that the recommended corn cob concrete may possess the necessary physical characteristics for a lightweight use of concrete in non-structural contexts.

## INTRODUCTION:

A lightweight concrete employing granules Corn on the cob (without corn) as an It is advocated in this study that we aggregate. Given that kernel of corn, then Getting the corn out of the ground is seen as agricultural garbage, a novel economic and long-term gain might because of Using it, it is a use in construction. So, it's possible be a long-lasting lightweight option aggregate answer in in contrast to most often used ones right now are expanded clay, frments of fibers from cork, bits of expanded (Expanded Polystyrene), additionally, etc. The compactness, the Corn cob concrete's compressive strength and thermal insulation qualities were measured experimentally. Reference was also made to an enlarged clay concrete. The most important findings, demonstrating that the recommended corncob concrete may possess the necessary physical characteristics for a lightweight use of concrete in non-structural contexts.

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0%, 20%, 30% and 50 % of Corn Cob Fiber. Then the specimen cubes were casted. After 28 days of curing, the specimens were tested to determine the durability of the concrete. Finally, the results are compared with the ordinary conventional concrete.

| **Cement** | **Coarse Aggregates** | **Fine aggregates** | **Fly Ash** | **Corn Cob Fiber** |
|---|---|---|---|---|
| Grade -53 Ordinary Portland cement from ultra cement Company India Limited | Coarse aggregates of 20mm size | Fine aggregate were taken of Zone-II were procured from Tuticorin District | Fly Ash from Thermal Power Plant, Tuticorin | Corn Cob Fiber were taken from Sivskasi. |

**Table 1: Materials used in the concrete**

**MIX PROPORTIONS:**

| **CEMENT** | **FA** | **CA** | **WATER** |
|---|---|---|---|
| 1 | 1.5 | 3 | 0.6 |

**Table 2: Mix proportions for conventional concrete**

| Cube Id | Replacement of Fly Ash in % | Replacement of Corn Cob in % |
|---|---|---|
| N | 0 | 0 |
| A | 50 | 20 |

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| | | |
|---|---|---|
| B | 50 | 30 |
| C | 50 | 50 |

**Table: 3 Specimen details of partially replaced fly ash and corn cob fibre concrete**

**RESULT AND DISCUSSION:**

**WORKABILITY:**

Workability of normal concrete with fly ash at 50% had little bit higher amount of slump value while replacing with corn cob up to 50% instead of coarse aggregate will reduce the slum up to 80mm from 120mm.From this we can conclude that the replacement of corn cob will improve the workability with increment of the replacement level.

| Cube Id | Replacement of Fly ash (in %) | Replacement of Corn Cob (in %) | Slump value (mm) | Type of Slump |
|---|---|---|---|---|
| N | 50 | 0 | 120 | TRUE |
| A | 50 | 20 | 100 | TRUE |
| B | 50 | 30 | 90 | TRUE |
| C | 50 | 50 | 80 | TRUE |

**Table: 4 Test result for workability**

**COMPRESSIVE STRENGTH:**

Compressive strength is the most common property used to describe a concrete. Sinceother properties of concrete often correlate well with the compressive strength, it

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is used as an indicator of the other mechanical properties. The results of the compressive strength tests of OPC and light weight concrete samples are given in Table 4. These are the mean values of the results obtained from three identical specimens

While comparing to the conventional concrete the replaced concrete with 50% of fly ash in fine aggregate and corn cob upto 20% in coarse aggregate will increase the strength. But further increasing the corn cub instead of coarse aggregate will reduce the strength. Table 3 revealed an increase in the characteristic strength of concrete cubes as per curing age and decreased as per ash content. It implies that 20% corn cob ash concrete might develop the required strength over a longer period of time

| **Curing Period** | **Compressive Strength in N/mm$^2$** | | | |
|---|---|---|---|---|
| | **N** | **A** | **B** | **C** |
| **7 Day** | 16 | 16.7 | 13.11 | 11.25 |
| **14 Day** | 19.65 | 20.05 | 16.52 | 14.02 |
| **28 Day** | 23.80 | 24.52 | 19.50 | 16.03 |

Table: 5 Value of compression machine value

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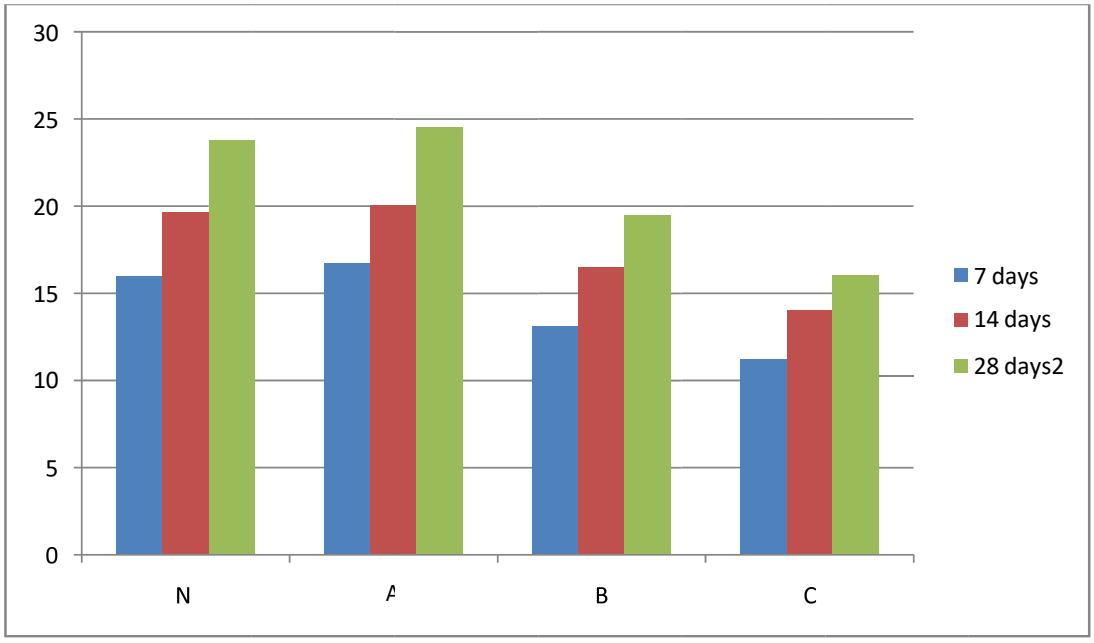


Fig 1:Comparison of weight of fly ash at 50% with corn cob fiber at 20%,30% and 50% replacement an normal concrete

**Density of concrete:**

The results generally revealed in Table 6 that density decreased with respect to increasing percentage of corn cob ash replacement in concrete samples. The density of Ordinary concrete is 8.150 Kg while replacing with fly ash at 50% and Corn cob at 50% is reduced to 5.370 Kg.

| Cube Id | Weight of Concrete in kg |
|---|---|
| **N** | 8.150 |
| **A** | 6.790 |
| **B** | 6.390 |
| **C** | 5.370 |

Table: 6 Comparison of weight between corn cob fiber and normal concrete

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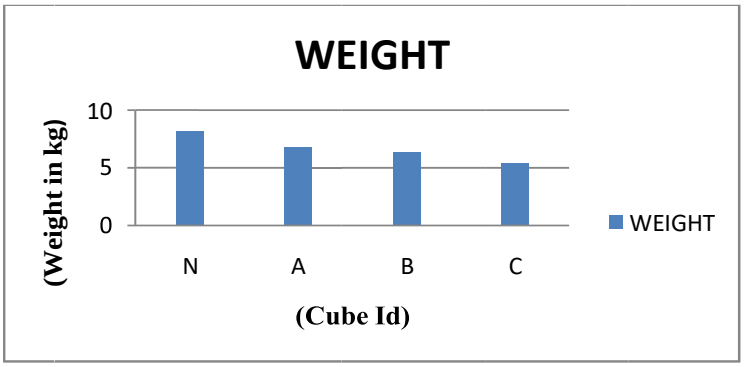


Fig 2 :Comparison of weight of fly ash at 50% with corn cob fiber at 20%,30% and 50% replacement an normal concrete

conclusion

**The following findings are made based on the current investigation. Because of the cut corn Larger than 20mm particles do not active, the vigor of Normal Cement Concrete, which included corn cob fiber elements, was used.resulted in have more prominence in comparison to• Corn cob fiber and fly ash concrete has better workability than regular cement concrete.As the percentage of fly ash in concrete rises, the workability of the material improves. Fly ash usage enhances the workability of the mix and hence permits a reduction in the quantity of water utilized.Compressive strength rises with up to 20% Corn cob substitution in concrete. As a result, this rate of replacement is ideal.• The proportion of fly ash in the totalThere is a lessening of the in 53 grade OPC.vigor of concrete.That makes sense, because secondary hydration because of Fly ash concrete has a delayed onset of pozzolanic activity. The decline is higher at early ages as compared to later ages.**

**Dead weight of concrete is drastically decreased by including corn cob fiber in the mix.**

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