

EFFECT OF COW DUNG ON PHYSICAL PROPERTIES OF CONCRETE

Dhiraj Thakur¹, Suraj Thakur², Neeraj Pal³, Pranav Kasbe⁴, Shreeshail Heggond⁵

^{1,2,3,4,5}Department of Civil Engineering, University of Mumbai, Palghar

Abstract: This project paper is written to show the effect on concrete with for partial replacement of cement with cow dung ash. Cement is replaced in concrete with cow dung ash in various proportion by weight (like 5%, 10% and 15%) and the compressive & tensile strength of concrete were found at different curing periods (7, 14 and 28 days). Various tests are conducted on samples like determination bulk density, settling time and workability of cow dung ash in different proportion. Cow dung ash (CDA) is economical in terms of cost & this reducing the environmental risk, maintaining the ecological balance.

Keyword: Cow dung ash (CDA), sustainability, compressive strength

1. Introduction:

Concrete is the most important and widely used construction material in construction of any structure. Due to which demand of concrete increases daily. And since cement is the basic binding material in concrete, simultaneously demand of cement is also increased. But production of cement requires lots of energy and also creates pollution. Production of cement is responsible for about 6% of total CO₂ emission in the world. This gas is responsible for depletion of ozone layer in the atmosphere. So, this is one of the reason to search for possible alternative for cement. The other reason is because of heavy demand, price of cement also rises periodically.

Cow dung ash is obtained by drying the cow dung in sunlight in the form of cake and burning the cake and pressing them to form ash. Cow dung ash is rich in nitrogen, phosphorous, potassium and calcium. Whereas cow dung reduces thermal conductivity through it. Hence it is suggested to partially replace cement with cow dung ash (CDA).

2. Literature Review:

A Mohammed et al (2014). This work reports on an investigation in to the use of Cow dung ash as supplementary cementations Materials in concrete. Cement was replaced with Cow dung ash up to 30% and get the experimental results such as setting time, slump test and compressive strength. The workability decreases as the cow dung ash increase. Cement is replacing as 15% can be consider for the production of strong and quality concrete.

Gautam Bhadoriya et al 2015. In this paper present the experimental study of Cow dung ash and rice husk ash as partial replacement of ordinary Portland cement in M15 mix

concrete. Cement was replaced with Cow dung ash and rice husk ash by weight of 5%, 10%, 15%, 20% and 25% respectively in concrete. Compressive strength test was carried out on concrete cube after 7, 14 and 28 days curing. This experimental result has maximum compressive strength is achieved when cement is replaced with 5% Cow dung ash and Rice husk ash.

Anisha G Krishnan, Gibi Miriyam Mathew and Sruthi G Raj et al (2017). This paper presents the result on the study for the use of Cow Dung ash as partial replacement of cement in the production of concrete. This replacement was designed to study the effect of adding Cow dung ash in various percentage by weight (6%, 8%, 10%, 12% and 14%) of cement. The strengthen the Cow dung ash concrete and making it more durable 0.5% glass fiber is being added. It is an economically strong material, have excellent flexural strength, crack resistance and can also use as an alternate material for concrete construction.

3. Methodology:

In this study, fly ash and cow dung ash were used for preparing concrete cubes by replacing different amount of cement percentage. The cement used in the experimentation was 43 grade ordinary Portland cement. The cow dung ash was collected from cow shed, palghar, Maharashtra, India. The cement was replaced by 05%, 10%, and 15% with cow dung ash. We used CDA as a replacement of cement in concrete, CDA is a good binding material reducing voids in concrete. This study was planned to find out the consistency and compressive strength of concrete by partial replacement of cement with cow dung ash. Cement replacement at various percentages that were used in this investigation to observe the effects of different cow dung ash percentage in cement to find the compressive strength of mortar and concrete at various ages of curing. Three different proportions of cement to cow dung ash (95:5, 90:10, 85:15) were used as observation.

Physical properties of cow dung:

- It is bulky
- It has large ash content
- It has low volatile content after burning.
- Carbon content is low
- Burning ratio is low

Preparation of concrete cubes:

Concrete cubes of size 150×150×150 mm was casted in standard moulds at three intervals using various percentages of cow dung ash. At each interval, concrete was compacted giving 25 blows by a compaction rod. At the end of the third interval, cubes were vibrated for 1-2 minutes on a vibrating machine and then the top surface of the cube was finished using a trowel. After that, the moulds were left for drying for 24 hours. At the end of 24 hours, the cubes were removed from the moulds and were submerged in water tanks for curing.

Curing of concrete cubes:

The cubes prepared with aggregates using different proportions of cement, cow dung ash was cured for the periods of 7 days, 14 days, and 28 days.

Testing of concrete cubes:

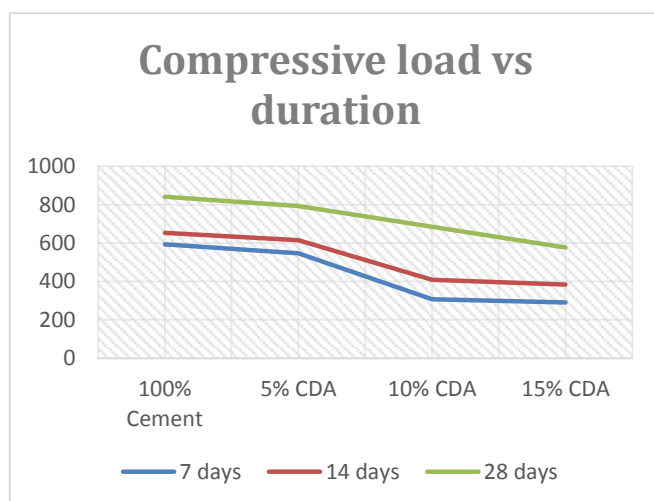
The samples cured for the periods of 7 days, 14 days, and 28 days were tested for the compressive strength using Universal Testing Machine.

4. Result:

The details of the results are as shown:

The compressive load variations for different proportions of cow dung ash (5%, 10% & 15%) are as shown in graphical representation and as the addition of CDA the strength of concrete is increasing till the 15% replacement.

Days\CDA	05%	10%	15%
7	547	308	290
14	615	408	384
28	793	684	576



Different cubes of concrete samples were prepared using coarse aggregate and Cement was replaced by cow dung ash (CDA) in different proportions, river sand and potable water was used during preparation of concrete cubes. The cubes were cured for the period of 7 days, 14 days and 28 days. Then the compressive strength of cured samples was determined using Universal Testing Machine.

5. Conclusion:

Performance of cow dung ash with concrete although seriously limited by its low compressive strength, cow dung ash concrete can be made to perform well in certain floor and wall applications. When CDA is mixed with concrete it requires more quantity of water while increasing the ash content. It performs well in when a limited percentage (up to 5%) can be used for floor applications or as a building component not subject to high structural stresses. the advantages of cow dung ash concrete offers lightness of weight, and low thermal conductivity make it a useful construction material. However, the strength of cow dung ash concrete when made in the most commonly used proportion is only 5% to 10% of that of normal concrete. It is not usable where high structural strength is required or where it would be subjected to heavy traffic and severe abrasive action. Its ash content also prohibits installation of lean mixes in environments of excessive moisture. However, strength is drastically reduced as the percentage of cow dung ash is increased. In general, cow dung ash concrete is not recommended for use where water accumulates or where water is constantly present. The specific gravity of cow dung ash is 2. The compressive and the flexural strengths of CDA concrete for the ages investigated such that the lowest values obtained at 30% additive level of ash. The initial and final setting time is increases by increasing the cow dung ash.

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