

Partial Replacement of Cement by Optimizing Lime Powder Dose to Produce Robust Concrete Using Rice Husk Ash

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ABSTRACT

Nowadays climatic change & environmental degradation are vital issues. Government and business sector have to use more ecofriendly awareness policies and practices. Now it is the crucial time to focus more on sustainable waste & construction materials such as greenhouse reducing agents ,energy saving equipment's ,and more to use renewable source of energy so that the resources and waste can be used more efficiently and recycled it in a new form. The optimum use of waste substances such as (blast furnace slag , rice husk ash , glass pieces or powder, plastics lime dust ,etc.) in concrete to boost the engineering financial environment , to gain more ecological benefits .therefore the use of wastes building and construction material is very helpful to achieve the new sustainable goals. So rice husk ash and lime dust can be used as a partial replacement material with cement concrete. The paper report is based on 16 various cubes mixes having partially cement replacement with RHA & Lime powder in equal amounts in different ratio between 0 to 10%. Portland pozzolana cement of fly ash based. And fine sand less than 0.5 was used to form standard concrete cylinder. Compressive test was performed on concrete at different ages. Test results concluded that the mix having the ideal proportion of rice husk ash and lime dust possess optimum compressive strength as RHA & LIME form good bond formation .The cement and sand mix was prepared with a specific water cement and aggregate ratio.

I. INTRODUCTION

Construction and building materials are the major materials which are responsible for the good interior and exterior aesthetic beauty of structure and gives positive environment impact. It is widely used material and it directly or indirectly affects the environmental and ecological factors through the process used to extract, built, transports and ultimately reuse or dispose them.

Sustainable construction materials are that materials which can be reused ,recycled and be used again to fulfill the future demand it also helps in reducing the effects of harm full gasses such as co2 , greenhouse gasses, etc. .Such waste materials have a lower environmental impact. Thermally efficient, can be operated with less fuels and energy and better than any conventional method. They are less toxic and can be recycled and reused less toxic emission and they are financially viable.

In concrete production large quantity of resources such as fuel, sand ,aggregates are required. Therefore to minimize these various waste or by product used in researches as potential alternatives in the construction of concretes and industry. In fact use of by product waste such as glass, ash, beads, plastic, slag, etc. in construction is one of the major aims to reach the new goal of achieving sustainable developments.

Therefore use of RHA in concrete can be a new scientific method in the field of concrete production. A large amount of agricultural wastes by product produced and it gives no

economic value and burned without any commercial returns. And a very high cost in required in their disposal and also a reason for environmental pollution of both land and air. So by using such a waste as a concrete supplement of cement reduces the construction cost and improves the property of concrete. The study concludes more on the concept of acceptable strength with the use of RHA and lime mix with cement for determining the optimum water cement mix to achieve good compressive strength.

II. SIGNIFICATION OF THE WORK

Now a day mostly construction structure based on concrete so its demands increasing gradually, the use of RHA and lime as a partial replacement with cement leads to a great results in achieve new goals. Recent research find that concrete made by using RHA are capable to gives good compressive strength and thermal insulation property. The use of RHA as greatly enhance the weight of concrete and helps in making light weight concrete. The major aim of this study is to achieve a good environment policies to reduce the disposal and burning of RHA directly into the environment so it help in reducing greenhouse concentration.

In this study the waste materials used are in the form of RHA (rice husk ash)and lime dust are added in equal quantity in cement and it is collected directly from the agricultural filed. Than it is burnt to find ash of rice husk and sieved from 90 micron sieve to achieve fineness

similar to cement and lime dust also sieved from 90 micron sieve to achieve fineness similar to cement.

III. EXPERIMENT WORK AND RESULT

Sixteen individual concrete mixes casted to achieve the selected mix design of 1:1:2 for M25 and the water cement ratio followed by 0.50. PPC cement and sand of fineness less than 0.5mm are used. With these different amounts of RHA & lime can be partially replaced with cement in various different ratios for making different mixes of sixteen cubes having standard concrete cylinders of 150mm

X 150mm .Compressive strength of each mixes at various ages and curing days are measured.

For RHA and lime powder replaced by 0 % ,5 %,7.5 % and 10 % . It was noticed that partially replacement of cement by rice husk ash & lime powder increases the compressive strength of concrete by 7 to 16 % and it is observed that the highest compressive strength was obtained for 7.5 % partial replacement of cement by RHA and LIME. Therefore it is used in conomical and sustainable way.

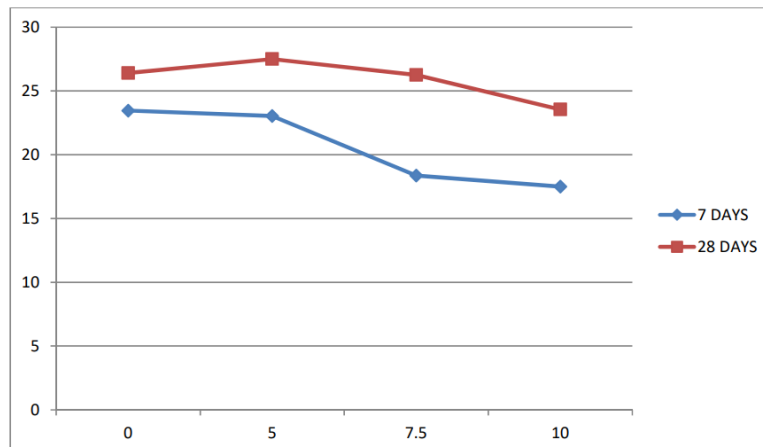


Figure 1. Graph representation of compressive strength for M25 grade concrete

Table 1. Graph Representation of Compressive Strength For M25 Grade Concrete

% Mix (Cement Partially Replaced by RHA & Lime Powder)	Slump Value in (mm)
0%	95
5%	90
7.5%	70
10%	40

IV. CONCLUSION

V. The paper based on the study of sustainable developments and ssibility to use RHA and lime as a construction material to produce concrete. The study focused on the artial replacement of cement with RHA & lime dust in equal amounts instead of pure cement. Cement re costly and their manufacturing cost is quite high as compared to other building aterials. They

undergo through long process therefore by replacing it with byproducts of agricultural astes is quite reliable and by using such wastes environmental degradation can be improved to a great xtent such as air pollution can be reduced.it is concluded that by product of agricultural wastes may pen a new path of economic and pollution reducing concrete with desired strength.

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