Studies on Effect of Cement Concrete Strength by using Waste Materials Likes Fly Ash and Brick Kiln Dust

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Abstract - Now day's construction work is going on a very large scale so requirement of cement concrete plays an important role. On the basis of topic, cement concrete will be mixed with some waste materials like fly ash and brick kiln dust and its strength can be determine by one of the most common test known as cube test. Here, we have to know what actually is cement concrete, flay ash and brick kiln dust.

Keywords: Sand, cement, aggregates, fly ash, brick kiln dust.

INTRODUCTION

This paper deals with the more important issues related with cement concrete strength. Literature review has aim to provide better knowledge regarding study of cement concrete strength. Basically literature review gives us knowledge about what work has been done earlier by other researchers. By this way it helps us to know the background research, required information and material information about all aspects of study. This paper has review on materials and design mix of cement concrete strength by cube test and common curing methods. Curing influences on physical and chemical properties of concrete mixes and concrete testing for hardened concrete, compressive strength, flexural strength by different mix proportion of cement, sand, aggregates with waste materials like fly ash and brick kiln dust

- **Cement Concrete:** Cement concrete is defined as the mixture of cement, aggregates, sand with water which hardens into super strong building materials and will be used in construction of buildings, foundations, highway, sidewalks etc. Here, cement act as a binding material.

- **Fly Ash:** Fly ash is defined as the finely divided residue resulting from the combustion of coal which is transfer into boiler by flue gases. Fly ash is a by-product of coal fired electric generating power plants. Due to excess production of fly ash it can be used in cement concrete as it has some properties i.e. it reduces permeability of water, and fill the size of pores inside concrete mixture and increased its strength and reduce permeability.

- **Brick Kiln Dust:** Brick dust is a waste material obtained from brick kiln industries. Now day's construction work is on large scale so demand of brick also increases so due to this brick kiln industries all over the world also increased. Tons of brick kiln dust comes out from such brick kiln industries. So such materials are used in filling low lying area and also in construction work it also used in mixture of cement concrete to fill the voids. As brick kiln dust contains mixture of ashes (coal+wood) and dust particles (soil+sand).

Objective:

- Use of brick kiln dust and fly ash as a waste materials in cement concrete and determine its compressive strength by cube test.
- To know the proportion of Brick kiln dust and Fly Ash in Design Mix

LITERATURE REVIEW:

Strength of concrete is one of the most important factor engineering properties of construction material. In any construction, structure which involves concrete as binding materials there comes a major problem that concrete does not gain its strength within given specific of time i.e. 28 days. A decision should be taken at the time 28 days to remove formwork depend on the rate of strength gain by concrete which considers safety as well as quality also. Some of the researchers has give their opinions on concrete strength as given below-

1) In 1977 Freiesleben and Pedersen examined that the rate of strength gain by concrete depends on "temperature".

2) In 1951 saul and in 1998 Kim et al. Investigate, the strength gain by concrete is subjected to effect of curing time and temperature during hardening process. They found concrete gain strength at early stage due to high temperature.

3) During experimental study in 1951, Price and Zhutovsky and Kolver in 2012 pointed that due to 1st 2 hours of curing at high temperature concrete gain a higher strength at early stage.

4) In 1958 Klieger and in 2010 Toe et al examined strength development at early stage due to effect of curing temperature.

5) In 2012 Jansen et al and Wongeko et al examined strength gain at any stage and strength gain of mortars and concrete containing fly ash will depend on pozzolanic reactivity of the fly ash.

6) In 2012 El-Nemr and hobbs in 1983 examined strength of concrete also depend on design mix, the character and grading of aggregate, the water content of mix and curing conditions.

7) In 2004 Mahasneh and Shawabkeh ; in 2011 Razak and Sajedi ; in 2012 sata el al examined that sometimes dying ambient disorders significantly reduce the strength con concrete made with PCC for secondary (pozzolanic) reaction fails to contribute to gain of strength.

8) In 2011 shafiq examined fly ash in concrete improves the workability and reduces the amount of water with respect to conventional concrete. Fly ash includes other effects such as it reduces bleeding, reduces segregation, reduces permeability, increased plasticity, and increased setting time of concrete.

9) In 2005 chindaprasit et al ; in2004 Hwang et al; examined Fly ash concrete is slower but it is sustained for longer periods than the rate of the strength increased of Portland cement concrete.

THE GIVEN BELOW TABLE SHOWS DIFFERENT CEMENT CONCRTE STRENGTH OF DIFFERENT DESIGN MIXES IN 28 DAYS FROM –IS 450:2000

GRADE OF CONCRETE	COMPRESSIVE STRENGTH
M10	10
M15	15
M20	20
M25	25
M30	30
M35	35
M40	40
M45	45
M50	50
M55	55
M60	60
M65	65
M70	70
M75	75
M80	80

STRENGTH IN **N/MM^2**

From the above table we have:

- Grade M10, M15, M20 are ordinary concrete.
- Grade M25, M30, M35, M40, M45, M50, M55 are standard concrete.
- Grade M60, M65, M70, M75, M80 are high strength concrete.

CONCLUSION:

Now days as per demand of cement concrete is increasing and also construction work is increasing so demand is to high so on the basis on IS 456:2000 design mix of concrete is made. Some design mix is designed by partial replacement of brick kiln dust and fly ash with cement. By this way it can be concluded that -:

1) Brick kiln dust and fly ash is used as admixture in concrete and it could save 20% of cement as binding material and provides the same strength.

2) Brick kiln dust and fly ash produced with satisfactory slump and setting times with nearly the same water cement ratio in nominal concrete gives.

3) Under certain conditions partial replacement of cement by brick kiln dust and fly ash gives the same or more strength of concrete.

4) In mass concrete use of admixture likes brick kiln dust and fly ash would reduce the heat of hydration.

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