

Fly Ash Concrete - A Review of Literature

Gurkeerat Singh^{1*}, Sunil Priyadarshi², Avtar Singh³

^{1,2,3}Department of Civil Engineering, Rayat Bahra University, Ajitgarh, India

Abstract: This research review discusses about the Fly Ash. This paper also discusses about the durability improvement of the fly ash concrete with durability improvement admixtures.

Keywords: Fly ash concrete, Compressive strength.

1. Introduction

Fly ash is a fine powder that is formed from burning pulverised coal in power plants. The coal is pulverised in electric generation power plants. Fly ash contains aluminium and siliceous material that forms cement when mixed with water. It is much similar to portland cement when mixed with like and water. This makes fly ash suitable as prime material in blended cement, mosaic tiles, and hollow blocks. When used in concrete mixes fly ash improves strength and segregation of the concrete and hence increase its durability.

Various application of fly ash are listed below,

1. It can be used as prime material in many cement based products such as poured concrete blocks and bricks.
2. It is widely used in Portland cement concrete pavements or pcc pavement.
3. It can be cost effective substitute for Portland cement in many markets.
4. It is an environment friendly material
5. Produces various set times. And cold weather resistant.
6. High strength gains and can be used as an admixture

Types of fly ash are,

1. Class - C
2. Class- F

Class c contains high calcium fly ashes with carbon content less than 2%. These are obtained from burning sub-bituminous or lignite coals whereas class f are low calcium fly ashes with carbon content less than 5%. These are obtained from anthracite coals.

This research review discusses about the experimental study on improvement of durability of fly ash concrete with the mixing of various durability increasing admixtures. In order to improve the durability of the fly ash concrete various tests are carried out. The stable air should entertain in the fly ash concrete. It is much difficult to control the air content of fly ash concrete.

2. Experimental Overview

The various material used and their characteristics are listed below,

Fine aggregate, coarse aggregate, fly ash, water and durability increasing admixture.

In the experiment the fly ash was mixed with mass of cement and of 10 kg/m³ to the weight of cement durability improving and mixture was added to final mixture. Air entraining admixture with 1% of weight of cement was added to the mixture. The slump of concrete was 18cm and their content was 4.5%.

A. Fabrication and curing of test specimens

The cylindrical specimens with 100 mm in diameter and 200 mm in height for compression test were encased in light gauge moulds in three layers and strip moulds for 24 hours. The specimens were cured at 27°C for 7 days.

Various tests on hardened concrete,

Compressive strength test

The specimen was tested at the age of 7 days and 28 days.

Drying shrinkage test

This specimen was tested at 7 days and 28 days.

3. Test Results

A. Compressive strength

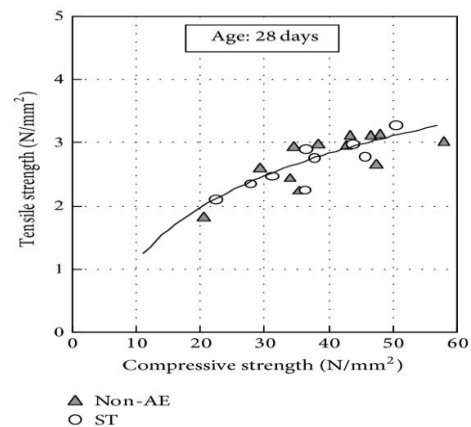


Fig. 1. Compressive strength vs. Tensile strength

The compressive strength development of concrete cured at 27 °C. The compressive strength of concrete reduces with the increase of fly ash replacement ratio. However, compressive strength growth of concrete is found to be increased with the

*Corresponding author: gurkeeratgrewal42@gmail.com

increase of fly ash replacement ratio after 28 days. after 28 days however because the assistance of pozzolanic reaction of fly ash to strength increasing the collaboration between cement water ratio and compressive strength is poor. The compressive strength varied from 65 to 85mpa.

B. Tensile strength

After 28 days the tensile strength cured at 27° celsius in the range of 1/10 to 1/20 in compressive strength.

4. Conclusion

The following conclusions were made from the work presented above on the facts of durability improving admixture air content water binder ratio and fly ash.

By using durability improving admixture in non and training a fly ash concrete the compressive strength of fly ash concrete can be improved by 10 to 20% and its initial compressive strength also improved.

Irrespective of the presence of air durability improving admixture of fly ash replacement ratio both tensile strength and modulus of elasticity are dependent on compressive strength.

By using durability improvement admixture in the fly ash concrete the drying shrinkage is a reduced by 60%.

References

- [1] www.Theconstuctere.org
- [2] www.Theconcrete.org
- [3] www.cement.org