

Effect of Air Entrainment (using H₂O₂) on Compressive Strength, Density and Abrasion Resistance Exposed to Various Chemical

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Abstract— The Primary objective of this study to establish the correlation between appropriate amount of hydrogen peroxide (27.5%) for strength and density , water absorption, other properties variation with varying amount of H₂O₂ . For above stated purpose experimental study has been carried out with 0%, 2.5%,5%, 7.5% H₂O₂. Namely density, workability, strength, water absorption slump and abrasion resistance of air entrained concrete carried out. 12-12 no cube prepared for 4 air content variation and 7&14& 28 days of compressive strength carried on.

Keywords: Coarse Aggregate, Air Entrainment, Water Absorption

I. INTRODUCTION

Concrete is the second most consumed material on earth, after water. So research in the field of concrete having great scope in 21st century. One of such material is hydrogen peroxide as an air entrainment agent. Very little literature work has been done in this material so far. Air entraining admixtures are as per ACI “an addition for concrete/ mortar which causes entrained air to be incorporated in the concrete or mortar during mixing. Such concrete possesses a cement paste in which air exist in the form of stable and small bubbles in well distributed matrix”.

The micro air bubbles in concrete mix created during mixing of the plastic concrete, and most of them survive to be part of the hardened concrete. The primary purpose of air entrainment is to increase the durability of the hardened concrete, especially in climates subject to freeze thaw; the secondary purpose is to increase workability of the concrete while in a plastic state and increase abrasion resistance.

Previous work has indicated that air entrainment has more to offer than workability & freez thaw resistance. It also reduce bleeding since the bubble tend to keep solid particle in suspension, so that sedimentation is reduced and water is not expelled. Moreover it reduces segregation, litanee, permeability also. . The main function of air entrained agent is to increase the workability of fresh concrete, and durability of hardened concrete.

II. METHODOLOGY

- 1) testing of material physical properties
- 2) Trial % of H₂O₂ in mortar cube
- 3) mix design (M30)
- 4) casting of cube
- 5) slump found
- 6) compressive strength found at 7,14,21 days
- 7) water absorption found
- 8) abrasion resistance variation in H₂SO₄ and cacl₂
- 9) density determine

III. EXPERIMENTAL STUDIES

Objective Of Experimental Programme is To find out effectiveness of hydrogen peroxide and its amount for getting proper advantage of this material.

Here hydrogen peroxide used with 4 different amount 0%, 2.5%, 5% and 7.5% and various properties of concrete studied and Proper correlation determined with varying amount of hydrogen peroxide properties of concrete.

A. Result of raw material

1) Cement:

OPC 43 cement used having specific gravity and initial and final setting time 40 min and 620 minute and finness is 5%.

2) Coarse Aggregate:

Well graded aggregate of size less than 20 mm used with specific gravity 2.7.

3) Fine Aggregate:

Locally available sand used for this purpose and sand size less from 4.75mm in size.

4) Water:

Potable water used for casting

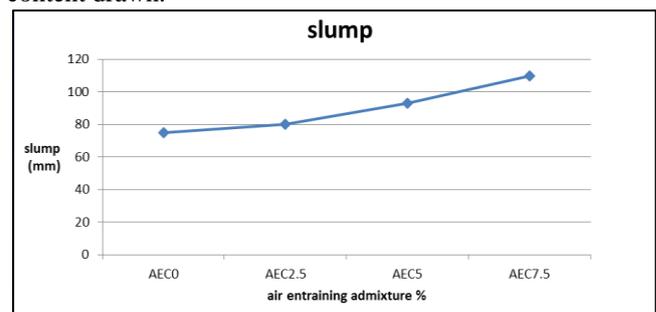
5) Hydrogen Peroxide:

H₂O₂ of concentration 30% used.

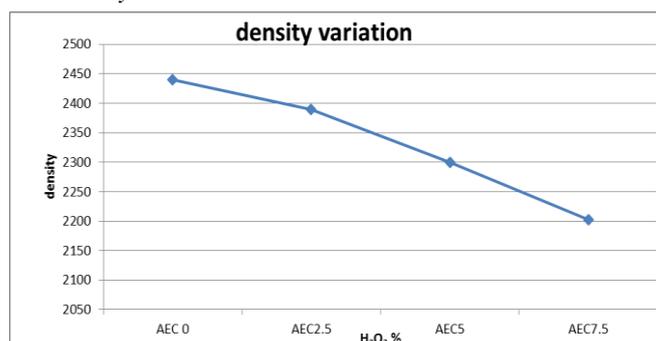
IV. RESULT AND DISCUSSION

A. Workability:

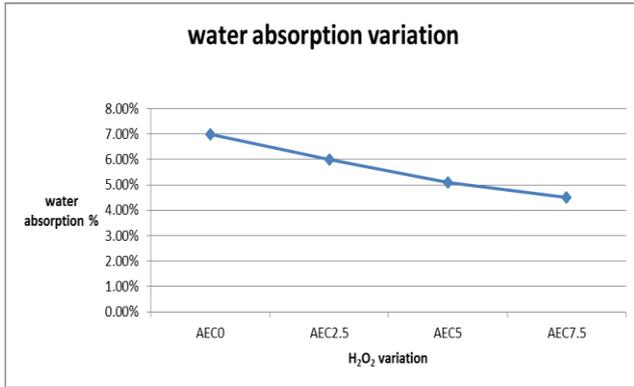
Found by slump test and variation with respect to varying air content drawn.



B. Density Variation:

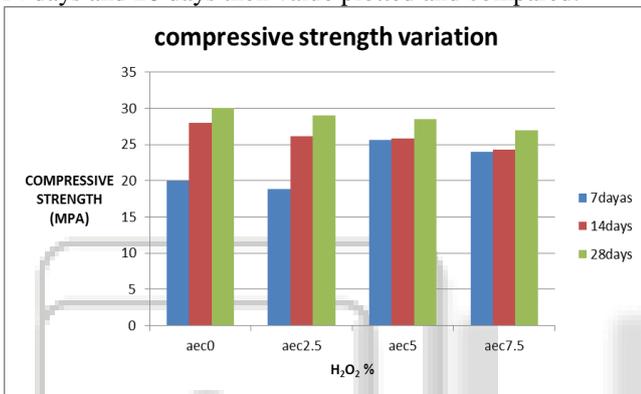


C. Water Absorption:



D. Compressive Strength Variation:

Compressive strength of concrete is determined after 7 days, 14 days and 28 days then value plotted and compared.



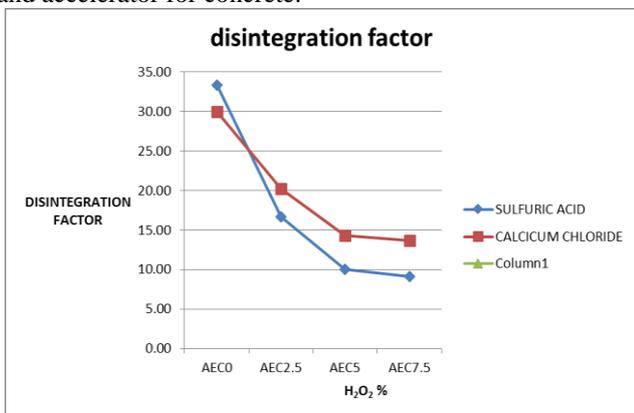
E. Abrasion loss:

Abrasion analysis occur in sulfuric acid and calcium chloride. Cube is subjected to no of cycle of 1 week then weight taken oven dried then weight taken then oven dried and next cycle begins .

Disintegration Factor = no of cycle /% mass loss
Disintegration Factor is defined at 20% mass loss.

1) Reason These Chemicals Behind Selecting:

Sulfuric acid found in sewer so structure exposes to sewer is subjected to this chemical .calcium chlorides is deicing salt and accelerator for concrete.



V. CONCLUSION

- 1) Density of concrete is gradually decreasing as H₂O₂ content increases.
- 2) Water absorption decreases as H₂O₂ content increases.

- 3) Workability of concrete considerably increases as H₂O₂ content increases.
- 4) Decreases in compressive strength due to H₂O₂ content increases but % decreases least at 5%.
- 5) Most benefit of abrasion resistance found at 5% H₂O₂ content increases.

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