

ANNEXURE I

LITERATURE REVIEW

Amal Francis k, Jino John (March 2013) studied the experimental investigation on mechanical properties of self curing concrete to predict the compressive strength, split tensile strength and flexural strength of the concrete containing Super Absorbent Polymer(SAP) at a range of 0%,0.2%,and 0.4% of cement and compared with cured concrete. Concluded that the addition of SAP leads to a significant increase of mechanical strength (Compressive and Split tensile) .Split tensile strength and flexural strength of self curing concrete for dosage of SAP 0.3% of cement was higher than non self curing concrete.

A.Aielstein Rozario, Dr.C.Freeda Christy (April 2013) investigated the experimental studies on effects of sulphate resistance on self-curing concrete. They conducted a detailed experimental study on sulphate attack measurement on self-curing concrete at ages 28 days, and 56 days. The main investigation in this study is variation of water soluble polymer dosage of 0.05% and 0.1%. The concrete produced by the addition of fly ash as a partial replacement of cement. The results of this paper they concluded that, the permeability of concrete decreases with increase in the replacement of fly ash with cement and in addition of PEG dosages. So, the penetration of chemicals is decreased with the addition of PEG and the concrete is safe against sulphates.

Raghu et al (2004) reported that due to the slow pozzolanic reaction developed and due to the addition of admixtures to the cement or concrete during mixing, both initial and final setting times get delayed. This delayed setting is beneficial during the hot weather concreting. The blended cement concrete showed considerable strength development and continues for longer period beyond 28 days.

Matsuda et al (2005) investigated the applications of GGBS to reduce seismic earth pressure. GGBS shows a similar particle formation similar to natural sand and also low weight, high shear strength, well permeability and especially a latent hydraulic property by which GGBS hardens like a rock. Model wall tests were carried out on GGBS, in which the resultant earth pressure, wall friction and the earth pressure distribution at the wall surface were measured, and the test results were compared with those of standard

sand. It was clarified that the resultant earth pressure obtained by using GGBS was smaller than sand, especially in the active-earth pressure side.

Vinayak , Manjunath.G. Tontanal (May 2013) evaluated that the self cured steel fiber reinforced concrete produced with 30% replacement of coarse aggregates by pumice aggregates will yield higher compressive strength. The concrete produced without replacement of coarse aggregates by pumice aggregates and with water curing show higher compressive strength. It can be concluded that the compressive strength of self cured steel fiber reinforced concrete will be slightly affected. The self cured steel fiber reinforced concrete produced with 30% replacement of coarse aggregates by pumice aggregates will yield higher tensile strength.

C. Chella, Gifta (May 2014), conducted experimental studies on High performance concrete. They concluded that, the internal cured specimens are proved to be better than conventional cured specimens in all means. Also, they suggested that the addition of internal curing agent increases the degree of hydration, producing a denser microstructure leading to better results. Compressive strength results reveal that compressive strength of internal cured specimens at 7 days and 28 days are greater but at the age of 3 days the strength is lower than conventionally cured specimens. SAP specimens show a significant improvement of about 6.88 % increase in compressive strength and LWA specimens are found to be 12.35% on 28 days compressive strength than the control concrete mix. Hence, the incorporation of internal curing components in high performance concrete means of LWA has proven to be effective than internal cured HPC using SAP with respect to strength. The durability studies have shown that internal curing by means of SAP has less chloride penetration than internal cured specimens using LWA. The RCPT value for the control mix was 783 coulombs which was greater than both the internal cured specimens, while the mix using SAP had a lower RCPT value of 483 coulombs which proved to be the best. The coefficient of permeability of mix M2 was 13.68×10^{-12} m/sec which was lesser than all the other mixes. Lesser the coefficient of permeability, the better the results.

Manoj Kumar and D. Maruthachalam (May 2013), discussed that the

experimental investigation on self-curing concrete. The concept of self curing is to reduce the water evaporation. As defined by ACI, “Self or internal curing refers to the process by which the hydration of cement occurs because of the availability of additional internal water that is not part of the mixing water.” Self curing distributes the extra curing water (uniformly) throughout the entire 3-D concrete microstructure so that it is more readily available to maintain saturation of the cement paste during hydration, avoiding self- desiccation (in the paste) and reducing autogenous shrinkage. The grade of concrete selected was M40. The self curing materials used are the use of Super Absorbent Polymer (SAP). The effect of variation in strength parameters i.e., Compressive Strength, Splitting Tensile Strength and Flexural Strength were studied for different dosage of self curing agent (0.2% – 0.4% weight of cement) and compared with that of conventional cured concrete. The optimum dosage is 0.3%. Addition of SAP leads to a significant increase of mechanical strength. Compressive strength of self-cured concrete for dosage of 0.3% was higher than water cured concrete. Split tensile strength of self- cured concrete for dosage of 0.3% was higher than water cured concrete. Flexural Strength of self-cured concrete for dosage of 0.3% was lower than water cured concrete. Performance of the self-curing agent will be affected by the mix proportions mainly the cement content and the w/c ratio. There was a gradual increase in the strength for dosage from 0.2 to 0.3% and later gradually reduced.

Nirav R Kholia (June 2015) discussed that the properties of hardened concrete, especially the durability, are greatly influenced by curing since it has a remarkable effect on the hydration of the cement. The advancements in the construction and chemical industry have paved way for the development of the new curing techniques and construction chemicals such as Membrane curing compounds, Self-curing agents, Wrapped curing, Accelerators, Water proofing

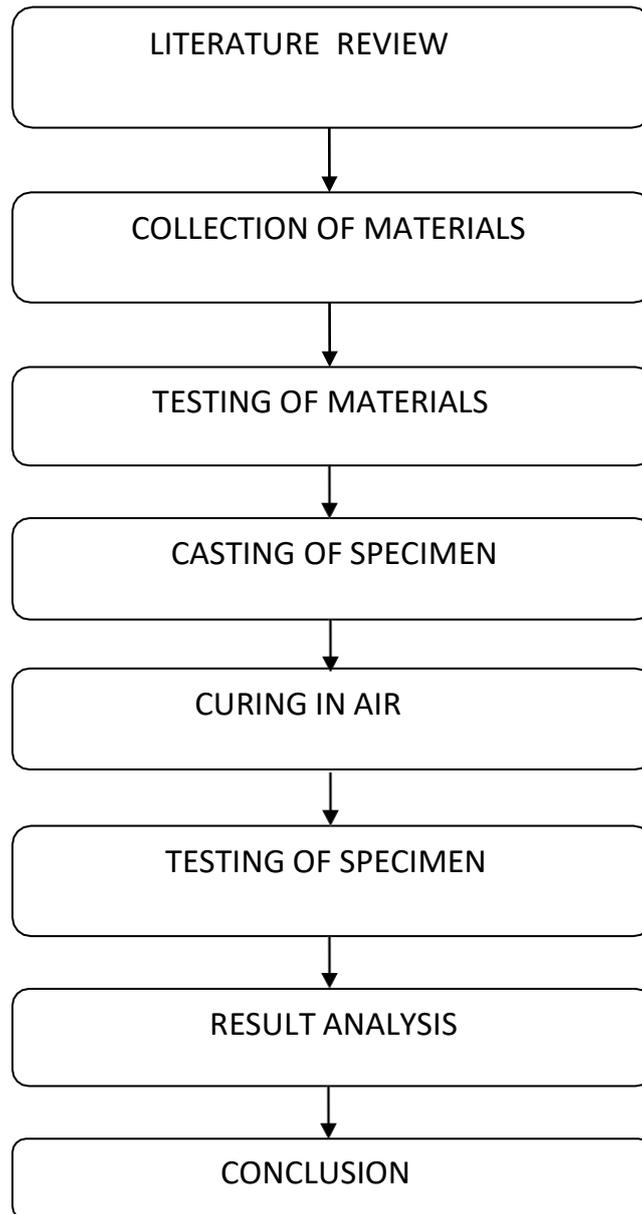
compounds etc. With the growing scale of the project conventional curing methods have proven to be a costly affair as there are many practical issues and they have been replaced by Membrane curing compounds and Self-curing agents up to some extent as they can be used in inaccessible areas, Vertical structures, Water scarce areas etc .It is most practical and widely used curing method. In this review paper effort has been made to understand the working and efficiency of curing methods which are generally adopted in the construction industry and compared with the conventional water curing method. Using Membrane curing and Self-Curing methods one can achieve 90% of efficiency as compared to Conventional Curing method. Self Curing method is most suitable for high-rise buildings especially in columns and inaccessible areas. Membrane curing compounds are most practical and widely used method it is most suitable in water scarce area. Wrapped curing is less efficient than Membrane curing and Self-Curing it can be applied to simple as well as complex shapes. Dry-Air curing should be avoided at the construction sites because designed design strength is not achieved by this method. The average efficiency of the curing compound increases with curing age initially by reduces at later age.

Sata et al (2007) experimentally investigated the effects of pozzolano made from various by-product materials such as Ground pulverized coal combustion Fly Ash (FA), ground fluidized bed combustion GGBS (FB), ground rice husk–bark ash (RHBA), and ground palm oil fuel ash (POFA) on mechanical properties of high-strength concrete. The results suggested that concrete containing FA, FB, RHBA, and POFA can be used as pozzolanic materials in making high-strength concrete with 28 days compressive strengths higher than 80 MPa. After 7 days of curing, the concrete containing 10-40% FA or FB and 10-30% RHBA or POFA exhibited higher compressive strengths than that of the control concrete.

METHODOLOGY

GENERAL

The methodology was framed on the basis of the literature survey and it is the step by step process of the entire work which are given below.



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