

PROJECT REPORT ON
“AN INNOVATIVE STEP TOWARDS THE DEVELOPMENT OF
FLOATING CONCRETE”

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ABSTRACT

Floating concrete is a special type of innovative concrete whose density is less than 1000kg/m^3 . Because of its low density and moderate range of compressive strength it can be used in non-structural applications as of now. The major step that is yet to be developed for the production of Floating concrete is developing and designing a rational mix proportion incorporating the two most important properties namely low density and compressive strength. Density of aggregates, cement content, water content, dosage of admixtures, plays an important role in the development of Floating concrete and more so on the overall density.

An attempt has been made in this study to develop a Floating concrete based on trials with an emphasis on overall density. Also, attempt has been made to obtain Floating concrete with considerable compressive strength. The study is carried out using 53 grade OPC, fly ash, GGBS, commercially available natural river sand, pond ash, pumice stone, EPS beads, commercially available polycarboxylic based superplasticizer, air entraining admixture, insulator (masterkure) and water. The materials were so proportioned such that the density of the resulting composite would be less than 1000 kg/m^3 .

The primary aim of the project is to develop floating concrete and to achieve this, different mix proportions were adopted based on absolute volume concept. The successfully developed floating concrete were accomplished in different phases. The cement was used in combination with fly ash and GGBS and was in the range of $200\text{-}425\text{kg/m}^3$. The waster was varied from $120\text{-}140\text{ l/m}^3$ based on consistency of the mix.

In this study, floating concrete was successfully developed for different densities ranging from $835\text{-}960\text{ kg/m}^3$ using the ingredients whose specific gravity is less than that in the conventional concrete. Study reveals pumice and EPS beads could be successfully used as an alternative to coarse aggregate and pond ash for fine aggregate which in turn results in lower density when compared to conventional material used in concrete. The compressive strength results show that floating concrete with strength upto 5MPa can be achieved and follows the Abram's Law as in case of Normal Concrete. The strength achieved in floating concrete can be extended to other applications as walling material. The experimental study has clearly demonstrated the volume of aggregate to be in the range of $0.7\text{-}0.75$ and the twin requirements of floating and compressive strength of the mix can be achieved by proper selection and proportioning of the materials keeping the density to be less than 1000kg/m^3 .