IRJMETS

e-ISSN: 2582-5208

International Research Journal of Modernization in Engineering Technology and Science

(Peer-Reviewed, Open Access, Fully Refereed International Journal)

Volume:06/Issue:04/April-2024 Impact Factor- 7.868 www.irjmets.com

A EXPERIMENTAL STUDY ON LIGHT WEIGHT CONCRETE BY PARTIAL REPLACEMENT OF CEMENT AND FINE AGGREGATE WITH FLYASH ANDTHERMOCOL

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ABSTRACT

With the quick development in building construction and urbanisation, buildings are getting taller and bigger than ever. In India larger of structures are constructed with the help of concrete resulting into very heavy structures. Heavy loads are one of the limitations for construction of tall buildings. If somehow structures are made lighter, cost of the foundation can also be lowered down. Conventional concrete is one of the main reason in increasing the weight of the buildings. Light weight concrete can be very much effective in reducing the overall weight of the building. In conventional concrete, larger volume comprises of coarse aggregates. In this study, attempt has been made to replace conventional coarse aggregates with Styrofoam which is a very light weight foam. Concrete with different aggregate replacement percentage was tested. The results show very encouraging results for the compressive strength and viscosity.

I. INTRODUCTION

Now-a-days the most suitable and widely used construction material is Concrete. This building material, until these days, went through lots of development. The definition of Concrete is the mixture of cement, water, additives or sometimes super plasticizers. It is artificial material. In the beginning it is soft, ductile or fluid, and gradually will be solid. We can consider this building material as an artificial stone. The most important part of concrete is cement. The production process of this raw material produces a lot of CO2. It is well known, that CO2 emission initiates harmful environmental changes. Now-a-days researchers make efforts to minimize industrial emission of CO2. The most effective way to decrease the CO2 emission of cement industry is to substitute a proportion of cement with other materials. These materials called Supplementary Cementing Materials (SCM's). Usually used supplementary cementing materials are fly ash. This is typically industrial by-product, hence the application of SCM's results less CO2 during cement production. The SCM's provide other advantages and that is why the usage in the concrete technology is more and more general. Concrete is a composite construction material composed primarily of aggregate, cement and water. There are many formulations that have varied properties. The aggregate is generally coarse gravel or crushed rocks such as limestone, or granite, along with a fine aggregate such as sand. The cement, commonly Portland cement, and other cementations materials such as fly ash and slag cement, serve as a binder for the aggregate. Various chemical admixtures are also added to achieve varied properties. Water is then mixed with this dry composite which enables it to be shaped (typically poured) and then solidified and hardened into rock-hard strength through a chemical process known as hydration. The water reacts with the cement which bonds the other components together, eventually creating a robust stone-like material. Concrete has relativelyhigh compressive strength, but much lower tensile strength. For this reason is usually reinforced with materials that are strong in tension (often steel). Concrete can be damaged by many processes, such as the freezing of trap Concrete is widely used for making architectural structures, foundations, brick/block walls, pavements, bridges/overpasses, motorways/roads, runways, parking structures dams, pools/reservoirs, pipes, footings for gates, fences and poles and even boats. A concrete mix is a combination of five major elementsin various proportions: cement, water, coarse aggregates, fine aggregates (i.e. sand), and air. Additional elements such as pozzolanic materials and chemical admixtures can also be incorporated into the mix to give it certain desirable