**EXPERIMENTAL INVESTIGATION FOR PARTIAL REPLACEMENT OF CEMENT BY PHOSPOGYPSUM AND USE OF STEEL FIBRE FOR MAKING NEW AGE CONCRETE.**

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**ABSTRACT**

Modern concrete is no longer a composite made up of only with cement, fine aggregate, coarse and water. It is now common to use admixture (chemical and minerals), pozzolanas for modifying different properties of concrete in fresh and hardened state. Based on the studies conducted over last decades of year for use of hazardous chemical waste. An experiment study was conducted to investigate the potential use of phosphogypsum (PG) in concrete. This project present the salient feature of the development of phosphogypsum cement concrete and discuss the improvement effected in the properties of concrete with the use of phosphogypsum as an admixture compared to the plain or conventional cement concrete. As the is 456:2000 opens the new avenue to the cement industry to use the variety of admixture and pozzolanas such as fly ash, silica flume, rise husk, highly reactive metakaoline and ground granulated blast furnace slag. This was accomplished by preparing cement concrete with ordinary Portland cement of 53 grade, coarse aggregate, natural fine aggregate and water. The objective of the use of phosphogypsum with the concrete in partial amount of replacing cement for modifying the properties of the concrete, controlling the concrete production cost, to overcome the scarcity of cement concrete mix M25. In this project phosphogypsum is used an admixture with 0%, 1%, 3%, 4% of ordinary Portland cement with 0.40. The compressive, tensile and flexural strength are studied by casting and testing specimens for 7, 14 and 28 days.

Keywords: Phosphogypsum (Pg), Admixture, Cement, Compressive, Tensile, Flexural.

**INTRODUCTION:**

With the advancement of technology and increased field application of concrete and mortars the strength, workability, durability and other characteristics of the ordinary concrete is continually undergoing modifications to make it more suitable for any situation. The growth in infrastructure sector led to scarcity of cement because of which the cost of cement increased incrementally. In India, the cost of cement during 1995 was around Rs. 1.25/kg and nowdays the price increased approximately four times. In order to combat the scarcity of cement and the increase in cost of concrete under these circumstances the use of recycled solid wastes, agricultural wastes, and industrial by-products like fly ash, blast furnace slag, silica fume, rise husk, phosphogypsum, etc. Came into use. The use of abovementioned waste products with concrete in partial amounts replacing cement paved a role for

(i) Modifying the properties of the concrete,

(ii) Controlling the concrete production cost,

(iii) To overcome the scarcity of cement, and finally

(iv) The advantageous disposal of industrial wastes.

The use of particular waste product will be economically advantageous usually at the place of abundant availability and production. Much of the literature is available on the use of fly ash, blast furnace slag, silica fume, rise husk, etc. In manufacture of cement concrete. However, the literature on the use of phosphogypsum in construction industry is in the budding stage. This paper tries to focus on the use of phosphogypsum in partial replacement of cement in concrete.



Concrete is acknowledged to be a relatively brittle material when subjected to normal stresses and impact loads, where tensile strength is only approximately one tenth of its compressive strength. As a result for these characteristics, concrete member could not support such loads and stresses that usually take place, majority on concrete beams and slabs. Historically, concrete member reinforced with continuous reinforcing bars to withstand tensile stresses and compensate for the lack of ductility and strength. Furthermore, steel reinforcement adopted to overcome high potentially tensile stresses and shear stresses at critical location in concrete member. The additional of steel reinforcement significantly increase the strength of concrete, but to produce concrete with homogenous tensile properties, the development of microcrack is a must to Suppress. The introduction of fibre was brought in as a solution to develop concrete in view of enhancing its flexural and tensile strength, which are a new form of binder that could combine portland cement in the bonding with cement matrices.

Fibre are most generally discontinuous, randomly distributed throughout the cements matrices.The term of ‘fibre reinforced concrete’ (frc) is made up with cement, various sizes of aggregates, which incorporate with discrete, discontinuous fibre. Fig shows steel fibre type.



STEEL FIBRE

**SCOPE AND OBJECTIVES**:

This proposed work is an effort underway to improve the environmental friendliness of concrete. Foremost and most successful in this regard is the use suitable substitutes for Portland cement, especially those that are byproducts of industrial processes, like phospogypsum. Also efforts to use fiber to improve the mechanical properties of concrete.

The main objective of this proposed work is to show the number of ways how the concrete industry can increase its compliance with the demands of sustainable development:

**PLAN OF RESEARCH WORK:**

The present research work is taken up with a view to investigate the use of supplementary cement material and fiber. Experimental work is carried out in three parts.

In first part the following physical and mechanical properties of conventional concrete.

Physical Properties like Slump cone, Compaction factor, etc

Mechanical Properties like Compressive strength, Flexural strength and Split Tensile strength

In second part the following physical and mechanical properties of new age concrete.

Physical Properties like Slump cone, Compaction factor, etc

Mechanical Properties like Compressive strength, Flexural strength and Split Tensile strength

And in third part comparative study of conventional and new age concrete.

Parameters will be varied in the experimental work (volume of SCM, fiber material)

**Chapter scheme:**

Introduction

Review of work done at national and international levels.

Properties of ingredients of concrete

Parametric studies on

Slump cone, Compaction factor test of conventional concrete mix

Slump cone, Compaction factor test of new age concrete mix

Compressive strength of conventional concrete cubes

Compressive strength of new age concrete mix cubes

Flexural strength of conventional concrete Beams

Flexural strength of new age concrete mix Beams

Split Tensile strength of conventional concrete Beam cylinder

Split Tensile strength of new age concrete mix cylinder

Result and Discussion

Conclusion and Future Scope

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