

# DETERMINATION OF AGE FACTOR OF CONCRETE: CASE STUDY OF PUNE METRO RAIL PROJECT

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**Abstract:** Concrete is most widely used construction material in the world. Its service life is considered with its mechanical strength, durability and serviceability. As concrete is most important and widely used materials in construction. Hence, to meet its requirements we need to achieve high quality concrete. As the long-term performance of concrete structure can affect the life span of concrete, so it is necessary to know its properties and behaviour at large extend. Hence, to determine the mechanisms that affects the properties of concrete, enhance the understanding and implication of behaviour on the service life of concrete. We must have knowledge of strength - time relationship is of importance when a structure is subjected to certain type of loading. Hence testing is important so in this project we are going to determine the age factor of various grades of concrete used in PUNE METRO RAIL PROJECT. Hence, in this project we are going to test the concrete that is only applicable for PUNE METRO and after testing of concrete from the results it shows that the behaviour of concrete with increase of time which gives a factor which is the main objective of our project.

**Keywords:** Ground Granulated Blast Furnace Slag (GGBS), Compressive Strength, Mechanical Strength, Quality.

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## I. INTRODUCTION

Now a day the world is witnessing the construction of very challenging & difficult structures, concrete being the most important & widely used structural material is called upon to possess very high strength. The main ingredient in conventional concrete is Portland cement. The amount of cement production emits approximately equal amount of carbon dioxide into the atmosphere. Cement production is consumed significant amount of natural resources. To overcome the above ill effect, the advent of newer material & construction techniques & in this drive, admixture has taken newer thinking with various ingredient has become a necessity.

Concrete is the most widely used construction material in the world. Its service life is considered synonymous with its mechanical strength, durability & serviceability. The selection of proper ingredients & mixture proportion is important to produce concrete that can meet strength & durability requirements. However, achieving a high-quality concrete may be elusive if adequate attention is not paid to its early age properties.

The long-term performance of concrete structure is affected to a large extend by the properties & behaviour of concrete at early age. However, the fundamental mechanism affecting the early age behaviour of concrete have not yet been fully understood. This is due to the various highly interrelated factors influencing it, & the complexity of testing techniques needed for its investigation. With modern development in concrete technology, it has become essential evaluate the influence of these interrelated factor & their implication for the service life of concrete structures. Thus, a more fundamental approach for investigation the early age behaviour of concrete, along with more reliable testing techniques, is required.

The strength of concrete is traditionally characterized by 28 days value. However, strength of concrete is expected to increase with time at continuously diminishing rate. Knowledge of the strength-time relationship is of importance when a structure is subjected to certain type of loading at a later age.

Core testing is most direct method to determine the compressive strength of concrete in a structure.

It provides useful, concise & coherent information on the behaviour of concrete at the early age, which should enhance the understanding of the implication of such behaviour on the service life performance of concrete structures.

This report provides a critical overview of research on the mechanisms that affect the properties of concrete & its performance at early age.

## II. METHODOLOGY

Methodology is the basic starting procedure to carry out the work for quality assurance and to maintain the quality and quantity of the concrete and to shorten the construction cycle to improve the productivity of concrete construction strength development of concrete for various grades. By inspecting the site, we will check for the availability of materials as well as testing. By planning we decided a time schedule for each testing of raw material and concrete. Also, for mix design and equipment casting.

We are going to discuss with our site project guide Mr. Yusuf Inamdar Sir about the procedure included in this project. And various tests are going to perform on cement and aggregates. After testing we will design for various grades of concrete and finally, we are going to cast various concrete cubes. And the cubes are kept for curing in curing tank and testing will be done for 3, 7, 28, 56 and 90 days.

After getting the test results we will calculate and determine Age Factor Of concrete for various grades of concrete.

## III. CONCLUSION

Hence, in this project we are going to test the concrete that is only applicable for PUNE METRO and after testing of concrete from the results it shows that the behaviour of concrete with increase of time which gives a factor which is the main objective of our project.

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