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# Indigenous Development and Testing of Accelerated Curing Chamber for Concrete Mixes

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**ABSTRACT:** Typically, the curing of a concrete block takes roughly 3, 7, 14, and 28 days, which is not particularly cheap, as it wastes formwork and is time consuming. So, the experimental procedure presented below tells us about accelerated curing, and the outcome produced after the experiment is similar to that of normal curing utilised. This testing was carried out in a heat resistant glass chamber which can hold a temperature of 240 C, and the heat supply to the water contained in this chamber was continuous. The temperature was initially brought to a constant and blocks were installed, after which the water temperature was kept constant for the appropriate time using temperature resistant.

**KEYWORDS:** Accelerated curing, Curing Tank, Compressive Strength

## I. INTRODUCTION

Accelerated curing is the process by which temperature of the concrete is raised artificially by applying external heat, to speed up the rate of gaining strength. Increase in temperature leads to reduction in time for gaining desired strength of concrete in the presence of water.

Normal curing of concrete for 28 days is quite complicated, time consuming for results. There are no adequate results to quantity durability. So to avoid this time consumptions and delay of results, the accelerated curing strength can be extremely helpful. As per IS 9013 (1978) there were only prediction for 28 days, strength of normal concrete from accelerated curing strength.

The technique of accelerated curing is especially useful in the prefabrication industry, wherein high early age strength enables the removal of the formwork within 24 hours, thereby reducing the cycle time, resulting in cost-saving benefits. A typical curing cycle involves a preheating stage, known as the "delay period" ranging from 2 to 5 hours; heating at the rate of 22 °C/hour or 44 °C/hour until a maximum temperature of 50–82 °C has been achieved; then maintaining at the maximum temperature, and finally the cooling period. The whole cycle should preferably not exceed 18 hours.

Accelerated curing is very much useful in Precast construction. Although a number of methods currently exist for the acceleration of the curing process, most precast manufacturers maintain relatively simple operations, and due to logistical and economic constraints, only employ one or two of the methods described herein.

## II. OBJECTIVE

1. To investigate the strength of concrete as soon as possible by using accelerated curing method. To Obtain the Compressive Strength of Concrete earlier.
2. To compare the results of normal curing & accelerated curing of concrete blocks.
3. To Investigate or demonstrate superior strength achieved for different types of blocks.



### III. RELATED WORK

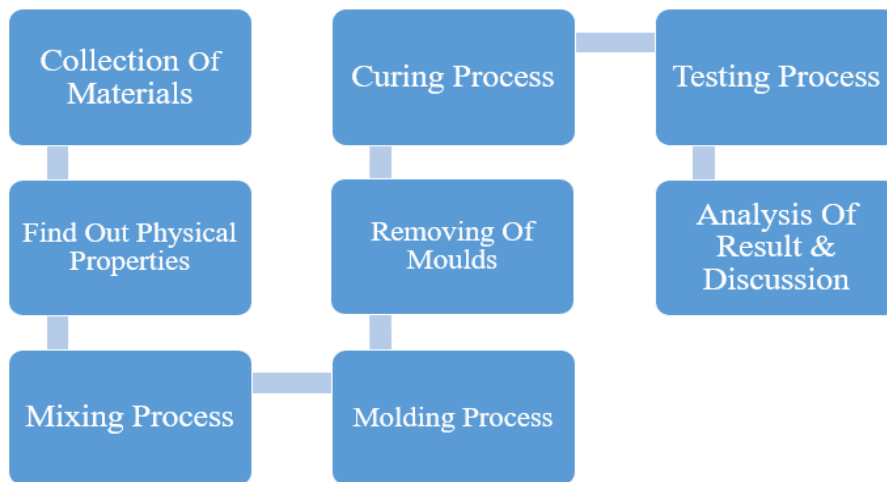
As global construction growth continues, the need to build cheaper buildings is more difficult-to-build-on locations in shorter periods of time while providing enhanced performance will always be desirable in order to maximize both product economy and quality. There are two techniques for concrete's rapid cure. 1.Physical Process 2. Chemical Process:-

1. Physical Process: It generally takes place in a tank, employing a boiling water method or a warm water method or under the heat of the sun, which is a natural process.
2. Chemical Process: A ratio of chemical admixtures is added to the concrete mixture to accomplish this. Triethanolamine, calcium formate, sodium thiocyanate, and calcium nitrate and nitrite were mostly used in the experiments, which were effective..

### IV. METHDOLOGY

Based on many literature reviews, availability in market, cost efficiency, and also study regarding different material to be used for construction of accelerated curing tank further development of curing tank needs to be started. Many materials are used in the construction of this tank and they are glass, tiles, relay, steel frame, adhesives, digital display, heat sensor, heaters, stirrer, etc.

#### 1) Flow chart of the process



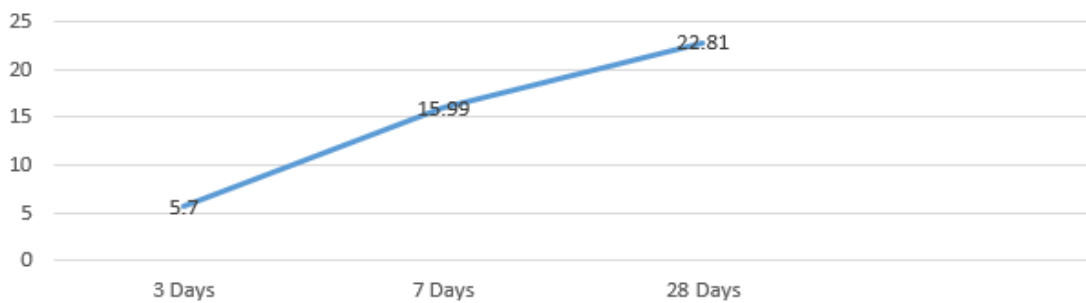
This process helps us acquire compressive strength as early as possible. This process is mostly used in prefabricated industries as it is cost benefiting then normally used curing process which takes about 7 to 28 days for curing. We have studied different types of curing process from research papers. Firstly, we are creating a accelerated curing chamber and using heaters the water is heated and using temperature detectors to maintain it constant by this way we can determine its strength earlier.

V. RESULTS

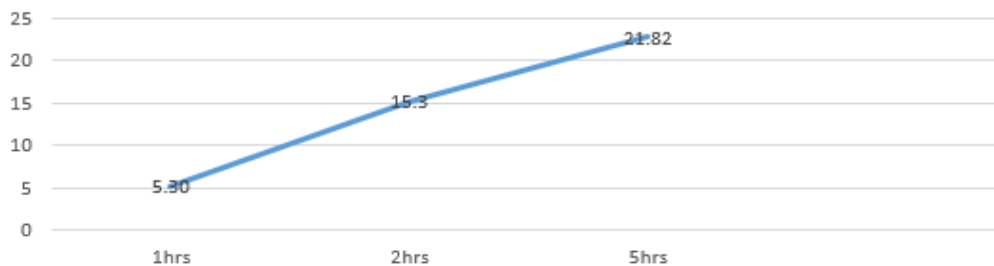
1) Result Using Normal Curing Method :-

SAMPLES	STRENGTH/DAYS/	STRENGTH/TIME
SAMPLES 1	5.70Mpa /3days	5.30Mpa /1hrs
SAMPLES 2	15.99Mpa /7days	15.30Mpa /2hrs
SAMPLES 3	22.81Mpa /28days	21.82Mpa /5hrs

Using of normal curing methods, the results of compressive strength of cubes for 3, 7 and 28 days is 5.70,15.99 and 22.81Mpa respectively. The graph of these values is given below:-



Using of accelerated curing methods, the results of compressive strength of cubes for 1hrs, 2hrs and 5hrs is 5.30Mpa, 15.30Mpa,21.82Mpa respectively. The graph of these values is given below:-



VI. CONCLUSION

Following are the conclusions drawn from the experimental test results:-

1. When comparing accelerated curing to natural curing, the outcomes are somewhat similar.
2. When temperature is maintained constant and water is stirred appropriately, the "crossover effect" is also minimised.

This study compares the compressive strength of concrete that is curing normally with concrete that is curing using accelerated tank

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