

**FINAL YEAR PROJECT REPORT  
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The logo of MARA Institute of Technology is a shield-shaped emblem. It features a yellow diamond at the top, followed by several horizontal lines representing a book or a stack of papers. Below this, there are two crossed white swords or spears. The entire emblem is set against a light purple background.

**THE EFFECT OF NONYLPHENOLETHOXYLATE  
ON LIGHTWEIGHT CONCRETE**

**BY :  
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## **ABSTRACT**

Lightweight concrete is a concrete lighter than the conventional concrete made from lightweight aggregate or in the form of aerated concrete.

This project analyzed the effect of **NONYLPHENOLETHOXYLATE** as an air-entraining agent to lightweight concrete. The experimental program comprised of design mix cement : sand ratio namely 1:3 and Nonylphenoethoxylate dosages of 50 ml, 75 ml, 100 ml, 300 ml, and 500 ml per 100 kg of cement. The strength development test carried out on 150 mm cube are at 3, 7, and 28 days curing. The Figg-air method for determining the air permeability by using a pressure difference of one atmosphere is carried out on 150 mm cube at 28 days curing.

It is known that density and strength of lightweight concrete is lower than normal concrete. It can be produced with a density range of approximately 300 to 2000 kg/m<sup>3</sup> and cube strengths of approximately between 1 and 60 N/mm<sup>2</sup>. These values can be compared to those for normal density concrete of approximately between 2100 and 2500 kg /m<sup>3</sup>, and cube strengths of between 15 and 100 N/mm<sup>2</sup>.

# CHAPTER 1

## 1.0 INTRODUCTION

### 1.1 GENERAL

All concrete are cement bonded products. Concrete is generally understood to be a mixture of cement, water, and aggregate which takes the shape and texture of its mould, or formwork on site. New materials are available in many sizes, shapes, color, and texture for special uses ranging from superlightweight and insulative concrete to dense structures capable of radiation shielding. Like most construction products, it can be made to meet standards and new design such as:-

- a- Reinforced concrete - Composite material of steel and concrete for precast and prestressed concrete for building and bridge.
- b- Concrete masonry - For masonry wall
- c- Concrete pipe - For irrigation, drainage, culverts and mains pipe (pressure water supply)
- d- Lightweight concrete - It can be no fines concrete, lightweight aggregate concrete or aerated concrete for reduction of dead loads in structure.

Potentially, the best concrete products can be made in factories by the used of ready-mixed concrete or pre-cast concrete. However, concrete is one of the materials which is often made on the building site. In practice its good quality depends on