

**THE USAGE OF WATER TREATMENT SLUDGE IN  
LIGHTWEIGHT FOAMED CONCRETE**

By

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## ABSTRACT

Lightweight foamed concrete was produced by using water treatment sludge that was collected from Batu Ferringhi, Pulau Pinang water treatment plant. Five different percentage of sludge were investigated: 10%, 20%, 30%, 40% and 50% as a replacement for fine aggregate material. Alum sludge was selected to be raw material from other sludge. In addition, the foam was produced by using mixtures of water and surfactant liquid based on surfactant water ratio of 1: 30. There were two test has been undertaken which are compression test and flexural test in order to examine the compressive strength and flexural strength, cubes with dimension 100 x 100 x 100 mm were used for compressive strength and mould of beam with dimension 100 x 100 x 500 mm were used for flexural strength. The result on specimen which contained sludge as a replacement for fine aggregate was compared to the result testing with normal lightweight foamed concrete that have produced with approximately density of  $1300 \pm 10 \text{ kg/m}^3$  at 28 days.

# CHAPTER 1

## INTRODUCTION

### 1.1 Background

Sludge is the mixture of water and solids separated from various types of water as a result of natural or artificial processes and other definition is a dense suspension of solid in water. Sludge is a complex material. At moisture contents greater than 90%, sludge behaves as liquids (Hammer and Hammer Jr., 1996). Treatment of water and wastewater will produce solids of sludge in the suspension having densities close to the water and difficult to separate the solid from the liquid fraction. For sewage sludge would be the sludge from urban wastewater treatment plants, septic tank sludge would be the sludge from septic tanks which contain human excreta and domestic waste water from single or multiple human dwellings and for industrial sludge would be sludge from the treatment of industrial waste water of the sectors. Sludge from septic tanks, cesspools and similar installations shall be taken to a wastewater treatment plant for further treatment.

Sludge is collect from treatment process, dewater and treat prior to disposal. Process of handling, treatment and sludge disposal is very important in water and wastewater treatment system. There are two treatments. One is wastewater treatment and another one is water treatment. Sludge that produced from wastewater treatment has high quantities of organic content. The cost of handling