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**AN EXPERIMENTAL DIFFERENT  
SHAPE OF LIGHTWEIGHT PALM  
OIL FUEL ASH CEMENT BRICK  
MICROWAVE ABSORBER  
CHARACTERIZATION**

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## ABSTRACT

The research on green technology to produce a useful product from dumping of these wastes is conducted. The alternative material to reduce the decline of the surround environment must perform studied on biomass reused. Thus, the composition outcome of cement brick absorber using biomass material has been investigated. The combination of biomass from palm oil with other element such as cement, foam and water were used to produce palm oil biomass cement brick absorber (POBCBA). The achievement of the electromagnetic wave absorption is improved with the increase of thickness. For the simulation, modeling and analysis of the properties of biomass cement brick absorber are using software, Computer Simulation Technology (CST) Microwave. The parameter such as dielectric and reflectivity properties used in this project. The measurement of absorber measured by using Arch Method Measurement for absorption performance from different thicknesses of brick with 3 cm, 6 cm, 9 cm, 12 cm and from different shape of brick which are semi-pyramidal hollow in cement brick and wedge pyramidal hollow in cement brick at frequency range 8 - 12 GHz. Among all of the prototype, the wedge pyramidal hollow gives a better absorption.

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# CHAPTER 1

## INTRODUCTION

### 1.1 OVERVIEW

This chapter explained about background of the study, problem statement, objective study, scope of study and thesis organization.

### 1.2 BACKGROUND

With the increase of the telecommunications industry, the demand of absorbing electromagnetic anechoic chamber increases. Anechoic chamber is a room that used to remove the unwanted microwave signal that would interfere with the device under test (DUT) performance [1]. Anechoic chamber used to carry out the radar, antennas, electronic warfare test and measurement [1]. During measurement, it provides a non-reflection, a time of quiet and full tests, prevent information leakage tests that can interfere with nearby electronic equipment. In addition, it also can isolate external electromagnetic signals where it may have a bad influence on the experiment [2]. The anechoic chamber has its performance include multiple path loss uniformity, field uniformity, quiet zone, cross polarization characteristic and so on[1]. The reflected level of quiet zone, usually expressed in dB, react to the reflected signal strength on ratio to the direct signal strength. . Basically, the reflected signal in anechoic chamber is hit by the floor, wall, ceiling and auxiliary antenna.

The design of microwave absorber should be developed based on parameters such as reflection loss, the magnitude and phase for various angles and perpendicular polarizations. The performance of the absorber is affected with different shapes and thicknesses. Many type of microwave absorber such as pyramidal, rectangular, wedges, honeycomb, flat, helical and many other are used in microwave design [3]. This study is only focusing on the rectangular shape of brick microwave absorber.