CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

The research methodology in this study more based on experiments and tests conducted to investigate the effect of different percentage used of eggshell powder as a replacement of fine aggregate on concrete brick performance. Based on the aim of the study which to investigate the effect of eggshell powder as concrete replacement in concrete brick using ratio 1:3, the main material used for the experiments was eggshell and the composition of concrete brick include ordinary Portland cement and sand with w/c ratio 0.5. Besides, the discussion on materials and types of testing used will be conducted and the methodology along the precaution to conduct the testing will be following the British Standard.

3.2 MATERIALS

Based on the aim of the study is to investigate the effect of eggshell powder as cement replacement in concrete brick, the main material used for the experiments was eggshells and the composition of concrete brick include Composite Portland Cement, sand and granite. Eggshell first will be grinded into powder and replace the fine aggregate by 5% in the concrete brick production. Sand will be used as the fine aggregate and the granite will act as coarse aggregate. Based on concrete design ratio, amount of composition between eggshell powder and fine aggregate used in concrete mixture will be controlled accordingly.
3.2.1 EGG SHELL

Figure 3.1: Eggshell

Figure 3.2: Eggshell powder
As eggshell is one of the food industry wastes, it can be obtained from the restaurant or any food plant before it is disposed. In this research, chicken eggshells were collected from the Eggtech Manufacturing Factories based on Figure 3.1 and then grind by the mixer into fine powder. The amount of eggshell powder needed for these experiments will be calculated before grind process. The eggshells that have been crushed was cleaned by water to remove the egg stick on the eggshell and dried under hot sunray for 2 days. After that it was grinded and sieved through 300 μm. Material that pass through the sieve will be used for cement replacement with percentage 0, 5, 10, 15 and 20%. According to (Tsai et. al, 2004), the eggshell powder usually has up to 95% of calcium, 1% of magnesium carbonate, 1% of calcium phosphate and 4% of organic matter.