CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The construction industry has become a major consumer of non-renewable resources and a huge waste producer. Based on recent study in developed countries, 30 to 40% of natural resources were exploited by building industry, 50% of energy used for heating and cooling in buildings, a most 40% of world consumption of materials converts to build environment and 30% of energy use due to housing (Pulselli et al., 2007). Malaysia well known as developing country, so it is expected to achieve a similar percentage. This shown that, there will be huge amount of resources and energy consume in building life-cycle. It became responsible to industries to tackle these issues and develop sustainable and environmental friendly constructions. Using EPS (expended polystyrene) as replacement material for fine aggregates in bricks was one of the innovation to develop sustainable and environmental friendly construction material. Therefore the strength of wall using EPS brick is top priority to be study on. To fulfill this requirement, proposed EPS brick wall must be able to resist the compressive and tensile force, and also thermal energy effect to be compared with conventional brick wall application.
1.2 OBJECTIVE

The main objectives for this research are:

- To compare the strength performance of EPS brick wall compared to conventional brick wall.
- To design the optimum mix percentage of EPS to obtain maximum strength for the wall.

1.3 BACKGROUND OF STUDY

In Malaysia, the construction industry plays an importance role to achieve the developed country status. The construction industry is also importance in contribution and influenced in development of social and economic infrastructures and buildings. ‘Malaysia construction output is estimated to be approximately RM 50 billion’, this represented 3-5 percent of Gross Domestic Product per annum (CIDB, 2007). This industry also provides the job opportunities for almost 1.03 million people that represent 8 % of total workforce (CIDB, 2006). Manufacturing sector, financial and banking, agriculture, mining and professional services, are the multiplier effect by this industries. It also acts as catalyst of economic recovery and as a driver for the modernization of Malaysia.

Construction material that widely uses in Malaysia is bricks. Conventional clay bricks are widely being uses in construction, for example in form of wall for buildings. Ongoing mining of clay and sand will occur which it’s not sustainable for the industry. The oldest type clay brick consumed high energy in production process that will involve in fossil fuels burning.

After a year, there came the cement bricks as solution for the industry. Nowadays many researchers that came out with other type of brick that becomes a solution. They have combined the material to replace the aggregate or the cement for the brick. Introducing of
recycling solid wastes into useful supplementary raw materials for new building materials, is one of the methods. EPS waste is a by-product from packaging industry.

Expanded polystyrene beads (EPS) is one of the industrial solid waste that having serious problem for disposal. The world today has concern in environmental issue, the problem to accumulate of unmanaged solid waste. The EPS is not a biodegradable type; it will not provide an environmental friendly solution to landfills. In increase concern for environmental issues, the sustainable development and energy conservation concept has become paramount importance.

It is one of many lightweight, low strength materials with density between (16-27) kg/m$^3$ and good energy absorbing characteristics. It is well known for its good thermal and acoustic insulation properties leading mainly to non-structural applications including precast roof and wall panels and lightweight infill blocks. It also in the way to reduce the density of the bricks, as well in improving thermal insulation properties, there forms the light weight brick innovation.

Brick technology is growing and many advances and innovations have appeared and a part of them are by use of artificial aggregates and lightweight aggregates such as slag, fly ash and porcelainite rocks. This project aims to experimental the suitability of lightweight brick applied as wall. The lightweight substituted material is expandable polystyrene (EPS).In this study, the bricks are arranged in prism form. Standard masonry panels and panel using EPS bricks were constructed and used as the test specimens as stated in standard.

Lightweight brick can be defined as a type of brick which includes an expanding agent in that it increases the volume of the mixture while giving additional qualities and