CHAPTER 1

INTRODUCTION

1.1 Background of Research

Nowadays in Malaysia, many contractors and developers are still struggling to catch up with the current pace of development, especially in meeting country's demand, as conventional construction methods still work. Although traditional practice, this conventional method has several disadvantages such as high skill labor and material costs, and especially, a tendency not to change production of construction waste. Therefore, to overcome these weaknesses, permanent formwork using lightweight concrete is chosen as an alternative solution. Briefly, the new technology existence in construction to overcome this problem is permanent formwork using lightweight concrete which is more useful than conventional methods in terms of effectiveness of the functions, lighter, safety features and productivity.

In conjunction, this research presents the design of a lightweight concrete arch slab to investigate the adequacy of the dish as a fixed reference for the floor slab above. In addition, two sets of arch slabs will be prepared with different density and dimension to propose to investigate the behavior under load application. Following this investigation, made significant experimental procedure of the properties of materials and preparation, to test established. From the results and discussion, as conclusion that the design of the lightweight concrete arch slab function adequately as a fixed reference for the floor slab above while arch slab that has a higher arch increases under constant and thickness measured period, stronger than the arch of the increase is lower.
CHAPTER 2

LITERATURE REVIEW

2.1 General

2.1.1 Permanent Formwork

Formwork is the term given to either temporary or permanent molds into which concrete or similar materials are poured. The formwork is built on site out of steel, timber or plywood. It is easy to produce but time-consuming for larger structures and the plywood facing has a relatively short lifespan. It is the flexible type of formwork, so even where other systems are in use, complicated sections may use it. Permanent formwork provides a practical and economical way of supporting freshly poured in-situ concrete in composite upper floor.

In this research, the type of formwork being use is a permanent one specifically for slab construction. A permanent formwork is a formwork that stays in place for the life of the element it is supporting and becomes a part of the permanent structure of the building. It does not only act as a temporary support to control the shape of the fluid concrete, but it also helps to strengthen the finished concrete structure.

Industrialized Building System (IBS) or semi-precast system known in Malaysia as a ‘half slab’ is another development in floor slab construction. The technique employs a reinforced precast floor panel that serves as permanent formwork for the composite with cast in-situ concrete. Steel lattice trusses projecting from the top of the
CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This research methodology chapter explains clearly about the study methods for producing lightweight concrete arch slab by using polystyrene beads as an extenuating agent. The main objective of this study is to determine the density and compressive strength of lightweight concrete to be used as arch slab by using polystyrene beads. The tests will be conducted to find compressive strength and the displacement of the arch slab. All the procedures are prepared accordingly, to assure the research objectives are applicable, and to secure proper sequence and smooth running of the entire flow, from start until end. Six samples will provided, which three of them are 50mm and the rest is 75mm.

3.2 Arch Slab Design and Properties

In this research, the rise of arch or arch height is the varying parameter, while the span length and thickness are fixed. The arch slabs are designed as shown in Figure 3.1 and 3.2. The design is made by using the ellipsoid arch formula.