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 be 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.
CHAPTER 4

RESULT AND DISCUSSION

4.1 Introduction

In this chapter, the result and discussion will be focused on the performance of EPS in the lightweight concrete. All the tests method involved were described in the previous chapter. The results presented comprehensively through tables, graphs and bar chart, with essential analysis and discussion. All the results obtained from the density, compressive strength, and flexural test for two different height of arch slab. The main objective in assessing the results is to compare the measured performance with the basis of the manual calculations. In the end, these results and discussions will draw necessary conclusion and suggest relevant recommendations.

4.2 Compressive Strength Test

Compressive Strength Test, trial and error method was used in determining the most suitable mixture in preparing research samples. A trial mix have been prepared during the research and from the results, the mixture with the compressive strength with the density will be used for further investigation.

After 3, 7 and 28 days of curing the concrete cubes, the result of the compressive strength of concrete is obtained, as shown in Table 4.1. There were three samples for each test and the results would be taken as the average of these three. The percentage of EPS applied is fixed for all mixtures and the difference in the results would occur because of the error or precaution.
CHAPTER 5

CONCLUSION

5.1 Conclusion

Based from the study, the result and analysis can be concluding that all the objectives were achieved. Hence, the results and discussion can be summarized as follow:

1. Polystyrene concrete can be classified as lightweight concrete according to American Concrete Institute (ACI). It is because the density of polystyrene concrete is in the range set by ACI which is 300 to 1850 kg/m³.

2. The workability characteristics of the mixes are very different from the normal concrete. Compaction by vibration was not effective owing to the lightweight nature of the mixes. The mixes were cohesive that the cement slurry coating the beads was very effective in holding the mix together.

3. EPS contribute to low weight and low density; it also contributes to the low strength of the specimens. EPS do not contribute to the strength of the material. The strength obtained in the mixes with EPS is very low, due to the bead’s weakness in compression. This is also because EPS do not react chemically with the mix to contribute strength.

4. The arch rise of an arch tile affects its behavior under load application. Comprehensively, under a fixed measurable span length, and thickness; an arch structure with lower arch rise dimension possesses higher load bearing capacity.