CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Reinforced concrete is compulsory in nowadays building and they contain cement, aggregates, steel then mix with the water. The purpose of this mixture is sometimes different according what to be built. Fresh concrete can built into any shape and they are good in compression but weak in tension. Many research has been done to overcome this type of situation and some of that by changing the ration of the concrete and type of aggregate. There are not so much difference after change the ratio and the aggregates but there is a slight increment in the positive aspect but there also some disadvantage on changing these two type items.

Aggregates play a huge part in mixing the concrete because the surface in the aggregates that makes the bond between the cement plus the water who bond them together to make strong hardened concrete. Common failure in aggregates are the surface which are sometimes not suitable in some part at construction because the angular shape may not be bond with the other materials. Concrete is more workable when smooth and rounded aggregate is used instead of rough angular or elongated aggregate. Most natural sands and gravel from riverbeds or seashores are smooth and rounded and are excellent aggregates. Crushed stone produces much more angular and elongated aggregates, which have a higher surface-to-volume ratio, better bond characteristics but require more cement paste to produce a workable mixture.

There also moisture in aggregates but there are small amount of it and the density of the aggregates makes it heavier. Nowadays there are many research on lightweight concrete which aggregates play a huge part in it for example oil coconut
shell, seashell and many others. So what my research is about changing the normal coarse aggregates with what we are normally called polystyrene and also called expanded polystyrene beads. The characteristics of the polystyrene may affect some of the criteria on the concrete. This EPS which are lighter in weight are one of the advantage of using it plus the smooth surface of it. If the surface is smooth, the bonding between other materials may be strong and bond tightly together. These can make the concrete gain more strength to support the load.

With these changes can it make the structure stronger and durable to the construction because there so many aspect that can affect the structure nowadays for example from the natural disaster, can the structure withstand the load or pressure given to the structure plus can it long lasting.

1.2 PROBLEM STATEMENT

Reinforced concrete is usually used as a structure part in construction. But there are some weakness in each of the item used that may cause defect on the construction. For each item that use in concrete structure there must be weakness in one each of them. During the life service these structures are subjected to many loads, wind gravity and else. These can make the life of the structure become shorten or not strong enough. What we can do is try to minimize the risk by changing certain aspect to make the structure stronger and also long lasting.

Plus nowadays the cost is expensive because usually in structure of the concrete there will need many items for mixture and in this case is aggregates which are more expensive day by day. And the quality of the aggregates may not be suitable with price give and to fit in some construction project. Because as we all know aggregates are not all the same because of their shape especially, the density of the aggregates. And the technology nowadays are more to greener which to save the environment, so that we can save some cost by changing the normal aggregate with polystyrene , there may not be all to change to polystyrene but maybe we can change some of the aggregates with expanded polystyrene beads.
As we all know the normal aggregates is much heavier than the polystyrene because they contain more moisture content. Compare to the EPS they are light in weight plus their surface are usually similar to each other and their surface is very smooth compare to the normal aggregates which may be rough and not same in shape. If we using the EPS as partial replacement of the aggregates it can make the structure more light in weight and also save the cost of course.

1.3 OBJECTIVES OF THE STUDY

There are two (2) main objectives for this project:-

i. To check the deflection and type of cracking on this structure using expanded polystyrene beads (EPS) after load is applied on lightweight beam.

ii. To check and compare the capacity of normal concrete beam and lightweight beam due to optimum moment

1.4 SCOPE OF STUDY

This study is focused on the behaviour of lightweight concrete when it containing different percentage or ratios of EPS beads as partial of aggregates. The ratio are varies, for the control 1:3:0, ratio 1 1:2.5:0.5 and ratio 2 1:2:1. Two mixes batch were prepared during this study.

The size of the beam is fixed to 0.15m base x 0.3m height x 2m span dimension and for the cubes test, mould with size of 100mm x 100mm x 100mm is used. For the curing process, the period of the concrete cube subjected to water is 7 and 28 days. The methods used for curing is water curing. The test for compressive and flexural strength of the concrete cube is conducted after the process of curing for each specimen.