CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Composite beam is type of system that combines the advantages of steel structure and concrete structure to form better building structures for future development. As early as 1808, the first structures with iron sections and concrete preceded the emergence of reinforced concrete with non-rigid round bars as propagated by (Monier Bracher 1949). Besides that, according to Monier Bracher, 1949 the composite action of composite beam is achieved by connect the steel and concrete material elements by means of connector. Shear connectors between concrete and steel in composite beam can play an important role in the shear response of a structure. The connector provide necessary shear connection for composite action in flexure, and can be used to distribute the large horizontal inertial forces in the beam to the main lateral load resisting elements of the structure.

As the world of industry revolutionize, the safety, cost and period of projects has been manipulate in order to get the best result of it. The manipulation of it in construction industry, the most common and frequently encountered combination of construction material are the design and implementation of steel-concrete composite members for building and offshore structures. The main factor used of reinforced of concreted beam produce minimum wastage of material. Therefore in terms of cost of the projects for using composite beam, lower than reinforced concrete beam. This long term efficient money consume due to composite beam reduce the wastage of material and labor mistake during construction works. Besides that, in terms of duration of projects which can influence the cost of project, composite beam obviously gives short period time of project due to its excellence in product manufacturing compare to reinforced concrete beam?
1.2 Problem Statement

The development of the industry today has mainly focusing on the strength and safety of structural members of projects. One of the method used to replace traditionally reinforced concrete structure is composite of steel-concrete materials. The replacement of composite beam compare to the traditional reinforced concrete beam brings more advantages compare to its disadvantages. The main focus replacement of composite beam is regarding to the structural and safety of structures components of building. The previous experimental shows the increasing of structural capacity of composite beam compares to traditional reinforced concrete beam. The composite beam which is combination of concrete and steel beam which connect by means of connector to act as a unit to produce high stiffness which resulting increasing of strength and stiffness of the composite beam with minimum used of materials (Johnson and Willmington, 1972).

1.3 Objective

The main objective of this study is to determine the experimental study of the structural capacity of composite I Beam with modified connectors. The following are for thesis study:

(a) To find the ultimate load, moment and deflection of composite beam under experimental flexural test.
(b) To investigate location of connectors for optimum composite action of steel and concrete elements in order to find ultimate load, moment and deflection of composite beam.

1.4 Scope of Study

Scope of this study will focus on experimental study for structural capacity on the use of combination between steel I-beam and concrete material to produce composite beam rather than use traditional reinforced concrete beam. The results will be used for selection of composite beam whether it can be used to produce building structure of high quality for future development.
This study also focusing on the use of connector in order to produce strong bonding between the two steel I-beam and concrete. The connector use is a simple connector which being applied by the method of welding.

Steel I-beam used size section of 124 x 74 x 8 UB, meanwhile for concrete studies using the cube size of 150mm x 150 mm x 150mm. The concrete studies produce by normal weight concrete in term of strength and workability and concrete strength supposed to be tested is C20/25 for compressive strength test.

Simply supported beam composite beam of size 0.15m x 0.3m x 2m will be produced from the combination of steel I- beam size section 124 x 74 x 8 UB and concrete strength of C20/25.