CHAPTER I
INTRODUCTION

1.1 Background Overview

Before a construction project takes place on site, structural design and architectural design must be done. The essence of both kinds of design is needed in order to achieve the owner’s wants. Structural design is crucial as structural failure may cost not just financial loss but as well as the loss of human lives. In the process of structural designing, there are some factors needed to be considered, such as: the purpose of the structure; the budget of the project; and the quality of the structure. In order to achieve sustainability of the structure, careful planning and thorough inspection on site is a must. Therefore, an engineer has a job of planning and design a strong, stable yet cheap structure.

The advancement of technology as well as the globalization has made the construction industry to be competitive, as competitors are competing to build and create a quick yet economical structure. Therefore, this competition had produced talents that created helpful innovations and sustainable products such as lightweight concrete. With such innovations and advancements, an engineer must design accordingly, with the correct method and the correct materials.

Batam is a city located at Riau Islands. It is an industrial city in which it has a strong economy with a fast-paced growth. The city is full of different types of sectors such as manufacturing, shipyard, concrete, steel, piping, gas and oil, electronics and so on. In order to fulfill the demands of an industrial city, a strong yet cheap structure is needed to attract investors or business owners to own or build an industrial estate. Though cost is a main factor, the strength and the area of the structure must be able to maintain industrial activities.

Steel construction is commonly used to build structures for industrial purposes. The reason why steel construction is commonly used in building industrial workshop is that it has a speedy assembly and it is stronger than concrete when it is designed for an expansive length. Even though it has such advantages, it comes with an expensive budget to fulfill this steel construction. (Juwanto, 2018)
The efficiency of the structure is a guide for an engineer if his/her design corresponds towards the quality of the material. In this writing, the effectiveness of the structures designed by the structural consultant and the construction drawing given by the contractor is compared with the design done by the writer.

1.2 Problem Formulation

With the background overview above, it is concluded that the problems that will be discussed in this writing are:

1. How to design the smelter workshop stronger than the designed structure?

2. How many percent is the efficiency of the structure of the workshop between conventional beam and castellated beam?

1.3 Problem Limitation

In this writing, the problems are to be discussed are:

1. The comparison of volume of steel used in the construction.

2. The comparison cost of construction specified to the rafter beams.

3. The comparison of strength in terms of demand/capacity ratio (PMM ratio in ETABS).

In this writing, the problems are limited to:

1. The lower structure is ignored.

2. The utilities of the structure are ignored.

3. Quake load is ignored.

4. Method and construction management will not be discussed in this writing.

1.4 Objective of the Research

The research’s objective is to:
1. Analyze different steel profiles used for the workshop in terms of strength.
2. Analyze the efficiency of the profiles used for the workshop.

1.5 Benefits of the Research

The benefits given by this research are:

1. The result of this research may give expansive knowledge on comparing the profiles used for a steel structure.
2. The result of this research may give expansive knowledge on the efficiency of the profiles used for the workshop.

1.6 Arrangement of Writing

The arrangement of this writing is broken down to these chapters:

CHAPTER I INTRODUCTION

This chapter introduces the background of this research, the problem formulated and its limitations, the objective and the benefits of this research, and the arrangement of this writing.

CHAPTER II LITERATURE REVIEW

This chapter discusses the theoretical basis and scholarly writings of this research.

CHAPTER III RESEARCH METHOD

This chapter discusses scope of the research, research object, research data, data processing, analysis of the research’s result, and the research scheme.

CHAPTER IV RESEARCH RESULTS

This chapter discusses the result of this research as well as the implementation of the design.
CHAPTER V CONCLUSION

This chapter concludes the result of the research and suggests possible further research for the design in this writing.