CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

This chapter will introduce readers to this study. Furthermore, readers will manage to get information on background of study, problem statement as well as objectives, and scope of the study.

1.2 BACKGROUND OF STUDY

Nowadays, our world is becoming more developed and developing as we know. Due to this, power consumption has continued to rise and this in turn had led to the increase in the number of power stations as well as power transmission towers from the generating stations to the load centres. Electrical power demand has been increasing around the world and many large-scale transmission towers have been newly constructed [1].

Generally, transmission tower is a medium to carry power loads from one station to another station. It is usually composed of steel and is able to run at long distances. Transmission tower consist of several types and designed in accordance to the tower height and capacity of tower to support load from the conductor, compression load, wind load, vertical load, longitudinal load and uplift load. Transmission towers are usually used where large amount of electrical current is to be distributed often ranging from 115,000 to 800,000 volts. Transmission towers are a vital component and management to assess reliability is needed to minimise the risk of power supply disruption that may result from in-service tower failure [2]. Towers are widely regarded as one of the most difficult form of lattice structure to analyse [2].
1.3 PROBLEM STATEMENT

The use of electrical power has become an increasingly important part of the economy of industrial countries. Transmission tower supports the phase conductors and earth wires of transmission line [3]. The importance of the transmission tower on national economy and people’s living has been well recognized. Unfortunately, natural disasters such as earthquakes and floods come without notice. These natural phenomena caused major damages to the transmission towers. During the attack of the Ji-Ji earthquake, with a size of 7.3 in Richter magnitude, in Taiwan on Sept. 21, 1999, the strong vibration of ground motion has caused the collapse of a main transmission tower located in the central region of the state [4]. Many transmission towers were built in the mountains or crossing rivers under rugged circumstances to overcome the loss electrical supply.

Before designing and planning in a construction, analysis of the structure becomes the main role in the process. Transmission tower structures are generally analysed by linear static analysis methods but it is also necessary to determine the deformation of the structure as well so that any failure can be avoided. In addition, Finite Element Analysis was applied towards the design of the transmission tower. However, using this manual method is less efficient and less practical. Therefore, computer software called ANSYS was used to compute calculation in order to create a safe and optimum design.

1.4 OBJECTIVES

An objective of study is an important aspect to be considered in any research. It might be useful as a guideline in preparing a research in order to get the expected result.

The main objective of this study is to analyse the transmission tower using Probabilistic Design System (PDS). The sub-objectives are:

i. To determine the reaction forces, deformation, deflection, forces and moments.
ii. To study the purpose of code checking on the structure.

1.5 SCOPE OF STUDY

During this study, several scopes are set to ensure that the objectives of this study can be achieved and any other variables that are not considered in the scope can be eliminated. The factors that are considered are:

i. Selection of a transmission tower structure.

ii. Using ANSYS as a software modelling process based on Finite Element Analysis.

1.6 SIGNIFICANCE OF STUDY

Significance of study is a general outline on the importance of the study which will be carried out. In terms of a research paper, the significance of study refers to the expected outcome from the research. Firstly, this study is important to produce a structure without failures. Failures within a structure can cause incidents such as collapse or breakdown when dealing with other environmental factors. Besides that, by doing this research, it is important to develop a structure that is environmentally viable as well as political acceptable. If these factors are not accounted in the research, it might bring unwanted occasions such as rebellion from the public.