CHAPTER 1

INTRODUCTION

1.1 ARC FLASH

Short circuit current flows across a gap which will create an arc. It does known as arc flash. It can be anything from minor embarrassing sparks to a deadly explosion. An arc flash is a result of a rapid release of energy due to an arcing fault that happen between phase bus bar and another phase bus bar neutral or a ground. During, an arc fault happen the air is the conductor, when conductor is energized accidently causes arc flash.

The air as a conductor during arcing fault can be energized when any tools dropped in the air. At the same time, an accidental contact with electrical system also causes an arc flash. Other factors that causes arc flash hazard are build up of conductive dust and also corrosion and improper work procedures. The result, from an arc flash can causes significant heating and burn injuries to occur.

1.2 PROBLEM STATEMENT

Electrical arcs produce some of the highest temperature known to occur on earth. This is four times the surface temperature of the sun. All known materials are vaporized at this temperature. When materials vaporize they expand in volume. The air blast can spread molten metal to great distance with force. Arc flash hazard that caused by pressure, normally the blast pressure waves have thrown workers across rooms and knocked them off ladders. Clothing can be ignited several feet away. Clothes areas can be burn more severely than exposed skin if clothing melts. Hearing loss from sound
blast is one of the harm caused by arc flash. The sound can have a magnitude as high as 140dB at a distance of 2 feet from the arc. Arc flash causes by dust and impurities, corrosion, condensation, spark discharge, overvoltage across narrow gaps, failure of insulting materials and also improper work procedures. To avoid the arc flash or to reduce harm to the worker from arc flash hazard analysis is done by categories the Personal Protective Equipment (PPE). PPE helps the workers to protect themselves from any accident.

1.3 OBJECTIVES

This project aims to implement an arc flash hazard analysis study on industrial test case scenario by using software. The output of software is to produce the arc fault current. The arc fault current for each bus in the system are used to calculate the value of incident energy, the suitable boundary for workplace and also suitable Personal Protective Equipment (PPE) level that can be use for each distance from the system.

The output from the software will be used to produce a technical report of analysis of arc flash. The analysis of arc flash will be depending on different scenario from the system that used.

1.4 SCOPES OF PROJECT

The scope of project for this study of arc flash hazard analysis is limited to certain limitation. In the case, the limitation of the study is limited to an industrial test case of a scenario based on the industrial. It means that, the calculation of short circuit, flash protective boundary and also Personal Protective Equipment (PPE) level only will be done based on the particular industries data or detailed that collected. Other than that, also produce a technical report of analysis of arc flash based on implementation of arc flash hazard analysis study that based on industrial test case.
1.5 SIGNIFICANT OF STUDY

An arc flash is one of the cause that explosion happens in industries. That explosion which is due to arc flash causes death and injury to workers. At the same time, it causes loss of in production and economically for country. Therefore, this study helps to reduce harm or fatality in industries. Arc flash studies should be used to determine the minimum level of PPE that workers must wear when they are near exposed energized equipment.