CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

This research contains information to create an experimental modeling of different housing design to determine the potential of natural ventilation. The outcomes of this chapter would be the research problem background, problem statement, research objectives, scope of study, and research significance.

1.1 PROBLEM BACKGROUND

Malaysia is a tropical country which has a warm and humid atmosphere. The annual mean temperature is 26.4 °C with average daily maximum temperature of 34 °C and a relative humidity of 70% to 90% throughout the year (Al-Tamimi, 2011). Hot and humid climate will develop a condition of thermal discomfort in a building. In most cases, air conditioning will be the key answer to solve the problem. However, the environmental effect that caused by the greenhouse gasses emitted from the air conditioning system could not be neglected as the problem keep arising in the conferences.

Natural ventilation is one of the most effective methods which can helps to achieve the cooling system and in the same time preserve the environment. The surrounding of Malaysia is very suitable for the implement of natural ventilation as there are 3 monsoon season that can guaranteed the wind flow in the country. Cooling by natural ventilation is a better energy conserving strategy in order to improve indoor
thermal comfort and air quality. With a good air movement, the residence can achieve a better comfort level when staying indoors.

1.2 PROBLEM STATEMENT

Nowadays, thermal comfort has become a nation concern in Malaysia as the temperature keep arise resulted from global warming and haze attack. This issue is getting more serious and will result to health issue to the residence. From the hot atmosphere, many residence choose air conditioner to lower the indoor temperature which leads to higher energy demand. Research shows that the electricity consumption in Malaysia rises rapidly every year and the demand is expected to increase by about 30% from its present record. As the demand increases, the authorities has made their decision to increase the tariff in order to control the energy consumption. The use of air conditioner promote the emission of chlorofluorocarbon (CFC) which can leads to the depletion of ozone layer and further impacts for the Earth.

The problem of the frequency used in air conditioner increase the energy demand can be replaced by a better and natural ways by implement the usage of wind ventilation in the design of the typical housing. Natural ventilation can significantly reduce the indoor temperature and promote the flow of wind in the internal part of housing. The importance of natural ventilation are keen to be more alert when green technology are introduce in the construction sector to preserve the environment.

Further research has been done to investigate and study the availability of natural ventilation in Malaysia. As for the success of the implement, the benefit can be bulk in all aspect. Therefore, the energy consumption can be reduce significantly if the usage of wind ventilation is fully deployed.
1.3 RESEARCH OBJECTIVES

The objectives of this research are:

(i) To investigate the potential natural ventilation on typical house in Malaysia.

(ii) To evaluate the performance of natural ventilation in housing of Malaysia.

(iii) To check and compare on the results obtained.

1.4 SCOPE OF STUDY

The scopes of this study are limited to preparation, implementation, and evaluation the effect of wind ventilation in two different prototype of the roofing design.

In this research, a few scopes will be included. Firstly, in the analysis, the effect of wind tunneling is not considered as the housing are not high rise building which can affect by the wind flow. Secondly, the types of housing that will be tested for this research are set up to be single story concrete house with different opening and different roof system.

The test will be conducted in a constant wind speed (1m/s) to compare the pattern of wind flow in the house. Besides, the area for both prototype of house are same, that is 6m (width) x 12m (length) x 4m (height).Prototype A is a single story house with a normal roof system while Prototype B is a single story house with an additional jack roof system.