

## CHAPTER 3

### RESEARCH METHODOLOGY

#### 3.1 INTRODUCTION

This chapter is more on the method for preparation for the process of collecting the data and inputting the data to get the results. This chapter will start with the flow of methodology. The main purpose of this chapter is to achieve the objectives of this study. This study is primarily consists of 4 phases, which are:

- i) Data collection : Thunderstorm hazard related cases in Peninsular Malaysia from 2013 to 2014 and the gust factors of the surrounding area around the weather stations.
- ii) Preparation : The collected data are to be readied in Microsoft Excel table
- iii) Data Processing : Data are input into Geographical Information System software (GIS)
- iv) Results : Thunderstorm hazard maps

## 3.2 DATA COLLECTION

Data collection is an important aspect of any type of research study. The process of data gathering and measuring information on the aspect of variables which is in interest are then evaluated and analyzed to produce suitable results. However, an inaccurate data collection may cause the results of a study to be a failure.

The data for this study are mainly taken from reliable sources from the internet. Examples are such as the news websites (New Strait Times, Harian Metro, The Star Online, and The Malaysian Insider) and Malaysia Meteorological Stations.

### 3.2.1 Thunderstorm Hazard Disaster Data

Any hazards cases regarding to thunderstorms that are reported in news website are collected, the data taken are then tabulated according to several aspect such as dates, locations, and damage type/losses. The tabulated data were then recorded in Microsoft Word for future references. A total of 18 cases were recorded in year 2013 and year 2014 is collected from the news websites.

Table 3.1 shown below is an example of some of the thunderstorm hazard cases:

<b>Location</b>	<b>Date</b>	<b>Damage Types</b>
Kedah (Kulim)	13 Mar 2013	30 Houses
Penang	13 Jun 2013	100 Houses, 2 Death
Penang	13 Jun 2013	25 -storey UMNO Building
Ipoh	7 Dec 2014	57 Houses

**Table 3.1:** Thunderstorm Hazard Cases

### 3.2.2 Determining Gust Factors

Gust Factors is defined as the sudden increase of wind speed in a very short period of time. The gust factor data are taken from Meteorological Stations to get the records of the gust factors in Peninsular Malaysia.

An example of weather history for a weather station which is located in Penang International, Malaysia on 13<sup>rd</sup> June 2013 is shown below.

As Figure 3.2 shown below, the exact time during the disaster of the 25 storey UMNO building, happened approximately at 7.00pm, the gust factor was recorded at 55.6 km/h or 15.4 m/s which were the highest during the day of the disaster event.

Time (MYT)	Temp.	Heat Index	Dew Point	Humidity	Pressure	Visibility	Wind Dir	Wind Speed	Gust Speed	Precip	Events	Conditions
12:30 AM	27.0 °C	29.6 °C	23.0 °C	79%	1007 hPa	9.0 km	North	1.9 km/h : 0.5 m/s	-	N/A		Mostly Cloudy
12:30 AM	27.0 °C	29.6 °C	23.0 °C	79%	1007 hPa	9.0 km	North	1.9 km/h : 0.5 m/s	-	N/A		Mostly Cloudy
1:00 AM	26.0 °C	-	24.0 °C	89%	1007 hPa	9.0 km	Calm	Calm	-	N/A		Mostly Cloudy
1:30 AM	26.0 °C	-	24.0 °C	89%	1006 hPa	9.0 km	Calm	Calm	-	N/A		Mostly Cloudy
2:00 AM	26 °C	-	24 °C	84%	1006 hPa	9 km	NW	1.9 km/h	-	-		Haze
2:00 AM	26.0 °C	-	24.0 °C	89%	1006 hPa	9.0 km	NW	1.9 km/h : 0.5 m/s	-	N/A		Mostly Cloudy
2:30 AM	27.0 °C	30.1 °C	24.0 °C	84%	1005 hPa	9.0 km	NW	5.6 km/h : 1.5 m/s	-	N/A		Mostly Cloudy
3:00 AM	26.0 °C	-	24.0 °C	89%	1005 hPa	9.0 km	Calm	Calm	-	N/A		Mostly Cloudy
3:30 AM	26.0 °C	-	24.0 °C	89%	1004 hPa	9.0 km	Calm	Calm	-	N/A		Mostly Cloudy
4:00 AM	26.0 °C	-	24.0 °C	89%	1004 hPa	9.0 km	NW	1.9 km/h : 0.5 m/s	-	N/A		Mostly Cloudy
4:30 AM	26.0 °C	-	24.0 °C	89%	1004 hPa	9.0 km	Calm	Calm	-	N/A		Mostly Cloudy
5:00 AM	26 °C	-	24 °C	91%	1004 hPa	9 km	Calm	Calm	-	-		Haze
5:00 AM	26.0 °C	-	24.0 °C	89%	1004 hPa	9.0 km	Calm	Calm	-	N/A		Mostly Cloudy
5:30 AM	26.0 °C	-	24.0 °C	89%	1004 hPa	9.0 km	Calm	Calm	-	N/A		Mostly Cloudy
6:00 AM	26.0 °C	-	24.0 °C	89%	1005 hPa	9.0 km	Calm	Calm	-	N/A		Mostly Cloudy
6:30 AM	26.0 °C	-	24.0 °C	89%	1005 hPa	9.0 km	Calm	Calm	-	N/A		Mostly Cloudy
7:00 AM	26.0 °C	-	24.0 °C	89%	1005 hPa	9.0 km	NW	3.7 km/h : 1.0 m/s	-	N/A		Mostly Cloudy
7:30 AM	26.0 °C	-	24.0 °C	89%	1006 hPa	7.0 km	NW	3.7 km/h : 1.0 m/s	-	N/A		Mostly Cloudy
8:00 AM	26 °C	-	25 °C	85%	1007 hPa	7 km	Calm	Calm	-	-		Haze
8:00 AM	26.0 °C	-	25.0 °C	92%	1006 hPa	7.0 km	Calm	Calm	-	N/A		Mostly Cloudy
8:30 AM	27.0 °C	30.6 °C	25.0 °C	89%	1006 hPa	7.0 km	Calm	Calm	-	N/A		Mostly Cloudy
9:00 AM	28.0 °C	32.7 °C	25.0 °C	84%	1007 hPa	7.0 km	North	5.6 km/h : 1.5 m/s	-	N/A		Mostly Cloudy
9:30 AM	29.0 °C	34.5 °C	25.0 °C	79%	1007 hPa	7.0 km	NNE	13.0 km/h : 3.6 m/s	-	N/A		Mostly Cloudy
10:00 AM	29.0 °C	34.5 °C	25.0 °C	79%	1007 hPa	7.0 km	NNE	13.0 km/h : 3.6 m/s	-	N/A		Mostly Cloudy
10:30 AM	29.0 °C	34.5 °C	25.0 °C	79%	1007 hPa	8.0 km	NE	14.8 km/h : 4.1 m/s	-	N/A		Mostly Cloudy
11:00 AM	30 °C	-	25 °C	69%	1007 hPa	8 km	NE	13.0 km/h	-	-		Haze
11:00 AM	30.0 °C	36.0 °C	25.0 °C	74%	1007 hPa	8.0 km	NE	13.0 km/h : 3.6 m/s	-	N/A		Mostly Cloudy
11:30 AM	30.0 °C	36.0 °C	25.0 °C	74%	1007 hPa	8.0 km	ENE	16.7 km/h : 4.6 m/s	-	N/A		Mostly Cloudy