CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

In methodology, it will discuss in depth about sampling site, research design, instrumentation and preventive measure. Detail explanation on sampling methods will be discussed according to: i) air exchange rate measurement and ii) air speed sampling method. The air speed parameters also measure the environmental factors: a) relative humidity and b) temperature. Next, data analysis will be discussed in order to determine the particle deposition rate. Besides that, quality control as well as study limitation will also be discussed in this methodology.

3.2 SAMPLING SITE

The study location for this research is at Block T, Universiti Malaysia Pahang (Campus Gambang). These experiments was performed in an experimental room at Block T with the area is 6.72 m² (2.8 m x 2.4 m), and the ceiling height 3.0 m (volume = 20.16 m³). Figure 3.1 shows layout of the experimental room.

3.3 RESEARCH DESIGN

An experimental study was carried out to assess the effect of air speed on particle deposition rate in indoor building. Measurement was performed in an experimental room, using four different air flow conditions (air conditioner on with fan off, fan on with air conditioner off, air conditioner on with fan on, and both air conditioner and fan off). The stand fan was used in these experiments.
On the other hand, the indoor air quality measurement was obtained to assess relative humidity and temperature. The environmental parameters such as relative humidity and temperature were set as constant, according to Industry Code of Practice on Indoor Air Quality 2010 by Department of Occupational Safety and Health (DOSH), Malaysia (refer Table 3.1). The air conditioner was set at temperature within a range of 23-26°C. Besides that, the exposure assessment was conducted through area monitoring to assess the number of particle and its concentration level in indoor building. This study was completed within six months starting from July until December 2014 (Appendix A). The process flowchart of the study is shown in Figure 3.2.

The sampling methods used in this study involving the air exchange rate measurement and air speed sampling method. For the air speed sampling method, ~10 cm³ of a mixture of ethyl alcohol was sprayed which act as particles generation for each experimental study. There are three direct reading measurements (instantaneous monitoring) were conducted for data collection: i) carbon dioxide concentration, ii) number of particle and iii) particle concentration.

![Figure 3.1: Layout of the experimental room](image-url)
Table 3.1: Acceptable range for specific physical parameter

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Acceptable range</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Air temperature</td>
<td>23-26 °C</td>
</tr>
<tr>
<td>b) Relative Humidity</td>
<td>40-70 %</td>
</tr>
<tr>
<td>c) Air movement</td>
<td>0.15-0.5 m/s</td>
</tr>
</tbody>
</table>

Source: DOSH (2010)

Figure 3.2: Process flow of study