



A Study of Indoor Air Quality in Refurbished Museum Building

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Abstract

Problem related with indoor air quality (IAQ), is rapidly becoming a major health issue as people spend almost 90% of their time indoors. Museums were established in Malaysia more than hundred years ago. Since the year 2005, Malaysia has been moving away from constructing new buildings in favour of refurbishing historic and old ones. A healthy environment at the museum building has been identified as one of the important element that must be considered, but it is not sure either IAQ in the museum building provide a good air quality or not. The purpose of this study is to determine the actual indoor environment of the museum building in Melaka. In this study, the IAQ measurement were conduct for six days at the Melaka Sultanate Palace Museum and at the History and Ethnography Museum. During the measurement, IAQ parameters of gaseous pollutant of nitrogen dioxide, sulfur dioxide and carbon dioxide, and particulate matter of fine particles were recorded by using specific IAQ equipment. The finding of this study indicates that the distance of buildings from roadways appears to have an impact on indoor environmental levels, especially for nitrogen dioxide, sulfur dioxide and particulate matter. Based on the results, only gaseous pollutant of sulfur dioxide had not exceeding the acceptable TLV compared to the other IAQ pollutants.

Keywords: Indoor Air Quality; Museum Building; Refurbished.

1. Introduction

Air is the most important element that supports human life on earth [1]. For an example, in breathing people need to inhale air, especially clean air in order to live a better life. However, more than two million premature deaths are attributed to the effects of urban outdoor and indoor air pollution [2, 3]. Problem related with indoor air quality (IAQ) is rapidly becoming a major health issue as people spend almost 90% of their time indoors, which they might be exposed to hazardous and unhealthy concentrations of pollutants due to the improper air circulation turnover within and outside the building [4]. Normally, aged, ill people and youngsters who spend longer time inside the buildings have a tendency exposure of indoor hazardous pollution. These indoor environments are including homes, offices, stores, restaurants, warehouses, factories, public buildings and vehicles. In these environments, people are exposed to pollutants emanating from a wide array of sources that creates indoor environmental problems which could affect their health.

IAQ issues are not new in Malaysia. Nevertheless, the lack of study, data and local regulation become one of the major contributions towards this problem especially with the non-industrial sector [5]. Nowadays, people are being exposed to a variety of health risks from the surrounding indoor pollution which can affect one's health. Some risks are unavoidable. The effects of particulates matter and gaseous pollutants, such as nitrogen dioxide (NO₂), sulfur dioxide

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