

**INDOOR AIR QUALITY AND THERMAL COMFORT INVESTIGATION IN
SECONDARY SCHOOL CLASSROOM**

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ABSTRACT

Indoor Air Quality (IAQ) and Thermal Comfort (TC) Investigation in secondary school classroom

A high indoor air quality (IAQ) environment and thermal comfort (TC) condition is utmost importance especially for educational institutions. This study attempts to provide more information about present IAQ and TC for school's classroom. The investigation was conducted in naturally ventilated (NV) classroom of a typical standardized government school (SMK Sultan Salahuddin Abdul Aziz Shah), located in Seksyen 2, Shah Alam. This study consist both physical measurements (CO_2 , CO, RH, T, and v) and subjective assessments in order to give an appropriate evaluation of the indoor comfort conditions. The investigation was conducted during the occupied period in morning session of the classrooms (mostly at about 8.30a.m-9.30a.m). Measurements were taken at every 5 minutes interval for an hour, continuously for particular 20 days. The surveys were carried out among 600 respondents (students aged 15-16 years old). The subjective sensation of thermal comfort or comfort vote (CV) was assessed using ASHRAE seven-point scale, together with an analysis of the preference votes. Correlation between the environmental variables and comfort votes were calculated and regression analysis was used to predict the comfort temperature. The mean CO_2 and CO for indoor concentrations obtained in the classroom were found to be 571.58 ppm and 7.187 ppm respectively, it was far below the limits stated in ASHRAE and the Institute of Environmental Epidemiologist, Ministry of Environment, Singapore (ENV) Guidelines. The mean RH, T and V were 76.92%, 27.83 °C and 0.4 m/s respectively. By regression analysis, the comfort indoor temperature obtained was 27.15 °C and it just 0.68 °C below than temperature obtained from measurement. This finding supported the sentiments on climatic adaptation.

CHAPTER 1

INTRODUCTION

Indoor air quality in workplace and residential environments caught attention of scientists and the public in recent years. There have been many studies on the indoor environment in school buildings has been done. Since the 1990s, with growing concern over the increasing use of energy over the past decades, more researches have been conducted in the area of thermal comfort to find means in providing comfortable indoor environments, to reduce energy consumptions and to save on air-conditioning costs. Besides that, many studies have found indoor pollutions level greater than outdoor levels because people spend more than 90% of their time indoor so good indoor quality is very important to us.

According to the United States Environmental Agency (USEPA, 1996), indoor air quality (IAQ) is important for health, economic, and legal reason. Clean air is considered to be basic requirement for human health and well-being. Failure to prevent indoor air quality can increase the chance of long-term and short-term health problems for students and can reduce in productivity of teachers also degrade the students learning environment and comfort. In other hand, indoor air pollutants can cause discomfort, and reduce school attendance and productivity. Some studies estimate that more than 50% of school children have some kind of allergy or asthma etc. Investigation of air quality in school classrooms helps us to characterize pollutants levels and implement corrective measures to improve air quality if necessary.