

## **Evaluation of Ventilation Performance and Indoor Air Quality: A Study on Ozone and Formaldehyde Levels in Mechanical Laboratory**

Wan Irfan Wan Omar<sup>a</sup>, Ismaniza Ismail<sup>a\*</sup>

### **Structured Abstract**

**Background:** With controlled ventilation and air conditioning, people spend 70% to 90% of their time indoors. Allergies, respiratory conditions, and other medical problems can be brought on by low IAQ. Thus, the influence of indoor air quality (IAQ) on health has caught public attention. People who work in environments with a lot of machinery, such mechanical laboratories, may encounter a variety of health problems as a result of inadequate indoor air quality. IAQ at the General Mechanical Laboratory at UiTM Shah Alam is assessed in this study. Students will work in the lab for two to three hours, whereas the normal working hours of the laboratory personnel usually correspond with Malaysian office hours. As to UiTM's information, the regular business hours are Monday through Friday from 8:00 AM to 5:00 PM. Even if the building has a mechanical ventilation and air conditioning (MVAC) system that is kept up to date, it is still necessary to ensure that indoor air pollutants are appropriately managed in accordance with regulations and standards.

**Methods:** Following the Industry Code of Practice Indoor Air Quality (ICOP IAQ) 2010 regulations, the study's methodology included structured questionnaire surveys to gather information on participants' backgrounds, experiences with IAQ, and present symptoms related to IAQ, as well as IAQ monitoring for formaldehyde, ozone, and ventilation system at a general mechanical laboratory.

**Results:** According to the laboratory's indoor air quality evaluation, formaldehyde and ozone readings did not exceed acceptable limits at all 6 sampling points throughout any cycle. There are 3 return air outlet and 1 supply air inlet that has a very low reading which is at the hallway and lab assistant's room respectively. This can affect the ventilation performances leading to poor IAQ. However, with ventilation studies, it is shown to be safe according to ASHRAE 63.1 and WHO guidelines. The survey findings indicated a number of symptoms associated with IAQ, such as headaches, fatigue, nausea, dizziness, and headaches, as well as difficulties with focus and itchy skins

**Conclusion:** In conclusion, poor indoor air quality can have negative consequences on the health and productivity of inhabitants. It is important to put measures in place to raise the general mechanical lab's indoor air quality

**Keywords:** Indoor Air Quality, Industry Code of Practice, ASHRAE 63.1

\*Correspondence: [ismaniza@uitm.edu.my](mailto:ismaniza@uitm.edu.my)

<sup>a</sup> School of Chemistry & Environment, Faculty of Applied Sciences, Universiti Teknologi MARA, Shah Alam, Malaysia