

INDICATING INDOOR AIR POLLUTANT PARAMETERS TO EVALUATE VENTILATION CONDITIONS IN COMMERCIAL AND OFFICE BUILDINGS

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Abstract

Indoor air pollution refers to contaminants in indoor air harmful to human health. Many pollutants build up rapidly indoors due to indoor and as well as outdoor pollution sources, resulting in higher levels as usually found outside. These pollutants can cause various health problems such as chronic pulmonary and respiratory diseases and can even be fatal at high levels. The California Environmental Protection Agency (CEPA) estimates that people spend 90% of their time in indoors. Infants and elderly spent their time in indoors even greater than others. Many researches have estimated that indoor air pollutants can pose serious health problems than outdoor air pollutants. There are many indoor air pollutants, which can be separated based on their effects on human health, the frequency of their appearance, their concentration, their sources etc. Some common indoor air pollutants are Particulate Matter (dust), Carbon dioxide (CO₂), Carbon monoxide (CO), Formaldehyde (HCHO) and Volatile Organic Compounds (VOCS) etc. Since the measuring all these pollutants require high technical equipment involving high cost, identification of indicator pollutants that represent indoor environmental condition are important.

This study was conducted to identify indoor air quality indicator pollutants related to ventilation aspect of indoor environment conditions in office and commercial buildings in Sri Lanka. In the present study, Indoor air pollutant levels with respect to CO₂ and H₂CO were measured in buildings with different environmental conditions. The buildings selected for the study includes, those with different air-conditioning systems, buildings with extensively used decorative panels, building areas having large number of electronic equipment and areas occupying large gatherings or over crowded. The study results indicate that H₂CO levels are relatively high compared to other pollutants in the buildings with poor ventilation and most of time exceeds the relevant safe guideline levels. The levels are able to be reduced to acceptable levels by increasing fresh air intake of the building and/or by introducing phytoremediation depending on pollutant concentration levels and space. The CO₂ levels are relatively high in places having high gathering of people in indoor with poor ventilation, the levels could be

reduced to acceptable norms by providing better ventilation conditions. The study confers that both Formaldehyde (H₂CO) and Carbon Dioxide (CO₂) can be used as indicative pollutants to measure the indoor air quality with reference to deciding required level of ventilation condition in buildings to ensure safe indoor air quality.

Keywords: Indoor, Ventilation, Formaldehyde, Phytoremediation