

Colloquium on Applied Sciences 2024

19-21 January 2024, Faculty of Applied Sciences, UiTM Shah Alam, Malaysia

PRELIMINARY STUDY: POTENTIAL IMPACTS GAS EMISSIONS TO THE WORKERS AT TANJUNG 12 SANITARY LANDFILL

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Structured Abstract

Background: Landfills are a global form of municipal solid waste disposal. However, it can have adverse environmental and public health effects due to the emission of landfill gas (LFG), primarily methane. This gas poses unique hazards to landfill employees, including respiratory problems, skin irritation, and asphyxiation. Quantitative and qualitative methods were used to perform this study. To determine worker exposure at Tanjung 12 Sanitary Landfill by assessing methane levels. Surveys and interviews with workers claimed to have potential symptoms of health effects of landfill methane gas emissions.

Methods: The study used a square static flux chamber to measure methane and CO₂ emissions from landfill cover soil at Phase 5 of The Tanjung 12 Sanitary Landfill. The chamber was made of stainless steel and used to collect soil gas samples at various waste volume levels. The gas samples were analyzed using Gas Chromatography with flame-ionization detection. A questionnaire was created to collect data on variables related to exposure, health outcomes, medical history, demographic information, and personal routines. The data will be analyzed using SPSS, with correlation coefficient analysis to quantify the extent to which temperature and humidity variations can account for methane concentration variability.

Results: The findings revealed considerable variation in methane emissions among the various sampling locations. A correlation matrix analysis revealed that temperature and precipitation positively impacted emissions, with values of 0.594 and 0.470, respectively. Humidity, on the other hand, had a negative influence of -0.181. The levels of methane exposure reported by workers allegedly surpassed the NIOSH-recommended safe limits, leading to potential health complications, including migraines (13), dizziness and nausea (13), and cough (12).

Conclusion: Tanjung 12 Sanitary Landfill emits methane, influenced by temperature, humidity, and rainfall. Despite exceeding NIOSH safe limits, employees experience health symptoms like headaches, dizziness, nausea, and cough. Addressing methane emissions is crucial for environmental concerns and the health of workers, emphasizing the need for immediate safety measures.

Keywords: Landfill gas, Methane emissions, Worker exposure, NIOSH-recommended safe limits, Sanitary landfill

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