



“Gheorghe Asachi” Technical University of Iasi, Romania



QUANTIFICATION OF LEACHATE GENERATION RATE FROM A SEMI-AEROBIC LANDFILL IN MALAYSIA

Hamidi Abdul Aziz^{1*}, Mohammad Nordin Adlan¹, Khairul Amilin¹, Mohd. Suffian Yusoff¹,
Noor Hisham Ramly², Muhammad Umar¹

¹School of Civil Engineering, Engineering Campus, Universiti Sains Malaysia, 14300 Nibong Tebal, Penang, Malaysia

²Idaman Bersih Sdn. Bhd. 24, Jalan Sri Aman 1, Pusat Perniagaan Sri Aman, 14200 Sg. Bakap, Penang, Malaysia

Abstract

One of the most important problems associated with the design, operation and long-term care of landfills is managing the landfill leachate. Leachate generation rates are primarily dependent on the amount of liquid the waste originally contains, and the quantity of precipitation that enters the landfill through infiltration. The estimation of leachate generation rate is important in designing the leachate collection system, and the treatment process. There are very limited data on the amount of leachate generation from landfills in Malaysia. This study aims to quantify the actual amount of leachate generation in the field from a semi-aerobic landfill site immediately after closure and after 10 years of waste stabilization under both dry and wet conditions. Flow rates of leachate at Ampang Jajar Landfill Site (AJLS) were determined both in the field and by the Water Balance Method (WBM). Field measurements were carried out on site using random sampling with more than 50 data per site. A significant decrease in the quantity of leachate produced was observed after 10 years of landfill closure. It was found from the field study that the maximum amount of leachate generated from AJLS was $4.2 \text{ m}^3 \text{ lift}^{-1} \text{ ha}^{-1} \text{ day}^{-1}$ in 2001, while it decreased to $1.39 \text{ m}^3 \text{ lift}^{-1} \text{ ha}^{-1} \text{ day}^{-1}$ after 10 years. The corresponding values obtained from WBM were $3.46 \text{ m}^3 \text{ lift}^{-1} \text{ ha}^{-1} \text{ day}^{-1}$ and $1.37 \text{ m}^3 \text{ lift}^{-1} \text{ ha}^{-1} \text{ day}^{-1}$, respectively. The results showed that the leachate generation from landfills decreases significantly over the years and the WBM can be helpful in designing the leachate management system by predicting long term leachate generation rates.

Key words: landfill, leachate quantity, semi-aerobic, water balance method

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* Author to whom all correspondence should be addressed: e-mail: cehamidi@eng.usm.my; Phone: 04-59954999; Fax: 04-5941009