

## **Fire and health impact assessment of a Malaysian landfill fire**

### **ABSTRACT**

Landfill fires are a growing problem for the environment and safety at the global level. In recent years, certain incidents of landfill fire have occurred in Malaysia, describing the need to assess the risk of fire ignition and its consequences in Malaysian landfills. The objectives of this study are to analyze the source of ignition for landfill fire in Malaysia using the Fault Tree Analysis (FTA) and to discuss the consequences of this fire using the BowtieXP. In addition, ALOHA software is used to assess the health risk impact of landfill gas emissions. The results of the analyzes helped to propose counter measures to reduce the risk of fire in landfills. From the findings of this study, several causes of surface landfill fires have been found within Malaysia by using FTA such as flammable gas emission, combustible material, uncompressed residual waste, naked flame, smoking, and weather. The consequences of the landfill fire determined by BowtieXP software are negative effects on health due to emissions that can be toxic mostly, and forest fire. The concentration of seven gases emitted from landfill fires was tested using ALOHA software. The four gases CO, CO<sub>2</sub>, NH<sub>4</sub>, and CH<sub>4</sub> have recorded a high concentration in comparison with the air quality regulatory limits, which means adverse effect on health. At the same time, the rest of the gases namely NO<sub>2</sub>, SO<sub>2</sub>, and H<sub>2</sub>S have shown lower concentration (ppm), mean null effect on health. Local government, environmental protection authorities and other regulatory bodies should work together with the management of landfill sites to make landfills safer for the community and the environment.

**Keyword:** ALOHA; Bowtie; Fault Tree Analysis (FTA); Health impact; Landfill fire; Malaysia landfill