

Consequence modelling for estimating the toxic material dispersion using ALOHA: case studies at two difference chemical plants.

Azizan, R.* , Norfaridah, A.G., Norhaniza, A.H., Mohd Shaiful Zaidi, M.D.

Faculty of Chemical & Natural Resources Engineering, Universiti Malaysia Pahang, Lebuhraya Tun Abdul Razak, 26300 Gambang, Kuantan, Pahang, MALAYSIA.

Email: azizanramli@ump.edu.my

ABSTRACT:

The most cited gruesome industrial disaster that ever-occurred in modern history-Bhopal Disaster has heralded the new era of managing human-induced catastrophe. Industrial disaster not only resulted in enormous calamities and huge property damages but also deteriorated the environment especially when it involved hazardous materials. The occurrence of major accident at major hazard installation (MHI) is unpredictable. Therefore, both structural and non-structural measures should come in the forefront before it claims human life and tremendously destroy the assets and environment. Thus, the main objectives of this study is to simulate the consequence modelling due to toxic materials dispersion (sulfuric acid) and subsequently suggest the evacuation mapping. The Areal Location Hazardous Atmosphere (ALOHA Version 5.4.7) was used to determine the threat zone and estimate the radius of toxic material dispersion from the source point. Two petrochemical plants were selected in this study and both are located at different petrochemicals industrial cluster estate in East Coast Region of Peninsular Malaysia. Based on the findings, it can be concluded that the radius of toxic material affects the adjacent facilities and other chemical plants in proximity. The threat zones with the radius of 1232 yards miles (red), 2.6 miles (orange) and 6.0 miles (yellow) respectively were determined for the first case study. As for the latter, the threat zones are greater than 6 miles for all zones. Based on both estimations, the evacuation mappings were proposed by sketching the map from Google satellite in the MARPLOT application.

Keywords: ALOHA; evacuation mapping; MARPLOT; threat zone