

Prakit Punlaworakul 2010: The Leakage of p-Xylene and Acetic Acid: Risk Assessment Using Fault Tree and What If Analysis and the Investigation on Factors and Their Effects Using ALOHA and Fire Dynamic Simulator. Master of Engineering (Safety Engineering), Major Field: Safety Engineering, Interdisciplinary Graduate Program. Thesis Advisor: Assistant Professor Nanthiya Hansupalak, Ph.D. 135 pages.

The purposes of this research were to study p-xylene and acetic acid leaking from storage tanks using Fault Tree Analysis (FTA) to find possible causes and What If Analysis to assess the risks. ALOHA and Fire Dynamic Simulator (FDS) were also used to study areas nearby that might be at risk from these chemicals leaking from storage tanks in a factory (no other chemicals were stored nearby). p-Xylene was kept in 2,300 and 6,283 m³ tanks while acetic acid in two tanks (825 m³). This work was divided into 4 parts: (1) using FTA to investigate the causes of leakage (2) using What If Analysis to assess the risks (3) using ALOHA to analyze areas that might be at risk and (4) using FDS to analyze areas that might be at risk. The basis causes leading to chemicals leaking were equipment failure. Basic causes were used to assess the risk using What If Analysis and found that 46 events leading to chemicals leaking (ignited and not ignited were included). The additional measures were proposed based on the existing measures to mitigate and control 6 events that show the highest risk level (level 4)

ALOHA and FDS simulation showed that the radiation due to p-xylene burning and gaseous products from the fire, including acid vapor threat zone covered only areas where the factory and other factories nearby (community was not affected) were located.

Student's signature

Thesis Advisor's signature