

A Two Stage Risk Assessment and Hazard Prevention Approach: A Case Study for Noise Hazard in Oil Industry

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Abstract

Oil industry is the umbrella of many industrial sectors. One of these sectors is the petrochemical industries. In petrochemical companies, it is normal to face chemical hazards, yet it does not mean that other hazards will not occur. Risks are subjective to hazardous factors which are categorized into the following categories: Physical, ergonomics, biological, chemical, and psychological. It is important to assure a safe environment for the workers in industrial facilities. In this study, noise hazard is the main focus since it is common in many industries, as a result of vibrating machines. This hazard can affect both the performance of the workers and their health in the manufacturing areas. This study proposes a two-stage approach for risk assessment and hazard analysis in Oil Industry. The first stage involves Failure Mode and Effect Analysis (FMEA) in order to determine the most critical and risky hazard to be studied and analyzed. The second stage is detailed noise hazard analysis involving Cause and Effect Diagram to determine the root causes for generating prevention alternatives, and Analytic Hierarchy Process (AHP) to evaluate the alternative prevention techniques to prioritize them for implementation. The proposed approach is then implemented in a real case study.

Keywords

Hazard Analysis, Noise Hazard, Petrochemical Industry, Risk Assessment, Multi-Criteria Decision Making

Biographies

Anwar Ebrahim, Fatemah AbdulRahman, Fatemah Mohammad, Hala Alhouti, and Hessah Alrabiah are Industrial Engineering students at the American University of the Middle East (AUM) located in Kuwait, who are expected to graduate summer 2018. In their university journey, they have learned several skills and techniques using different computer programs like Microsoft Office Application, Jack Software, Visual Studio, Arena Simulation, Lingo, MATLAB, Minitab, Arduino, and AutoCAD. They also attended several conferences such as Global HSE 6th International Conference & Exhibition on Health, Safety, and Environment, Kuwait, 9th International HSSE & Loss Prevention Professional Development Conference & Exhibition, Kuwait, and Kuwait International HSE Conference & Exhibition. They participated in several AUM academic activities. Moreover, they have learned several courses related to Industrial Engineering major such as Work Analysis and Design I, Work Analysis and Design II, Quality Control, Lean Six Sigma, Operation Research: Stochastic & Optimization, Safety Engineering, Statistics, and Mathematics.

Rifat Ozdemir is an Associate Professor in the Department of Industrial Engineering of American University of the Middle East, Kuwait. He holds his bachelor and master degrees in Industrial Engineering from Istanbul Technical University. He received his PhD in Production Management from Istanbul University. He started his professional academic life as a Research and Teaching Assistant in the Department of Industrial Engineering of Istanbul University. He worked as Assistant Professor and Associate Professor in Industrial Engineering Department of Istanbul Kultur University. He teaches the courses of Safety Engineering, Cognitive Ergonomics, Production Planning and Control, Engineering Economics, Operations Research, and Advanced Manufacturing Systems. He has published a number of

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