A modified two-dimensional (2D) risk model for occupational health and safety (OHS) risk assessment in mining environments

M. Fatih Ak[1+], Muhammet Gul[2*]

[1]Antalya Bilim University, Department of Industrial Engineering, Antalya, TURKEY fatih.ak@antalya.edu.tr
[2]Munzur University, Department of Industrial Engineering, 62000, Tunceli, TURKEY
[*]Corresponding author: muhammetgul@munzur.edu.tr
[+]Speaker: fatih.ak@antalya.edu.tr
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Abstract- Mining environments have faced with serious fatalities related to works, workplaces and workers as a consequence of their accident-prone processes. Underground mining stands in the first place in terms of being a hazardous industry worldwide. Due to risks involved structure of mining industry, it requires special measures, detailed risk assessment, hardware, knowledge, experience, expertise, planning, investment and production to marketing stages all over the world. Although copper and zinc mines are considered to provide safer conditions than in coal mines, both have difficult working condition hazards due to mining underground. Therefore, mining risk assessment is necessary for reducing the negative effects. The current study aimed to develop a modified 2D OHS risk model for copper and zinc mine risks. Unlike the other studies, two parameters of the model "likelihood" and "severity" is considered from the viewpoint of four components as OHS, damage losses, environment, society/ out of company. In addition to this modified 2D risk model, a fuzzy-based model in quantifying risk ratings is provided. Results of both methods are compared and potential corrective-preventive action plans are suggested.

Keywords- OHS; risk assessment; 2D risk model; copper and zinc mine; fuzzy sets