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Analysis of Factors Affecting Human Reliability in the Mining Process Design Using Fuzzy Delphi and DEMATEL Methods



sustainability

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چکیده (۲۰۷ کلمه):

Design errors have always been recognized as one of the main factors affecting safety and health management and sustainable development in surface mines. Unfortunately, scant attention is paid to design errors and the factors causing them. Therefore, based on expert opinions, this study aimed to identify, rank, and investigate cause-and-effect relationships among variables influencing human error in surface mine design in Iran. The study variables were identified by reviewing previous literature on “latent human errors” and “design errors.” After specifying effective variables, two rounds of the Fuzzy Delphi study were carried out to reach a consensus among experts. Nineteen variables with an influencing score of 0.7 and higher were screened and given to the experts to be analyzed for cause-and-effect relationships by the fuzzy DEMATEL method. The results of the study revealed that the following variables were the major factors affecting human error as root causes: poor organizational management (0.62), resource allocation (0.30), training level (0.27), and experience (0.25). Moreover, self-confidence (-0.29), fatigue (-0.28), depression (-0.25), and motive (-0.23) were found to be effect (dependent) variables. Our findings can help organizations, particularly surface mines, to opt for effective strategies to control factors affecting design errors and consequently reduce workers’ errors, providing a good basis for achieving sustainable development.