

Fuzzy Logic Approach to predicting unsecured workers' work stations: Exploiting Injuries frequency

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Abstract

In this study, a fuzzy-based expert system called Accident Prone Workstations Prediction Expert System (APWAPES) was developed to forecast unsafe level of work stations. APWAPES used fuzzy set theory to make decisions based on the “Total-hours-worked” and “Injury-Count” as inputs and “Workstation-unsafe-ratings” as the output. Data collected from subjects in 20 workstations were run with APWAPES. The results were compared with an Existing Mathematical Model (EME). The validation result showed that there was a strong positive relationship between the EME and the developed APWAPES with a correlation coefficient of 0.710. The independent sample t-test for mean difference showed that EME had a statistically significantly higher level of rating (0.60 ± 0.30 , SEM=0.004) compared to APWAPES (0.50 ± 0.02 , SEM= 0.007), $t(38) = 1.613$, $p = 0.115$. With a significance level of 0.001 at 95% confidence, the APWAPES and the EME predicted values were not significantly different. The study developed an expert system, APWAPES, which can find its applications in any work place where hazards occur and capable of helping managers of industries, to measure work places and/or activities disposed to accidents.

Keywords

Injury, unsafe, occupation, fuzzy, workplace