Comparison of failure mode and effect analysis and functional resonance in press shop

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Abstract

Background: Machines, especially pressing machines, have a huge contribution to the incidence of occupational accidents and their costs.

Objective: The purpose of this descriptive-analytical study was to evaluate the risk of pressing operations. For this purpose, two traditional and new methods of risk assessment were used.

Methods: This study was carried out in a press workshop of one of the automobile production factories in 2017. Risk assessment was performed in two ways: Failure modes (FM) and effect analyzes (EA) and functional resonance analysis method (FRAM) based on extended resilience engineering. After identifying the six aspects of the operation of pressing, their variability and exacerbation were determined.

Findings: From 72 potential breakdowns, twenty mode in one of the risk factors of the risk priority number (severity, probability and detection rates) were equal or greater than five, and other failure modes identified were normal and not require new corrective actions. Fifteen functions were also identified for press operations, which seven operations including planning, mapping, raw material supply, forklift lifting, stamping, census, and delivery of preformed parts were resonating.

Conclusion: Considering the focus of the method of FM and EA on technical issues and the visibility of this method, as well as the overall and organizational view, the FRAM, the simultaneous use of these two methods, significantly contributes to improving the safety of the system makes.

Keywords: Risk assessment, Safety, Failure modes, Effect analyzes