THE USAGE OF MCDM TECHNIQUES IN FAILURE MODE AND EFFECT ANALYSIS

Onur ÖZVERİ[1]

Muhammed KABAK[2]

FMEA (Failure Mode and Effect Analysis) is an widely accepted risk assessment tool which used many of industries and has been subject of numerous scientific research. In this method, prioritization of failure modes based on RPN (Risk Priority Number) . Though FMEA is common accepted method, it has been criticized due to computation of RPN and prioritization of failure modes based on RPN scores. Some of these criticisms are, different combinations of O (Occurrence), S (Severity) and D (Detection) risk factors may exactly same value, relative importance among O,S and D is not taken into consideration, the Formula for calculating RPN is questionable, though RPN distributes at the scale from 1 to 1000 many of numbers in the range of 1-1000 cannot be formed from the product of O,S and D risk factors and RPN is more sensitive to variations in O,S and D risk factors. To overcome the drawbacks of traditional RPN computation several approaches have been proposed in literature. Usage of MCDM (Multi Criteria Decision Making) techniques in prioritization of failure modes is one of these approaches. In this study, we purpose to obtain more proper results in prioritization of failure modes with use of AHP (Analytic Hierarchy Process) and PROMETHEE (Preference Ranking Organization Method for Enrichment Evaluation) methods. For this purpose, we examined the FMEA in an factory which producing shoe and shoe sole. We also compared results which obtained with traditional RPN computation method, AHP-RPN method, AHP-PROMETHEE method and evaluated which method produced more proper prioritization.

Key Words: Failure Mode and Effect Analysis, AHP, PROMETHEE, Risk Assessment

[1] Professor, Departmant of Business Administration, Division of Quantitative Methods, Dokuz Eylul University, Izmir, Turkey

[2] Research Assistant, Deparmant of Business Administration, Division of Quantitative Methods, Dokuz Eylul University, Izmir, Turkey