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Fuzzy failure mode and effect analysis application to reduce risk level in a ready-mixed concrete plant: a fuzzy rule based system modelling approach. (English) [Zbl 07318155](#)

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Summary: In this study, failure mode and effect analysis were applied to evaluate and eliminate potential failure modes in a Ready-Mixed Concrete Plant using a fuzzy-rule-base system. The questionnaires were specially prepared for each sub-department such as production plant, workshop and maintenance, dumping grounds, materials transportation and storage, utilities, administrative office, social facility, quality control laboratory and wastewater pool and recycling facilities. The questions were answered by the workers in each section. Risk Priority Numbers (RPNs) and Fuzzy Risk Priority Numbers (FRPN), which measure potential failure modes, were calculated using the risk parameters. High-risk areas were identified, and some suggestions were made to reduce accident risk at the Ready-Mixed Concrete Plant. Three questionnaires were prepared, based on these suggestions, and distributed to workers to determine whether the suggestions would reduce the risk or not. Based on conditions at the time the recommendations were implemented and improvement rates were calculated. The results showed that the fuzzy failure mode and effect analysis methodology were effective in identifying and eliminating potential failure modes at the Ready-Mixed Concrete Plant. The results can also be used by other ready-mixed concrete manufacturers who want to improve the safety of their operations.

MSC:

[90Bxx](#) Operations research and management science

Keywords:

failure mode and effect analysis; fuzzy rule base system; multi-criteria decision making (MCDM); ready-mixed concrete plant; risk assessment

Software:

[Fuzzy Logic Toolbox](#)

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