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A FRAMEWORK FOR FUZZY EVALUATION OF EMERGENCY RESPONSES TO CHEMICAL LEAKAGE ACCIDENTS

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Abstract

A quick and efficient response to an emergency incident is critical to avoiding further damage, so its evaluation is important before taking real action. In this study, a framework for response strategy evaluation is proposed based on a whole-process risk analysis of historical accidents, which provides a method to compare the efficiency of different response strategies in a hypothetical scenario. The framework is a multi-step procedure consisting of three major steps: system definition, index system creation, and fuzzy recognition evaluation. Three criteria were considered to evaluate different strategies: response-efficiency, environmental damage, and economic losses. In the case study, the fuzzy evaluation framework was applied to a hypothetical toluene leakage accident and three response scenarios. The evaluation results help identify the most efficient response strategy, rate efficiency level of each response action and the disadvantages of each strategy, which provide more detailed information for decision-makers to design or optimize a response strategy in advance. This framework can assist in crafting effective emergency response and preventive safety management plans.

Key words: chemical leakage accident, fuzzy pattern recognition, performance evaluation, risk emergency response

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