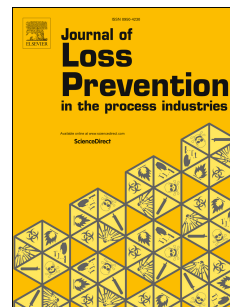


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A Safety Vulnerability Assessment for Chemical Enterprises: A Hybrid of a Data Envelopment Analysis and Fuzzy Decision-Making

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Abstract: This study constructs a composite indicator system for vulnerability assessment based on the disaster-causing factors and hazard-bearing bodies involved in chemical safety accidents. In such a context, a hybrid model (D-FDM) is built by combining a data envelopment analysis (DEA) and fuzzy decision-making while considering the exposure, sensitivity, and adaptability of chemical enterprises. A case is employed to verify the proposed hybrid model and demonstrate its practical application in a safety vulnerability assessment of an ammonia-producing plant in Sichuan, in southwestern China. The degrees of safety vulnerability related to the production and supporting facilities are discerned to provide insights into safety risk control and management for the case plant. Limitations related to the applicability of the methodology are also given to lay the foundation for further improvement.

Keywords: Safety vulnerability; Chemical enterprise; Data envelopment analysis; Fuzzy decision-making

1. Introduction

With rapid development of China's national economy, the chemical industry has become an important pillar industry (Lin and Long, 2014). As a wide variety of

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