In the chemical industry, ensuring safety in plant design is paramount to protect both the workforce and the surrounding environment. Traditional approaches often prioritize productivity and cost-effectiveness over safety considerations, leading to potential hazards and risks. Inherently safer design (ISD) principles advocate for the systematic integration of safety considerations into the design process from the outset. This article presents the development and validation of a comprehensive framework for inherently safer chemical plant design that integrates both process and occupational safety aspects. The framework encompasses hazard identification, risk assessment, safety integration, safety culture promotion, and continuous improvement. Validation involves real-world applications, industry collaboration, regulatory compliance, and the establishment of performance metrics. The integration of process and occupational safety considerations offers numerous benefits, including enhanced safety performance, improved employee morale, reduced environmental impact, and enhanced operational efficiency. Overall, the framework represents a significant step towards fostering a culture of safety excellence within the chemical industry and ensuring the long-term sustainability of plant operations.

Keywords: ; C ; ; P ;

Introduction

C

Safety culture: F

Continuous improvement:

Validation of the framework

Case studies: A

Industry collaboration: C

Regulatory compliance: E

Performance metrics: E

Bene ts of integrated safety design

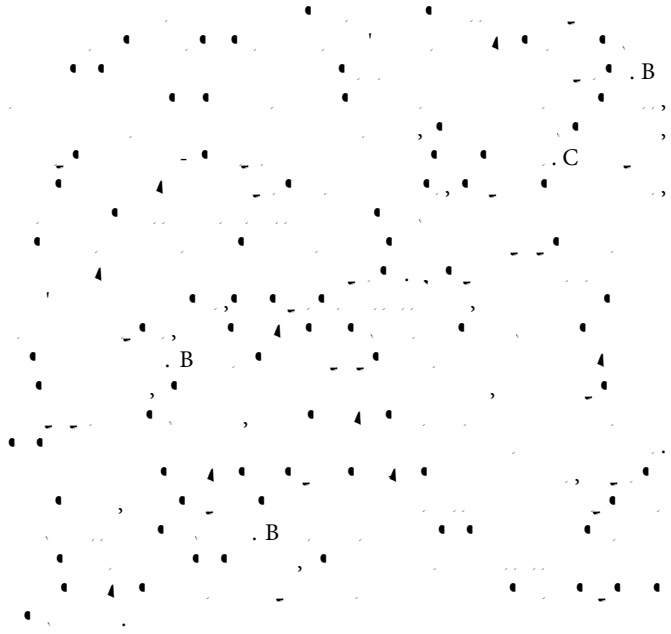
Enhanced safety performance:

Improved employee morale: F

Reduced environmental impact:

Enhanced operational e ciency:

Conclusion



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