

A Study on the Training Effectiveness of Safety Practical Course for Safety Supervisor in the Petrochemical Industry

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ABSTRACT

This study aims to assess the effectiveness of practical safety training courses for safety supervisors in the petrochemical industry. The petrochemical industry is characterized by high capital and technology intensity, significant resource dependency, substantial economies of scale, a broad range of products, an extensive downstream market, stringent environmental and safety requirements, and intense global competition. These characteristics define the industry's essential role in the economy and its operational model.

The industry's labor demands include technical skills, safety and environmental awareness, problem-solving abilities, teamwork, continuous learning, and effective time and stress management. These requirements underscore the technical complexity, high safety standards, and functional expectations of the industry. To meet these stringent safety needs, the training program incorporates real-world scenarios. A practical safety training facility has been established, equipped with diverse training tools, including scaffolding and fall protection for elevated work, cranes and rigging tools for lifting operations, digital display boards and retaining walls for civil engineering tasks, storage tanks and ventilation systems for confined space operations, pumps and explosion-proof tools for hot work, electrical testing panels, protective gear for water jet operations, personal protective equipment, and gas detectors.

For this study, ten years of big data from Company A were analyzed, with qualified trainees from the practical safety training courses for safety supervisors serving as the research subjects. The Kirkpatrick Four-Level Training Evaluation Model was used to analyze pre- and post-training effectiveness, with performance indicators including improvements in certification bonuses, frequency of audit irregularities, annual performance appraisals, and departmental annual evaluation scores.

The main findings of this study are as follows:

1. The practical safety training for safety supervisors has a significant positive impact on improving certification bonus, reducing the frequency of audit irregularities, and increasing annual performance appraisal and departmental annual evaluation scores, indicating that the course effectively enhances trainees' job performance and the department's safety management level.
2. Based on the results of this study, it is recommended that future training unit designs and teaching methods in practical safety training for safety supervisors include more discussions on practical work hazard scenarios, integrate findings from behavioral and cognitive science research, and apply information technology tools to increase trainee engagement and learning outcomes.

This study hopes to provide valuable references and improvement suggestions for practical safety training courses for safety supervisors in the petrochemical industry and offer useful insights for future research in related fields.

Keywords: Safety, Practical Training Courses, Training Effectiveness, Kirkpatrick Model, Certification Bonus, Audit Irregularities, Annual Performance Appraisal, Departmental Annual Evaluation