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Project risk management using multiple criteria decision-making technique and decision tree analysis: a case study of Indian oil refinery

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Abstract

This study proposes an integrated analytical framework for effective management of project risks using combined multiple criteria decision-making technique and decision tree analysis. First, a conceptual risk management model was developed through thorough literature review. The model was then applied through action research on a petroleum oil refinery construction project in the Central part of India in order to demonstrate its effectiveness. Oil refinery construction projects are risky because of technical complexity, resource unavailability, involvement of many stakeholders and strict environmental requirements. Although project risk management has been researched extensively, practical and easily adoptable framework is missing. In the

proposed framework, risks are identified using cause and effect diagram, analysed using the analytic hierarchy process and responses are developed using the risk map. Additionally, decision tree analysis allows modelling various options for risk response development and optimises selection of risk mitigating strategy. The proposed risk management framework could be easily adopted and applied in any project and integrated with other project management knowledge areas.

Keywords:

risk management

cause and effect diagram

the analytic hierarchy process

decision tree

oil refinery construction project

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