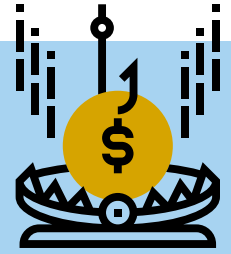


Construction Risk Modeling and Analysis



BACKGROUND

The complex and dynamic nature of construction projects imposes considerable uncertainty and subjectivity on risk analysis and contingency determination processes. Traditional risk analysis approaches are ineffective in capturing subjective uncertainties and expert knowledge, and they rely on historical data that are often not available. Furthermore, the causal interactions and dependencies that exist among construction risk events are often not adequately captured, leading to overestimation or underestimation of project contingency. Through this study, we are developing dynamic risk analysis models and tools for determining the impact of risks on work package costs and evaluating the effectiveness of response strategies.



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OBJECTIVE, METHODS, AND DELIVERABLES

Our objective is to develop models and tools to improve risk analysis on construction projects. Our models are able to account for the dynamic behaviours, causal interactions, and dependencies of risks to help practitioners determine contingency and evaluate response strategies. Since the models use linguistic terms, they provide better transparency and visibility when tracking the impact of dynamic and interacting risks over time. Based on our research, we are developing Fuzzy Risk Analyzer[®] (FRA[®]), a database-driven software tool for determining construction project contingency by assessing risks and opportunities using natural language.

BUSINESS IMPACT

This project will provide industry practitioners with better models and tools for assessing risks using experience and subjective evaluation. Our models capture the dynamic causal interactions of risk events by incorporating fuzzy system dynamics in our analysis methods. They allow practitioners to evaluate the effectiveness of risk response strategies prior to implementation, explore different scenarios, and track the impact of interacting risks over time. FRA[®] is a systematic and transparent assessment tool for determining contingency reserve that frees up time and capital, providing construction organizations with a competitive advantage.



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