



ABOUT THE CHAIR

Established in January 2012 under the leadership of Dr. Aminah Robinson Fayek, the Industrial Research Chair in Strategic Construction Modeling and Delivery operates within the Department of Civil and Environmental Engineering at the University of Alberta.

The Chair brings together construction industry owners, contractors, and labour groups working in Alberta and across Canada to develop comprehensive research-based solutions to key industry problems. Giving particular attention to Canada's oil and gas, utilities, industrial, and commercial construction sectors, the Chair focuses on strategic concerns related to construction management—such as construction industry productivity, project delivery, and performance. Research undertaken includes improvements to labour productivity, structuring projects and teams, assessing owner and contractor competencies, and reducing project execution risk.

The Chair's research program takes advantage of fuzzy logic's ability to capture and quantify the many subjective uncertainties that challenge construction projects. Researchers combine fuzzy logic with other forms of uncertainty modeling, artificial intelligence, and simulation techniques to develop advanced decision-support tools and approaches.



PROJECT PARTNERS



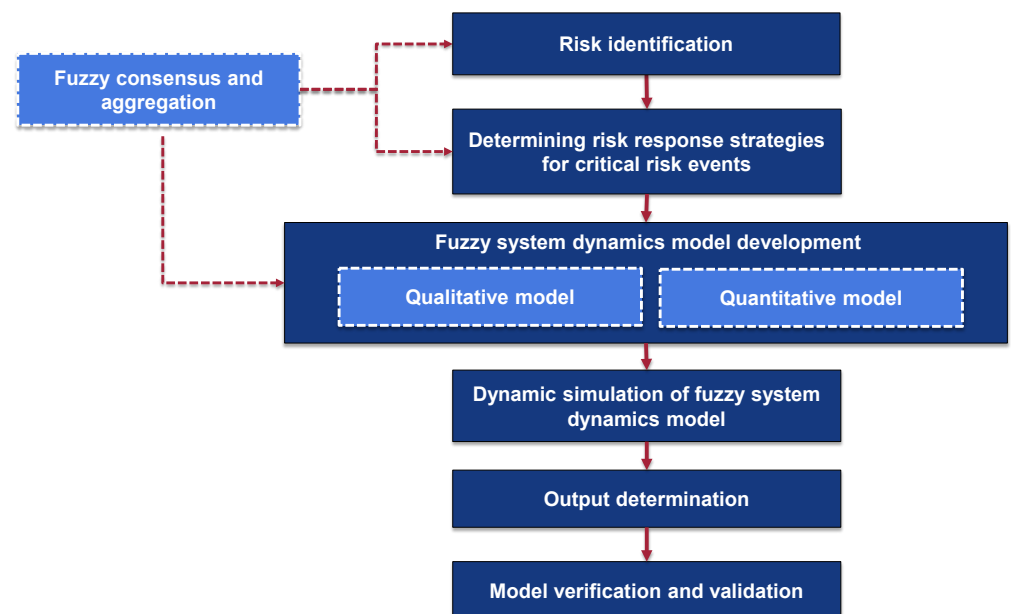
BACKGROUND

- The complex and dynamic nature of construction projects imposes considerable uncertainty and subjectivity on the risk analysis and contingency determination processes.
- Causal interactions and dependencies exist among construction risk events; analyses that do not adequately capture this information can lead to overestimation or underestimation of project contingency.
- Traditional risk analysis techniques are ineffective in capturing the dynamic causal interactions between risks and the subjective uncertainties involved in assessing risks.

OBJECTIVES

- Develop a model to determine the impact of risks on project cost and to evaluate the effectiveness of response strategies for critical risks using fuzzy system dynamics.
- Consider the dynamic behaviour, causal interactions, and dependencies among risks in project contingency determination and response strategy evaluation.
- Use linguistic terms to assess probability and impact of risks and to establish the causal relationships among risks.
- Provide better transparency and visibility in tracking the impact of dynamic and interacting risks over time.

FUZZY SYSTEM DYNAMICS MODEL DEVELOPMENT FLOWCHART



INDUSTRY APPLICATIONS AND BENEFITS

- A risk modeling and analysis approach that helps to capture the dynamic causal interactions among risk events.
- A fuzzy system dynamics model to determine the impact of risks on project cost and evaluate the effectiveness of response strategies for critical risks prior to implementation.
- Allows industry practitioners to assess risks by using subjective evaluations and past experience.
- Allows industry practitioners to investigate different scenarios and helps to track the impact of interacting risks over time.