STRATEGIC CONSTRUCTION MODELING AND DELIVERY
INDUSTRIAL RESEARCH CHAIR

ASSESSING THE EFFECT OF MOTIVATION ON CONSTRUCTION CREW PERFORMANCE

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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

NSERC CRSNG

BACKGROUND

- There is a critical gap in existing literature regarding the factors that directly and indirectly affect construction crew motivation.
- There is a lack of research into modeling the complexity of interactions that exist among crew workers and the subjective uncertainties involved in the factors affecting construction crew motivation and performance.
- Agent-based modeling is capable of modeling complex systems of interacting agents.
- Fuzzy logic is able to handle subjective uncertainty.

RESEARCH OUTCOMES

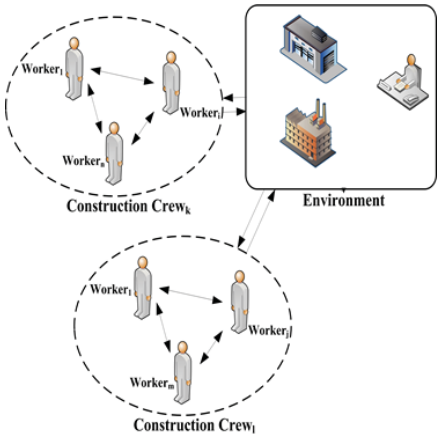
- To define crew performance metrics and to evaluate factors affecting crew worker motivation at both the individual and crew levels through the use of a multi-dimensional and multi-level perspective.
- Measure crew motivation based on factors affecting motivation.
- Combine fuzzy logic and agent-based modeling to analyze complex models in construction.
- Develop a model that describes the relationship between motivational factors, crew motivation, and crew performance metrics.

METHODOLOGY

1. Identification	• Identify input and output variables (e.g., factors affecting motivation of construction crew workers; crew metrics attributes).
2. Quantification	• Quantify input (e.g., motivational factors) and output (e.g., crew performance metrics) variables.
3. Modeling	• Develop a fuzzy agent-based model for assessing the effect of motivation on construction crew performance.
4. Verification and Validation	• Verification and validation of the research analysis and modeling.

INDUSTRY APPLICATIONS

- Identification of critical factors and practices leading to improved labour motivation and performance metrics (i.e., task performance, contextual performance, and counterproductive behaviour).
- Advanced models for construction crew performance prediction, which will help to prevent or at least mitigate common cost overruns and schedule delays.
- Better understanding of construction crew behaviour.



Architecture of an agent-based model of a construction crew

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