



**STRATEGIC CONSTRUCTION
MODELING AND DELIVERY**
INDUSTRIAL RESEARCH CHAIR

ESTIMATING THE PRODUCTIVITY OF A MODULE ASSEMBLY YARD



ABOUT THE CHAIR

Established in January 2012 under the leadership of Dr. Aminah Robinson Fayek, the IRC in Strategic Construction Modeling and Delivery operates within the Hole School of Construction Engineering in 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

AECON



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Dr. Sadeghi is a recent PhD graduate of the University of Alberta's Hole School of Construction Engineering and former researcher with the IRC in Strategic Construction Modeling and Delivery, where Nima is a current PhD student and researcher. To learn more about this project, email Nima at the address above or visit the IRC's website at:

► strategic-construction.ualberta.ca

Background

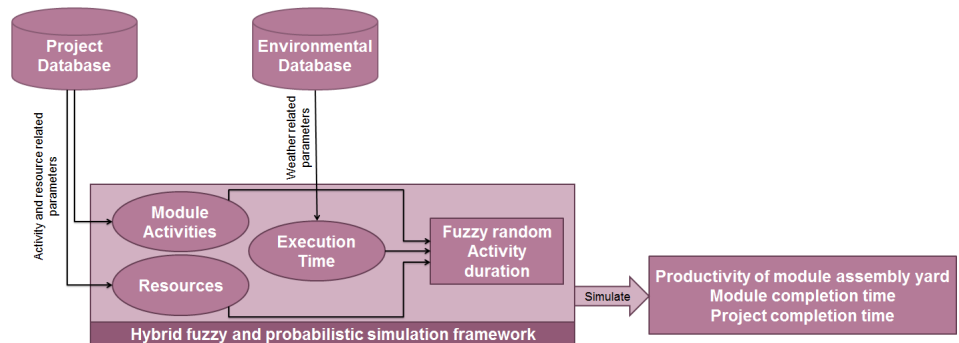
- Modules are preassembled units built off-project in the yard for oil sand refinery projects.
- Projects in module yards can experience multiple change orders, which, in combination with other factors, cumulatively impact project objectives related to time, cost, and productivity.

Objective

The objective of this study was to determine the effect of change orders, when combined with other factors (e.g., type and complexity of modules), on the productivity and required manhours of module assembly yard projects.

Methodology

In pursuing this objective, we developed and executed the following methodology:



Industry Applications

This project is now considered complete. Research resulted in an integrated prediction and simulation model for estimating the productivity of module assembly yards.

The integrated simulation model is capable of...

Estimating effect of significant factors

- Change orders
- Complexity

Conducting if-then analysis for different planning strategies

- Schedule crashing
- Material delivery

Realistically considering uncertainties

- Randomness
- Fuzziness (subjectivity, imprecision)

Applied uses for this model include bidding, impact claims, scheduling, and process improvement.