

## Great Expectations in Ice Engineering – An Updated Risk Management Framework for Ice Designs based on Emerging Research and Technology as a Response to Climate Change

NOR-EX proposes to present a brief discussion on the innovations affecting design methodology in the emerging discipline of Ice Engineering. As ice cover operators face operational pressures from shortened seasons, they are seeking to safely and confidently optimize the time available for transportation of goods and resource exploration. The current framework for determining allowable loads, on ice, provides very little structure for confidently navigating an appropriate risk management framework. Ice Engineers are incorporating technology and innovation within a modern risk management framework that assists in design.

Combined effects of climate change and increasing industry demands are fuelling requirements for research to provide expanded theoretical knowledge and field tested validation of solutions for difficult operational challenges. The integration of Ground Penetrating Radar (GPR) technology for ice thickness measurement, combined with enhanced efforts to understand ice performance in the field, provides an opportunity to increase understanding and to craft a more relevant and effective risk management framework to enhance the safety and operational success of operations on ice.

**Speaker:**     **Chris Swallow, P. Eng.**  
                    **Project Director at Nor-Ex Ice Engineering**



Chris is a critical thinker with over 27 years within industry and the Canadian Forces. He has extensive experience in project leadership roles, consulting engineering, construction management, environmental oversight, and infrastructure support services in Canada and abroad. He has developed exceptional interpersonal skills through extensive community relations experience and numerous public speaking engagements. Chris excels at conceptual & detailed planning, complex situations, with proven success in strategically restructuring organizations to meet objectives. Recognized for outstanding leadership, problem solving, critical thinking skills, and a talent for quickly gaining trust and building high performance teams.