



**UAA College of Engineering**  
UNIVERSITY of ALASKA ANCHORAGE



UAA Professional Development Seminar Series

## **Investigation of Ice Crushing Forces on Vertical Piles with Tidal Accreted Ice**

Presented by: Jasmine Langmann,  
UAA Graduate Student, Civil Engineering

**ABSTRACT:** The Port of Alaska in Anchorage is crucial to the State's economic vitality and is currently undergoing an expensive expansion to meet Alaska's growing needs. Construction of port facilities in ice-laden, polar latitudes requires the design of coastal elements, such as vertical piles and walls, to withstand the impact of sea ice. Large masses of ice cannot be stopped. Instead, ice is crushed against rigid structures. Design forces are determined by applying the crushing strength of thick sea ice over the width of the structural element. Freezing air temperatures cause ice formation (or accretion) on the cold surface of a semi-immersed structure as the tide recedes. Almost no research has been conducted on this process of tidally induced lateral ice growth. As a result, designers must make conservative assumptions about the size, shape, and strength of the ice attached to the structure. This presentation will talk about the process that has gone into determining the strength of the accreted ice. Ice was collected from the Port, an ice-core drill was developed, and the ice was compression and shear tested. The experimental testing results will inform the construction of a mechanics-based finite-element model of the ice-ice-structure interaction and simulate the resulting forces on the pile. (Recent Article: [Ice research may add up to big savings for growing industry](#))

**BIO:** Jasmine Langmann is a MSCE student at UAA. She graduated with her BS in Civil Engineering from UAA Spring 2021 and will complete her MS Civil Engineering Fall 2022. She has been working under Dr. Scott Hamel on the Port Ice project since January 2021. She has been an officer in ASCE at UAA and been on the Steel Bridge team since 2019.

She has interned at PND Engineers and Alaska DOT Bridge Section and will be working for Alaska Testlab in Fairbanks this summer. When she is not spending long days studying or cutting ice in the walk-in freezer at UAA, she enjoys rowing, hiking, and biking with her German shepherd.

Friday, April 8, 2022

11:45 am - 12:45 pm

Online Via [YouTube Live](#)