Arctic temperatures affect properties of building materials such as concrete and rebar. Structures properly designed for moderate temperatures might behave differently at cold temperatures. We are particularly concerned about structural behavior transitioning to brittle failure mechanisms driven by crushing of concrete, rather than the preferred ductile failure mechanism, which is driven by yielding of steel.

We have established how material properties change at temperatures ranging from +20 to -60 °C. These results must be synthesized with reinforced design practice to develop strategies for design that ensure both sufficient strength and ductile behavior at a wide range of temperatures.
THIS PROJECT WILL BE REMOTE – Physical Presence is Optional
• We will have regular virtual meetings to discuss progress and answer questions.
• If laboratory testing is shut down, students from “Rebar Behavior at Cold Temperature” will assist this team.
• If you have questions about these requirements please contact Dr. Riddell riddell@rowan.edu or Dr. Cleary cleary@rowan.edu before selecting this project as one of your options.

WHAT YOU WILL BE DOING –
• We will review existing literature and design codes to identify current best practices.
• Brainstorm to create characteristic parameterized designs to evaluate.
• Predict behavior of characteristic designs for different parameters (geometry, materials) under different temperatures.
• Evaluate the results, identify conditions that might cause trouble, and create new design recommendations.