

High-Performance Building Envelope Systems North of 60°

Objectives

To develop building envelope assemblies that are energy efficient and durable in extreme outdoor and indoor climates, focusing on their heat and moisture performance and impact on the environment.

Background

The climates of both northern and northern-coastal communities impair the durability of building envelopes, and reduce indoor comfort. They also result in high costs for utilities, transportation and infrastructure. Energy efficiency and durability can be enhanced by designing envelope systems that accommodate both extreme outdoor climates and extreme indoor climates such as those involving high humidity.

Statement of Work

We will begin by consulting with northern communities and the construction industry to identify technological issues and community needs, and to determine climate parameters. Based on the results of this consultation we will then design and construct a number of building envelope assemblies, assess them in our Extreme Environmental Exposure Facility and Dynamic Wall Test Facility, and factor the results into computational studies. The next steps will be to analyze the energy and environmental impact of the assemblies and to validate this analysis by monitoring the field performance of several assemblies over a period of years. We will then select the wall assembly that performs the best overall, install it in an IRC test hut and possibly homes in northern communities and monitor its field performance over several years.

Expected Outcomes

Monitoring of the chosen wall assembly will result in new information for the design of durable, energy-efficient building envelope systems that provide a healthy and comfortable indoor environment.

Partners

Program for Energy Research and Development (PERD), Canada Mortgage and Housing Corporation, Natural Resources Canada (NRCan)

Start/Expected Completion Dates

This project began in July 2004 and will be completed in March 2008.

Project Manager

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For more information, see http://irc.nrc-cnrc.gc.ca/bes/hmpe/north60_e.html

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IRC researchers prepare full-scale wall specimen for an experiment in the Envelope Environmental Exposure Facility (EEEF)