



Research • Innovation • Education



Cold Climate Housing Research Center

CCHRC

“Promoting and advancing the development of healthy, durable, and sustainable shelter for Alaskans and other circumpolar people through applied research.”



Top Left: Solar hot water collector, Top Right: REMOTE wall construction, Bottom Left: Mold growing in a home wall, Bottom Center: Frozen sewage vent, Bottom Right: Coastal erosion in Shishmaref, Alaska

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Research. Innovation. Education.

The Cold Climate Housing Research Center is committed to meeting today's critical challenge of creating sustainable housing for the world's cold environments. In the extreme climatic conditions of the North, shelter can literally mean the difference between life and death. From Interior Alaska—where temperature extremes range from lows of -80°F to highs of 100°F—to the rainforests of Southeast Alaska—where annual rainfall can exceed 220 inches—Alaska presents daunting challenges to the building industry.

For much of the 20th century, housing in cold regions used technologies and materials from more temperate climates. The failure and cost of this approach has become clear over time and remains a tremendous burden to Northern communities. It is imperative to find innovative solutions that are practical, affordable, and sustainable. Melting permafrost, changing vegetation, rising temperature, a diminishing ice pack, and coastal erosion are all contributing to drastic environmental changes. In late 2007, rapidly escalating energy costs dramatically impacted the lives of both rural and urban Alaskans. As a result, an ever increasing portion of household income is used to pay for heat and electricity. Unless solutions are found, many people will be forced to leave their homes—for some this means abandoning communities and lands their ancestors have occupied for thousands of years.

In 1999, members of the Alaska State Home Building Association decided to address these challenges and work toward solutions by founding the Cold Climate Housing Research Center (CCHRC). CCHRC's mission, "promoting and advancing the development of healthy, durable, and sustainable shelter for Alaskans and other circumpolar people through applied research," has led to the organization becoming a world leader in improving the quality of life in high latitudes. It is our conviction that the pioneering and innovative spirit of Alaskans will generate significant contributions to all who live on this beautiful planet.



CCHRC Research and Testing Facility

The Research and Testing Facility

The home for CCHRC's statewide research activities is the Research and Testing Facility (RTF) adjacent to the University of Alaska's main campus in Fairbanks. The building is a working example of the latest in sustainable northern building design, incorporating customary and innovative approaches to northern building issues. CCHRC installed over 1200 sensors throughout

the structure and building site to record important data relating to building performance and infrastructure in Arctic conditions. Designed and constructed to meet the US Green Building Council LEED Gold standard, the RTF provides space for CCHRC's administrative offices, classrooms, meeting rooms, a building information library, and over 4000 square feet of laboratory space in which to develop and perform research that can then be shared with builders, homeowners, and other interested parties.

The Research and Testing Facility offers a unique opportunity for interactive education. There are examples of many new construction techniques such as the REMOTE wall system, innovative demonstrations like the Hybrid Micro Energy Project, and exciting research topics, for example, wood energy. Collaboration with education providers, weekly guided tours, interactive displays, and web based tours of our facility are just a few of the ways the RTF aids educators and researchers in getting the word out. A prime example of the interaction between the RTF and educators is CCHRC's collaboration with Siemens Building Technologies. Siemens is using the CCHRC interactive displays, along with the building systems data, as source material for an engineering-based education program designed for high schools and universities internationally.



Interactive Display

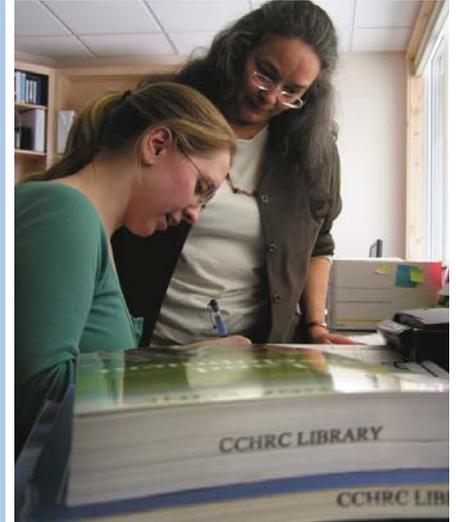
Research

CCHRC's broad research covers sustainable building techniques, efficient infrastructure, and green power production. Research projects are conducted in partnership with many public and private organizations, in particular through a long standing relationship with the Alaska Housing Finance Corporation. One current research topic is wood energy, including testing and certifying wood burning technologies and demonstrating their feasibility and affordability. We are also studying residential and village-scale Combined Heat and Power (CHP) units. Other research topics include healthy indoor air quality, home retrofits, appropriate housing envelopes, innovative mechanical systems for homes, and economic analyses.



Outreach

CCHRC is committed to raising awareness of cold climate building techniques and issues. Our research is integrated into builders' manuals, taught in local and national workshops, and included in statewide builder's certification programs. We offer training courses and education through our partners. We publish information on all our projects and regularly contribute to newspapers and other publications. We also support an active production department, creating instructional videos, television programming, and radio spots. Furthermore, we provide a builder's resource library for public use and maintain an active and vibrant online presence at www.cchrc.org. Our goal is to connect the world with our research to maximize the benefits of our work.



Consulting

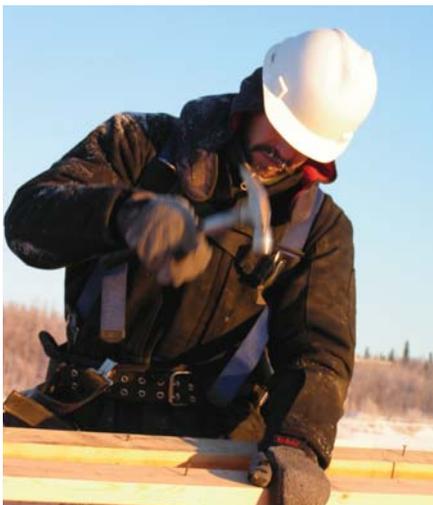
In addition to research and outreach, CCHRC performs a variety of consulting services pertaining to sustainable building in the north. From the construction of a building foundation through to its finish materials, we provide information and suggestions on sustainable, climate appropriate, and energy efficient technology that can be integrated into a design. We provide consulting services to private construction companies, the Alaska Housing Finance Corporation, rural Alaska housing authorities, the U.S. Department of Energy, and U.S. Housing and Urban Development (HUD).





Demonstration—Hybrid Micro-Energy Project

A portion of our work at CCHRC is demonstration projects, which show the possibilities of different building approaches or systems. We, along with several sponsors, began the Hybrid Micro-Energy Project (HMEP). HMEP will enable CCHRC to demonstrate and research a combination of renewable energy systems working in concert to provide year-round heat and power to Arctic structures and communities. The system includes four solar photo voltaic arrays, three solar hot water units, and one biomass fired combined heat and power system. Gathering data on the performance of the system and the feasibility of installing it at different locations will help us determine the opportunities of applying the system in different locations around the state.



Green and Energy Efficient Building

CCHRC is dedicated to researching, developing, and promoting sustainable building practices across the circumpolar north. Under the heading of “Green Building,” we are working with the Alaska Housing Finance Corporation, the Alaska State Home Builders Association, and the National Association of Home Builder’s to develop and promote new green building standards. Central to this effort is our extensive work on energy efficiency, including developing policy recommendations for the State of Alaska, developing training and certification programs in energy evaluations and home retrofits, and researching the best practices in energy efficient building design.



Future Plans

With its extensive laboratories, CCHRC will soon expand its product testing and development capabilities. Products that pass the rigorous protocols we are working to establish will earn the “Certified Alaska Tough” label. The testing lab will also support the development of new products and industries important to building in the north. Additionally, we are actively engaged with Alaska’s regional housing authorities, individual rural communities, and local leaders across the state to develop affordable and culturally appropriate housing for different regions in the north. Our focus remains finding solutions and addressing issues that are important to builders, homeowners, and communities across the circumpolar north.



Top Left: Mobile Test Lab used for collecting data on different wall configurations
Top Right: Local builder at the construction of the Research and Testing Facility
Bottom: Steel framing during winter construction

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Support CCHRC

- Join us in changing the world

From walls and roofs to electricity and heat, CCHRC's mission to promote the cutting edge in northern shelter affects our everyday lives. Your donation to CCHRC makes change happen by providing valuable support to our efforts. Together we can build a more sustainable future.

To become a member or donate contact CCHRC at: (907) 457-3454

or visit our web site:
www.cchrc.org



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