

## Cold Challenges

- Strategic defense and national facilities located in cold and remote locations
- Performance criteria must be adapted to provide high reliability
- Cold regions can add significant cost penalties to build and sustain facilities
- Effects of extreme cold on materiel and procedures
- Army Transformation infrastructure must support all season operations

## CRREL CRI Programs

- Cold regions facilities planning, construction, and maintenance criteria
- Design and construction techniques for permanent and contingency airfields
- Design reviews for DoD and polar facilities
- Logistics, operations and infrastructure planning for remote polar sites

## CRREL CRI Facilities

- Frost Effects Research Facility
- Materiel Evaluation Facility
- Environmental Wind Tunnel
- Comprehensive Geotechnical Labs



The Cold Regions Research and Engineering Laboratory (CRREL) in Hanover, New Hampshire, and Fairbanks and Anchorage, Alaska, is part of the US Army Corps of Engineers Engineer Research and Development Center (ERDC). Our mission is to solve interdisciplinary, strategically important problems of the US Army Corps of Engineers, Army, Department of Defense, and the Nation by advancing and applying science and engineering to complex environments, materials, and processes in all seasons and climates, with unique core competencies related to the Earth's cold regions.

## CRREL's Cold Regions Infrastructure Mission

To provide innovative cold regions solutions and services to agencies planning, constructing, operating, and maintaining standard and strategic facilities in cold regions worldwide.

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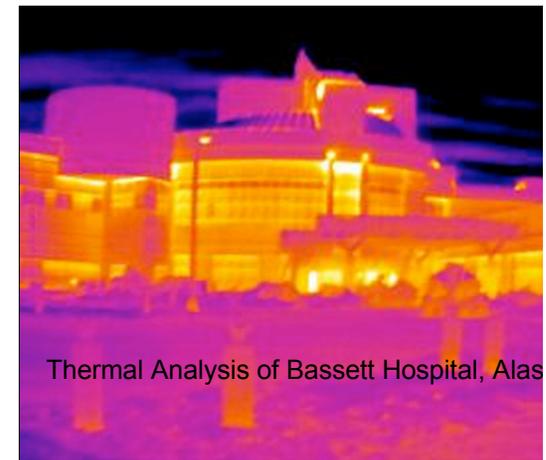


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## Cold Regions Research and Engineering Laboratory

## Cold Regions Infrastructure (CRI)

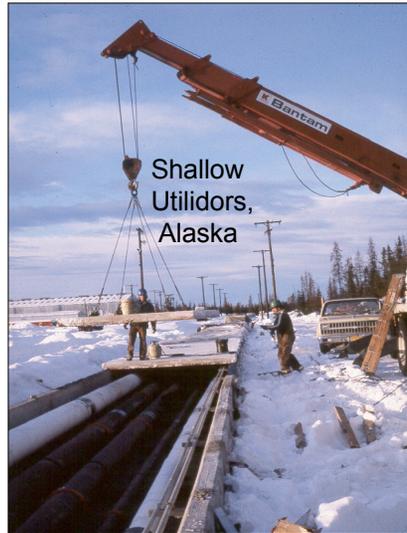


Thermal Analysis of Bassett Hospital, Alaska

- Building Envelopes
- Pavements, Utilities and Site Work
- Polar Facilities and Logistics

## Building Envelopes

- Thermal analysis of unique, cold regions infrastructure
- Criteria and design guidance for Army and Air Force buildings and facilities, including
  - Headquarters, barracks and dining facilities
  - Medical and dental facilities
  - Family housing and child development centers
- Roof ventilation design guidance to avoid problematic icing
- Research on permafrost engineering and interactions with infrastructure
- Techniques to minimize snow and ice problems in and around buildings



## Pavements, Utilities and Site Work

- Snow drift siting studies using wind tunnel facility
- Shallow utilidor design for cold regions
- Mechanistic-empirical models for pavement subgrade design
- Research on seasonally frozen ground and frost heave
- Design and repair guidance and criteria for Air Force bases and fixed runways
- Development and testing of innovative phase change materials for heat exchange systems



## Polar Facilities and Logistics

- Research to improve the Army's ability to conduct operations in extreme climates and remote locations
- Improved site planning for Arctic land disturbance analyses
- Arctic and Antarctic operation and logistics support
- Development of construction methods and design requirements for sea ice, glacial ice, and deep snow airfields
- Development of autonomous instrument shelters for extreme climates

