Research & Development Highlights

Technical Series
90-223

Thermal Testing of Wall Sections in the Northwest Territories

The severe climate in the Arctic creates a unique environment that may, over time, reduce the insulating value of composite wall sections. Factors include shrinkage of wood members, shifting of structures, and degradation of individual components within the walL This may create air spaces between the insulation and the studs, allowing for convective loops to fonri.

This project evaluated the thermal performance of composite wall sections in Arctic housing to determine if significant reductions in the insulating value of the wall sections had occurred as a result of the harsh Arctic environmerit.

Test Program

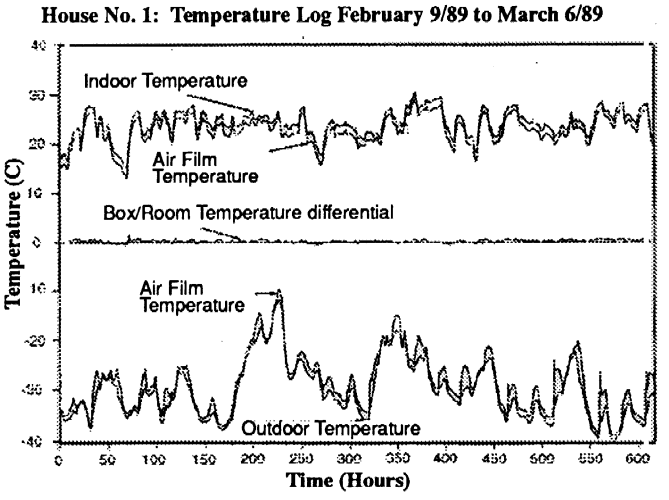
The project involved in-situ testing in four housing units in Rankin Inlet, Northwest Territories, that were of different styles and constructed in different years. The performance testing included inspections using infrared thermography equipment and continuous monitoring using guarded hot box calorimetry instrumentation. The infrared thermography scans were conducted first **to** ensure that the wall sections selected were properly insulated and of typical construction practice. Effective RSI values of the wall sections were determined from the data obtained from continuous monitoring with the calorimetry instrumentation. These measured values were then compared to theoretical values which were calculated using individual component thermal resistance values and aceounting for thermal bridging of studs and strapping.

TABLE #1: Summary of Results

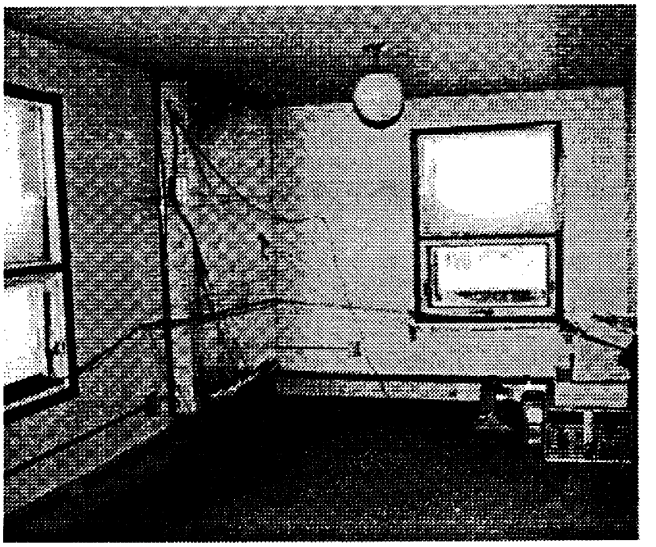
House	Measured	Calculated	% duff.
?	3.6	3.2	-13
2	5.1	4.5	-13
3	2.1	3.6	+42
4	5.4	4.8	-12

Conclusions

The results from testing wall sections in four housing units suggest that significant reductions in insulating value of composite wall sections have not occurred. The measured RSI values of three of the four houses were found **to** be in line with theoretical calculations. For House No. 3, where the measured effective RSI value was significantly lower than the theoretical RSI value, a field inspection of the wall section did not reveal any indication of degradation. The deviation between field and theoretical values for this house is probably due **to** equipment malfunction. It is recommended that detailed infrared thermography inspections be conducted in many houses, encompassing a wide variety of wall construction types.



Sample of calorimeter test results



Typical hot box calorimeter installation

CMHC SCHL
Helping to house Canadians

Project Manager: Robin Sinha

Research Report: In Situ Testing of the Thermal Performance of Wall Sections in N.W.T.

Research Consultant: G.K. Yuill and Associates

A full report on this research project is available from the Canadian Housing Information Centre at the address below.

Housing Research at CMHC

Under Part IX of the National Housing Act, the Government of Canada provides funds to CMHC to conduct research into the social, economic and technical aspects of housing and related fields, and to undertake the publishing and distribution of the results of this research.

This factsheet is one of a series intended to inform you of the nature and scope of CMHC's technical research program.

This **Research and Development Highlights** factsheet is one of a wide variety of housing-related publications produced by CMHC.

For a complete list of Research and Development Highlights, or for more information on CMHC housing research and information, please contact:

The Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa (Ontario)
K1A 0P7

Telephone: (613) 748-2367
Fax: (613) 748-2098

Cette publication est aussi disponible en français.