

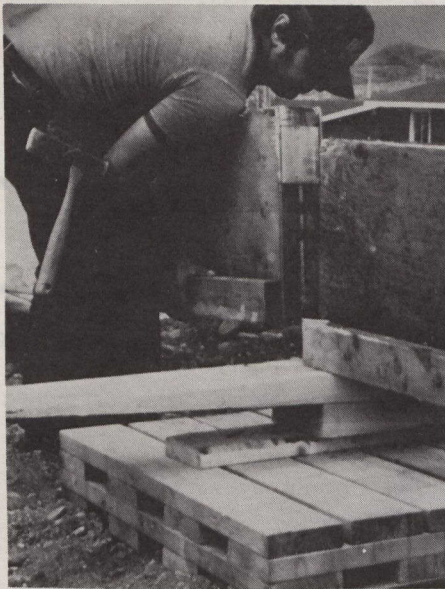
is the permafrost, or permanently frozen ground, that underlies most of the Northwest Territories. Permafrost areas have two distinct layers — an upper or active layer that freezes and thaws with the seasons, and a lower layer that may be more than 100 metres thick in places and remains frozen.

A slight change in the environment and the loss of insulating vegetation, for example, can start the permafrost thawing and turn once-solid ground into a muddy bog. Foundation problems arise when the heat from a house placed directly on the permafrost causes the frozen soil to melt. As a result, the house starts to sink into the mud.

The permafrost problem is usually tackled in one of two ways. First, by constructing houses on piles sunk deep into the frozen ground — an effective but expensive method. Or, by the more common method of erecting housing on insulating gravel pads. However, ice often remains embedded in the gravel, creating an unstable foundation as it gradually thaws, and wreaking havoc with joints and woodwork.

Brief construction time

Another major obstacle for northern builders is the short construction period in the Arctic, a mere four or five months at the best of times. Moreover, there are few indigenous materials with which to build houses in the tundra, nor are there as yet enough skilled tradespeople in the North to build housing components. This means that materials must be imported over great distances from the South to be



The house is lifted off the permafrost layer by gravel bed and wood footings.

assembled before the first winter storms.

To offset these problems, northern houses are usually prefabricated in the South and shipped to the Arctic in easy-to-assemble panels. Needless to say, the transportation costs, handling accidents, and shipping delays all add to an already inflated construction bill.

With the support of the federal government through Canada Mortgage and Housing Corporation (CMHC), the NWTCH is attacking northern housing problems in several ways. It has initiated a major rehabilitation program to bring existing houses in the North up to standard and to make them more energy-efficient. Architects in consultation with northern communities are creating innovative building designs, specifically adapted to northern conditions. Through extensive training programs, the NWTCH is fostering the growth of a local construction industry as a means of lowering the exorbitant cost of building in the North.

Houses last 15 years

Unless rehabilitated, the average northern house has a life expectancy of about 15 years. This is due to the wear and tear caused by nature, and also to heavy use by large families crowded into their homes through much of the year. Current plans call for rehabilitation and insulation by 1989 of most of the 2,360 houses built under the northern housing rental program.

Much of the rehabilitation work on northern homes will be done by local native people who are currently receiving extensive training in the building trades.

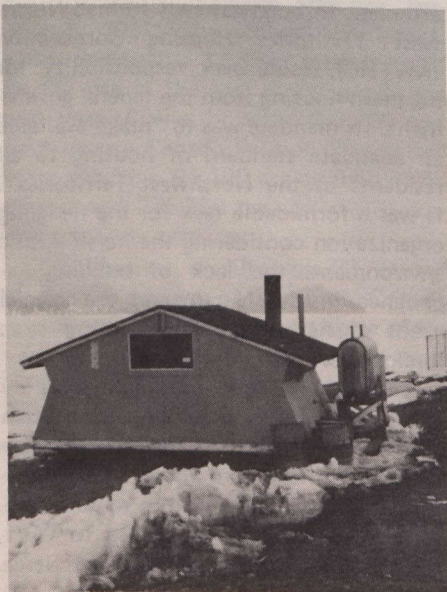
It is hoped that within three years, housing will be turned over to the native people through their local housing associations and through the district housing federations. CMHC will become the resource for technical assistance, financial funding, and control teaching.

To realize this goal, the NWTCH has begun a five-year training program whereby local residents learn the construction, maintenance and management trades. In 1980 alone, the territorial government spent \$420,000 on instruction for 130 trainees. The NWTCH also plans to train local contractors in tendering procedures, program and finance management.

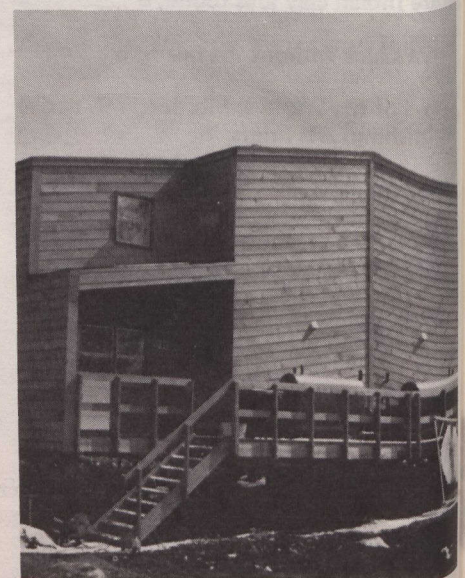
Unique northern residence

Innovative homes now being built in the North include details such as a porch for the hunter to butcher meat or repair a snowmobile. A series of demonstration homes has just been completed in seven communities in the Keewatin district of the Northwest Territories. Most striking about these demonstration houses are their energy-conserving features. Each building is a highly insulated, airtight cube with walls 30 centimetres thick. Almost all windows face south to bring in as much sunlight as possible, and a large porch across the front of the building provides a buffer against strong winds. The porch also acts as a passive solar collector to capture the sun's heat on bright days.

(Excerpts from an article by Gabriella Goliger in Habitat, No. 4, 1981.)



Twenty-year-old house provided under the early federal housing program.



Recent housing takes many forms as architects experiment with the suitability of various designs and materials for the northern lifestyle and climate.