

large sleds, called "wannigans". A tractor train must carry its own bunking and messing quarters, workshop and fuel supply, which cuts down materially the amount of freight which it can carry. A tractor train can travel about two miles an hour over sea ice near the shore or over land where the surface is not too uneven.

The most difficult type of terrain from the point of view of transportation is, of course, the rugged deeply crevassed Quebec-Labrador area. Much of this area can be served only by air as other means would take much too long and would eventually probably cost a good deal more. Knob Lake, with its air and rail facilities, is proving invaluable as a construction base for this area.

The types of buildings too, vary according to the region. In the western and Hudson's Bay regions prefabricated steel structures with interior fibre board walls are being used, while in the Quebec-Labrador area, due to the prevalence of airlift as the means of transportation, light-weight prefabricated aluminum buildings will be installed.

The question of building foundations in the north presents many problems. In some areas ideal bases for buildings are provided by solid plateaus of ancient rock of the pre-Cambrian age. At such building sites, which are usually to be found where airlift of all materials is necessary, very little concrete is required for foundations, and the contractor's burden is lightened. But in other areas, where the top soil is deep and is subject to intense freeze-up and prolonged thawing, ordinary foundation construction procedure would be entirely ineffective. In such areas it has been found that pile construction must be used. The piles are sunk in holes made deep into the permafrost by high pressure steam jets. Similar techniques are required for anchoring towers. Towers themselves, to withstand the rigours of the climate in many areas, must be provided with special de-icing equipment.

Construction under the circumstances which obtain in the sub-Arctic has required new and very carefully worked out logistical planning. Caches of aviation gasoline, fuel oils and lubricants, stores of food and large quantities of building materials have to be delivered to the points where they are required -- well in advance of the time when they will be used -- and, in some cases, within a very short period when transportation is possible.

Some of the construction obstacles are less technical. At one of the locations in the Hudson's Bay region last August a field party found so many polar bears occupying the site that work could not be safely undertaken and had to be postponed for a time. Or again, towards the end of September, at the Knob Lake construction base, fire destroyed part of the contractor's camp including fourteen temporary construction huts, kitchen and messing accommodation. Such a loss is a major upset to the timing of any contract. It is doubly so in the far north, even though no equipment or essential materials for building the line was involved in this case. However, prompt steps were taken to offset the delay and it is felt that as a result timing of the work in this area can be maintained.

Wear and tear on construction equipment and on air transport is, of course, very high. For example, experience has shown that out of approximately ten helicopters or fixed