CANADA - P.E.I. FOREST RESOURCE DEVELOPMENT AGREEMENT

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TECHNICAL NOTE/NOTE TECHNIQUE

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Forestry Canada Forêts Canada

WETLAND FOREST ROAD CONSTRUCTION

INTRODUCTION

Bulk Carriers (P.E.I.) Ltd. constructed a wetlands forest road to a chip harvesting site during the fall of 1988. The ground's wet, unstable nature did not permit the use of standard road-building techniques. Therefore, Bulk Carriers decided to employ the use of a geogrid product made by Tensar® (Figure 1).

BACKGROUND

Many forested lands in Prince Edward Island are inaccessible

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because of wet, boggy conditions. Access to these areas has been limited because of the cost or inappropriateness of conventional road-building techniques.

One method for road construction has been to excavate material from the surrounding area and place it on the roadway, raising the roadbed above grade. This approach disturbs a larger area of the wetlands and is not always practical.

DESCRIPTION

In October of 1988, Bulk Carriers (P.E.I.) Ltd. received assistance from the Woodlot Technology Transfer Program to construct 191 m (623 ft) of forest road across an environmentally sensitive sphagnum moss bog. The depth of the peat moss in this bog measured 12.2 m (40 ft), making conventional road building techniques impractical.

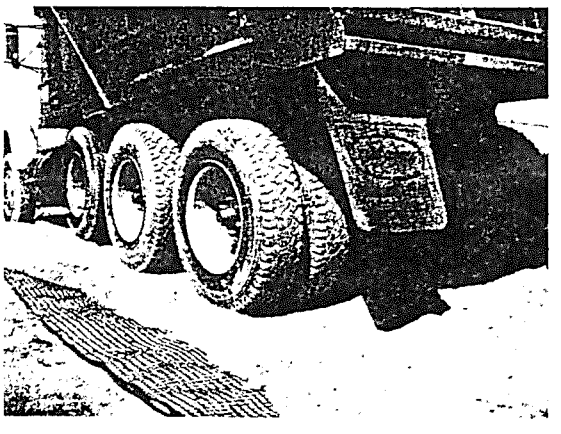

Figure 1. Geogrid laid directly on the ground and covered with gravel.

There was also concern that the ditching necessary for conventional road building might disturb drainage on neighboring properties.

Because of the ground's unstable nature, plastic-webbed geogrid was used to reinforce a base for the roadway.

Tensar® geogrid looks like plastic snowfencing and acts like a snowshoe on snow. It supports the roadway's weight and prevents the road-building material from sinking into the soft ground below.

Geogrid is laid directly on the ground and gravel is spread on top of it. The gravel interlocks with the plastic grid forming a firm base that will not shift or become absorbed by the sub-soil.

OBSERVATIONS

Road construction began by clearing the right-of-way of trees and slash. The stumps were cut as low as possible and rounded with a chainsaw to prevent the geogrid from being cut (Figure 2). Their root systems acted as a base to bind the sub-soil. One important advantage to using geogrid in this application was that no further preparation was required. The geogrid was simply unrolled like chicken wire directly onto the road surface.

Tandem trucks were used to haul P.E.I. pit-run gravel to the roadway. This was spread in a layer 20 cm (8 in) thick on top of the plastic grid with a small dozer. This initial layer

of gravel interlocked with the plastic grid and served as a base for a 45-cm (18-in) thick layer of good quality sandstone shale overburden. The only compaction on the road was that caused by the dozer as it spread the overburden. Culverts were put in place to accommodate a stream crossing.

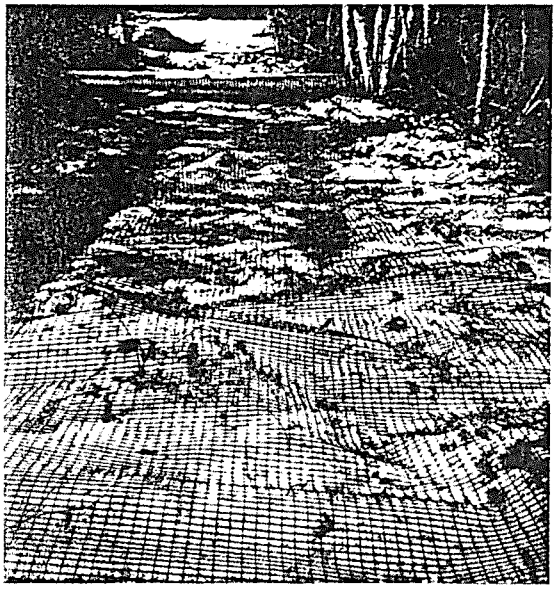

Figure 2. Preparation of the right-of-way.

Road construction took 2 days. On the second day the temperature dropped to -10 °C (14°F) and the cold made the PEI pit-run gravel unavailable. Nova Scotia crushed rock measuring 12.5 mm to 18.8 mm (½ in to ¾ in) was used in its place. Because of the expense of this material, only a 12.5-cm (5-in) thick layer was spread on the roadbed instead of a 20-cm (8-in) thick layer. The crushed rock was also covered with approximately 45 cm (18 in) of sandstone shale overburden.

As soon as this material was spread, the road was ready for use. Even during construction, the fully loaded tandem trucks, used to haul the gravel to the construction site, caused no deflection of the road surface. There was no water seepage on the road and the roadbed remained stable.

DISCUSSION

Two days were needed to construct this wetland forest road after the right-of-way had been cleared. Once the Geogrid was in place and covered with gravel the road was ready for immediate use. There was no necessity to let the road settle and become firm as is often the case with conventionally built roads.

The resulting road was just over .5 m (1.66 ft) in height and required no ditches. This minimized drainage problems.

Costs

Three rolls of Geogrid were used at a cost of $340 per roll. The P.E.I. pit-run gravel cost $1308 and the Nova Scotia washed, crushed rock cost $1738. Use of Nova Scotia crushed rock increased construction costs considerably. The sandstone shale overburden cost $1800 and the dozer costs came to $107. The total cost of the construction of this 0.19 km (623 ft) section of the road was $5973, or approximately

$30,000 per kilometer. The bulk of this cost was spent on gravel and overburden while less than 20% was spent on geogrid material.

CONCLUSION

This approach was more costly than conventional wetland forest road construction, but conventional techniques were inappropriate because of the environmentally sensitive nature of the bog, the depth of the peat deposits, and the necessity to avoid flooding of neighboring properties.

Tensar® geogrid proved to be an ideal solution to the problem posed by the wet and unstable ground, and made the satisfactory completion of this project possible.

ADDITIONAL INFORMATION

Additional information concerning the use of geogrid road building materials can be obtained from:

Forestry Canada
Prince Edward Island District Office
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