FOREST ENGINEERING RESEARCH INSTITUTE OF CANADA
Eastern Division

FERIC

INSTITUT CANADIEN DE RECHERCHES EN GENIE FORESTIER
Division de l'est

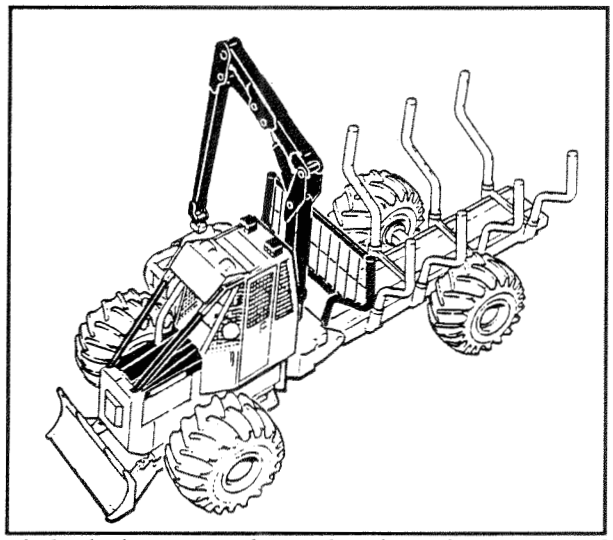
December 1989

Field Note N°: Skidding/Forwarding-9
*Summary of FERIC TN-140

TIMBERJACK 230 8-TON FORWARDER

Wheeled forwarders are widely used in Atlantic Canada in both woodlot and company-run operations. FERIC recently conducted evaluations of the most popular unit, the Timberjack 230 8-ton, on contractor operations in Nova Scotia.

Timberjack introduced the 230 model forwarder in 1973. The machine remained basically unchanged until 1987, when an improved model was introduced. The "improved" 1987 model has a load capacity of 7260 kg (8 tons). It has a 70-kW Cummins diesel engine, a 5-speed manual-shift transmission and a 2-speed, fully-reversing transfer case. Both axles are driven and have no-spin differential locks. The forwarder can be equipped with either standard tires (24.5 inches) or wider tires up to 43 or 50 inches.



Timberjack 230 8-ton forwarder. (Drawing courtesy of Timberjack Inc.)

The 70-kW Cummins provides 7 kW more power than the older version with a GM diesel. The new version also has 28% more tractive effort. Other improvements include wider axles, changes to the transfer case, relocation of control levers, a better seat and more cab space.

The study was conducted on five woodlot operations near Antigonish, Nova Scotia in February 1988. Forty-two trips (turns) were measured. One of the three Timberjacks studied was a 1987 model with 43-inch wide tires. It had been operated for 2000 hours and the tires were in good condition. The other two forwarders in the study were 1985 models and had 4500-5000 operating hours each. The tires were worn out and were equipped with friction chains that were in poor shape.

All observed operators had over ten years of experience operating forwarders and were considered to be highly skilled and motivated. The terrain was considered good to excellent (mainly flat with some sloping areas). Travel was over cutovers, farm fields and improved forest trails. Sorting for pulpwood grades or firewood was done on three of the sites.

RESULTS AND DISCUSSION

The productivity of the Timberjack 230 8-ton forwarder as determined by the FERIC studies varied from 19.4 m^3 to 31.6 m^3 per productive machine hour (PMH). The differences in productivity were mainly a function of forwarding distance although travel speed, terrain, tire wear, load volume and loading efficiency were also important factors. The highest productivity was achieved on a site where the average forwarding distance was only 170 m, while the lowest productivity occurred at the longest average forwarding distance, 1000 m.

Average travel speed empty ranged from 61 m/min to 136 m/min while average travel speed loaded varied from 52 m/min to 116 m/min. Travel speed was much faster on improved trails and on fields (117 m/min empty and 104 m/min loaded) than over the cutover (71 m/min empty and 60 m/min loaded).

The total time per turn (complete cycle) averaged 25.6 minutes and ranged from 18.6 to 29.1 min. Travel time empty and loaded averaged 8.2 min (32%). Loading and moving during loading took 11.4 min (44%), unloading took 5.3 min (21%), and delays consumed 0.7 min (3%) of time per turn.

* Summary prepared by T. Schwan, ing.f. under contract to FERIC.

143 Place Frontenac, Pointe Claire, Québec, Canada H9R 4Z7 (514) 694-1140 Fax: (514) 694-4351

Wide Tire vs Standard Tires: Today, in Atlantic Canada, many older forwarders with standard tires are being replaced by forwarders equipped with wide tires. Though it was difficult to compare directly the merits of wide vs narrow tires in this study, the newer, wide-tired forwarder did provide higher productivity in the most representative and comparable study conditions. The 1987 model forwarder with wider tires was able to load faster and travel at higher speeds not only because of the increased stability, improved flotation and better suspension capacity of the wide tires, but also because of the higher engine output.

Comparison with Newfoundland Study: It was noted that the forwarder productivity measured during this study was generally higher than might be expected on most forwarder operations. The FERIC results were compared with a study conducted by the Newfoundland government which assessed six different forwarders, including one older Timberjack 230 8-ton model.

The total time per turn in the Newfoundland study was almost double that in the FERIC study - 48.4 min vs 25.6 min. As a result, the average productivity of the forwarders in the Newfoundland study only ranged between 10.4 and 17.6 m^3 per PMH (FERIC - 19.4 to 31.6 m^3 per PMH). In general, the terrain was much more difficult, the trees smaller, and the operators were less experienced.

Operator Comments: Operator comments on the Timberjack forwarder mainly centered on the merits of wide tires and cab design. Forwarders with wide tires provided smoother, faster rides than those with standard tires. However, more operator attention was required to avoid damage to the sidewalls of the wide tires, and driving or transporting wide-tired forwarders on public roads presented some problems.

With regard to the cab, the rear cab window at the loader control levers does not seal off the wind adequately and thus operators' hands may get cold in winter. The cab was too narrow and too short for most operators to find a comfortable position on the seat. The noise level in the open cab was reported to be too high. **NOTE**: Timberjack Inc. have indicated that they plan to make improvments in the cab area in future.

CONCLUSIONS

The Timberjack 230 8-ton forwarders studied by FERIC in Nova Scotia in 1988 worked in favourable ground and stand conditions and were operated by highly skilled operators. The resulting productivity was high; it varied from 19.4 to 31.6 m^3/PMH. A earlier study in Newfoundland was conducted in less favourable conditions with less experienced operators, resulting in much lower productivity.

The FERIC study showed that the 1987 model Timberjack 230 forwarder equipped with wide tires was more productive than older units with standard tires. Wider tires also caused less rutting and provided a more comfortable ride for the operator.

The 7260 kg (8-ton) load capacity of the Timberjack 230 permits long forwarding distances. This forwarder is thus well suited to the operating conditions in the Atlantic provinces where woodlots are usually long and narrow, and where low-quality access roads limit truck traffic during inclement weather.

DISCLAIMER

This report is published solely to disseminate information to FERIC's members. It is not intended as an endorsement or approval by FERIC of any product or service to the exclusion of others that may be suitable.

This Field Note is a summary of FERIC Technical Note TN-140 "Evaluation of Timberjack 230 8-Ton Forwarder" by Ismo Makkonen. Copies of TN-140 are available free of charge in English or French from:

Forest Extension Service, Department of Natural Resources, Box 6000, Fredericton, N.B. E3B 5H1.
Publications, Department of Forestry, Box 2006, Corner Brook, Nfld. A2H 6J8.
Publications, Department of Lands & Forests, Box 698, Halifax, N.S. B3J 2T9.
Publications, Private Land Forestry Unit, Ministry of Natural Resources, Box 1000, Sault Ste. Marie, Ont. P6A 5N5.
Publications, Department of Energy & Forestry, Box 2000, Charlottetown, P.E.I. C1A 7N8.
Direction de la forêt privée, Ministère de l'Énergie et des Ressources, 785 Salaberry, Quebec, Que. G1R 5N5.