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Field Note N°: Skidding/Forwarding-8
*Summary of FERIC TN-136

CHOOSING A WHEELED SHORTWOOD FORWARDER

Wheeled shortwood forwarders are designed to load and carry logs of various lengths from the stump to the landing or roadside. In eastern Canada, the most common size of wheeled forwarder has a 75-kW engine and a load capacity of 7.5 tonnes. Forwarders equipped with a suitable loader cost between \$100 000 and \$250 000.

The *advantages* of using a forwarder as compared to a skidder on an operation are as follows:

- sorting of products is easier;
- the wood is free of mud and grit at the mill;
- there is less damage to residual trees in thinning or partial-cut operations if smaller forwarders are used;
- less landing space is required because logs can be piled higher;
- forwarder productivity is less dependent on tree size;
- forwarder loads are larger than skidder loads given similar engine power;
- the operator normally stays in the cab;
- forwarders are safer to operate, especially at night;
- fuel usage per m³ produced is generally lower.

The *disadvantages* of forwarding versus skidding can be summarized as follows:

- forwarders are more expensive given the same engine power;
- operator training is longer;
- forwarders travel at slower speeds;
- forwarders are more liable to become stuck since they cannot release their load;
- forwarders are less stable because of higher centers of gravity;
- grapple loaders can not handle very large size logs.

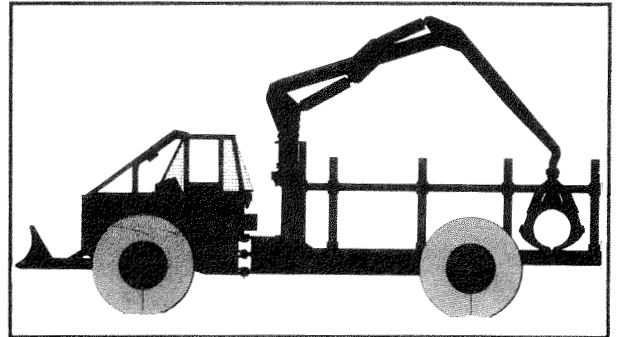


Figure 1. A typical wheeled forwarder.

FACTORS TO CONSIDER WHEN CHOOSING A FORWARDER

Potential owners have many technical features and options to consider before selecting a forwarder for their operation:

Forwarder Size: Large forwarders are more economical on large-scale, high-volume operations, with longer travel distances and over rough terrain. Smaller forwarders cost less and are favoured in small-scale operations where there are limited volumes, scattered piles, short travel distances, commercial thinning, multiple sorting, good terrain, etc.

Tractive Effort: Tractive effort is the driving force at the wheels which serves to move the vehicle and its load. High tractive effort is required on slopes and in soft or rough ground. However, forwarders with low tractive effort are usually less expensive.

Stability: Forwarder stability is mainly influenced by the height of the loader and the tracking width of the machine. For a given load, the wider the bunk, the lower the center of gravity of the load. A wider track improves stability noticeably. Some manufacturers provide devices that lock the frame or the front axle to improve stability when loading on slopes.

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

Ground Pressure: Most forwarders are equipped to work in moderate to well-drained sites. Using forwarders with standard tires on wetter sites will result in tearing of the soil surface and possibly sinking. Wider tires, bogie axles and the use of tracks will decrease ground pressure and improve flotation as well as operator comfort.

Single Versus Bogie Axles: Bogie axles create a better distribution of the wheel load because more tire surface is in contact with the ground (twice as many tires). This is a distinct advantage on wet sites. Steel tracks on the bogie further reduce ground pressures by 35 to 50 percent, but they require more power and increase fuel consumption.

Bogie axles also reduce the vertical lift of the machine which enhances stability and softens the ride for the operator, and thus may permit increased speed. For the same flotation, forwarders with bogie axles are narrower than those with wide, high-flotation tires. The disadvantage of bogie wheels is the increased cost and weight.

Differential Locks: The use of differential locks permit full utilization of the driving forces of each wheel. Machines without differential locks are more liable to spin tires. There are two types of differential locks; those that activate automatically, and those that the operator engages manually. The latter are recommended for use with wide tires.

Loaders: The loader is used 50 to 70 percent of the total work cycle of the forwarder so it is an important factor to consider. Customers are usually able to choose their loader when purchasing a forwarder. The smallest loader that can do the job effectively should be selected. This keeps the vehicle weight to a minimum and may permit a larger load. Other important considerations are loader location, reach and design, and piling height.

Operator Comfort and Safety: Operating a forwarder is fairly light work using hand and arm muscles. A heated cab for the winter, with good ventilation or air conditioning in the summer, contribute to operator comfort. Cabs should also be equipped with a good suspension seat, safe steps and hand grips, and efficient work lights. Good visibility, acceptable noise levels, and accessible maintenance points also should be considered. No hydraulic components should be in the cab.

Other Considerations: Potential users must identify what machine features are important for their operating conditions, as well as the optional equipment required. A visit to a similar operation and consulting with other owners will provide useful information regarding productivity, reliability, parts supply and service, fuel consumption and operator comfort.

Dealer reliability and support is essential. Spare-parts service is important, as is the delivery time of parts. Warranty programs should be compared. The dealer should have a competent mechanic available.

Contractors must have their own maintenance services. Adequate tools, parts and backup are required for an efficient operation. An inventory of on-hand spare parts is required, especially for often-used parts such as hoses, filters and bolts. A refueling tank is handy near the site.

A financial plan developed by the contractor should encompass all aspects of the operation. It should take into account the work planned and future contracts for the payment period of the forwarder, anticipation of work stoppages or slowdowns, and operator training. Lower productivity will result during the typical 3 to 12-month learning period, as well as more frequent breakdowns.

This Field Note is a summary of FERIC Technical Note TN-136 "Choosing a Wheeled Shortwood Forwarder" by Ismo Makkonen. Copies of TN-136 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.

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