

February 1990

Field Note N°: Processing-17
Previous Reference Sheet N°: None

DEYLE FIREWOOD SPLITTER-CONVEYOR

[In January 1990, a staff member from FERIC's Woodlot Technology group visited Deyle Logging & Firewood near London, Ontario. This field note describes the splitter-conveyor and the operation.]

INTRODUCTION

Theo Deyle, a full-time firewood producer, operates with a four (or five) man crew equipped with a wheeled skidder, one (or two) chain saws and a homemade splitter-conveyor to produce firewood from large hardwood tops left behind by sawlog harvest operations.

At the landing, the hardwood tops are cut into bolts which are placed onto the conveyor, split and dumped straight (not stacked) into an open-top truck or van owned by a firewood distributor. The splitter-conveyor, built especially for processing the tops of trees, is the key machine on this operation.

BACKGROUND

During the past 10 years, Theo Deyle has used a variety of equipment to process hardwood tops into firewood. Commercial firewood processors proved unsuitable to convey irregular-shaped tops. Conventional firewood splitters proved too labour intensive and lacked an operator-controlled infeed conveyor to permit a regular duty cycle. A dumping wagon with twin splitters, built by Theo in 1986 (also observed by FERIC), again proved too labour intensive. Therefore, in early 1989, Theo designed and built a splitter-conveyor to suit his requirements (see Figure 1).

Machine Description

The Deyle splitter-conveyor is mounted on a tubular trailer frame, is equipped with a pintle-type hitch, and can be easily towed by a 3/4-ton truck. Its main components are a 2-m infeed conveyor and a wood splitter, plus a 9-m outfeed conveyor. It is powered by a 15.2-kW Kohler gasoline engine which drives a 42-L/min, 2-stage pump. This pump powers a hydraulic motor on each conveyor, plus the wood splitter. The splitter cycle time (back/forth) is 8 seconds; the 10-cm diameter cylinder has a 60-cm stroke. An oil cooler is mounted near the engine. According to Theo, the splitter-conveyor cost about \$13 000 to build.

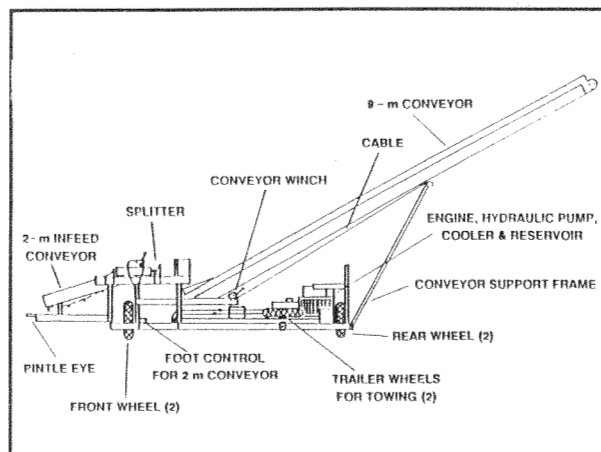


Figure 1. Deyle splitter-conveyor.

The 2-m infeed conveyor is activated by the splitter operator using a foot control. He then rolls the bolts off the infeed conveyor onto the splitting table, and regulates the splitter control lever with his right hand. Large pieces requiring resplitting can be rested on a table to the operator's side. Once split, the pieces go up the outfeed conveyor to be dumped into the truck or van (see Figure 2). Small-diameter bolts not requiring splitting are placed directly onto the outfeed conveyor, bypassing the 2-m conveyor and the splitter.

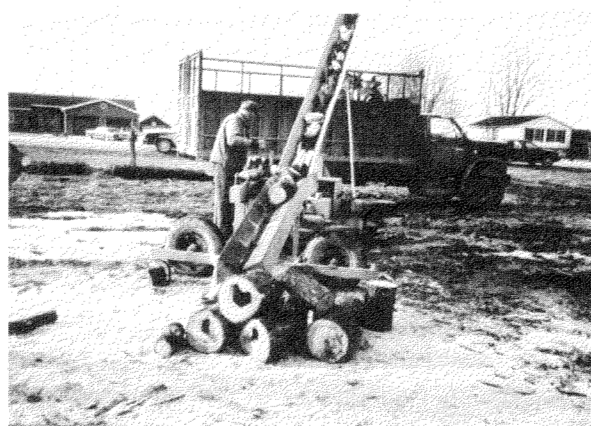


Figure 2. Wood moving up infeed and outfeed conveyors.

When filling a parked van, the splitter-conveyor is moved along the van by using a tow line on the skidder. For on-road transport, the outfeed conveyor is lowered to its rest position, the unit is jacked up, and the transport wheels are lowered and bolted into place. The unit is then ready for towing. Upon arrival at the new site, the transport wheels are raised and the unit is lowered back onto its support wheels.

Performance and Costs

Since the splitter-conveyor is part of a production system, it is necessary to discuss the machine's performance in that context.

The operator of the John Deere 440 cable skidder skids the tops the same distances as in regular logging operations. The tops are partially dry because logging has usually occurred a year earlier. The second person works full time with a chain saw, bucking the tops into 38-cm firewood lengths. A third person places the bolts onto the infeed conveyor, or directly onto the outfeed conveyor in the case of small pieces; the fourth person operates the splitter (see Figure 3). Theo assists in bucking, but also supervises, repairs equipment and sharpens the chain saws.

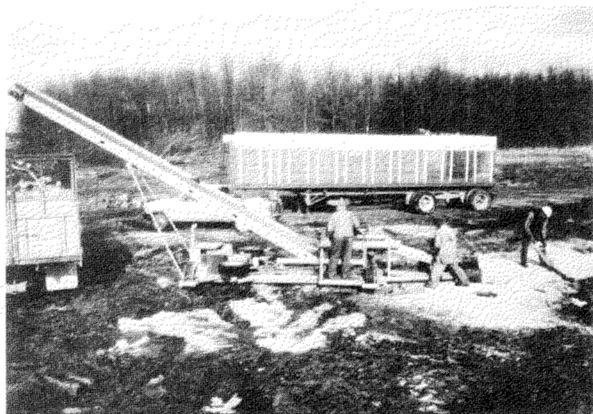


Figure 3. Deyle firewood operation.

Dirt on the skidded wood makes frequent sharpening of the chain saws necessary, especially in cold weather because frozen mud/sand quickly dull a chain saw. For this reason, tops skidded in winter are not stockpiled, but are all bucked before the workday ends.

According to Theo, the normal daily production for the four crew members, plus himself, is one 11.6-m (38') semi-trailer load containing 34 face cords. This works out to about 7 face cords per manday. Theo receives payment for the firewood on a loose-thrown, bin volume measurement. The bin volume/face cord ratio

is based on stacking tests. NOTE: A standard cord measures 4' x 4' x 8'. A face cord measures 4' x 8' x specified length of the pieces of wood, in this case 38 cm.

Theo claims that he pays about \$5 per face cord to the woodlot owner for the right to salvage the hardwood tops. The volume of the tops is usually based on a post-harvest cruise done by the Ont. Ministry of Natural Resources. Theo pays his crew \$12 per face cord to be split among the crew members (not including Theo). The remainder is for Theo's salary, equipment (including chain saws, skidder and splitter-conveyor), other overhead and profit. The price paid by the dealer, loaded onto his truck or van, is \$30 per face cord. The final price, delivered to the consumer, is about \$70 per face cord.

DISCUSSION

After one year of operation, production results with the splitter-conveyor have been good. Its use has reduced fatigue for several crew members, and has resulted in increased manday production. Since this is a "hot" operation, delays that affect the entire crew (e.g., when the skidder breaks down) must be kept to a minimum. Also, inclement weather (rain, snow, wind) and poor ground conditions (mud) can greatly hinder this operation. Theo carries out equipment repairs and maintenance during inclement weather, and arranges his logging areas to minimize the effect of muddy ground conditions.

Theo noted that he would make several changes if he were to build another splitter-conveyor:

- provide hydraulic lift on the trailer wheels
- provide side-to-side pivot on the support wheels for better turning
- build the trailer frame higher for better clearance
- remove the oil cooler (the steel tubing dissipates the heat adequately)

INFORMATION

A video of the splitter-conveyor made during the visit is available from FERIC at reasonable cost. Additional information is available from:

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