FOREST ENGINEERING RESEARCH INSTITUTE OF CANADA
Western Division

FERIC

INSTITUT CANADIEN DE RECHERCHES EN GÉNIE FORESTIER
Division de l'ouest

December 1993

Field Note No.: Cable Yarding-13

OBSERVATIONS OF A KOLLER K301 YARDER

INTRODUCTION

Small-diameter stems harvested in commercial thinning operations are becoming an important source of raw material on the coastal region of the Pacific Northwest. Although ground-based systems are used to thin the relatively gentle lower slopes, cable systems are more effective on the steep upper slopes. In the fall of 1992, the Forest Engineering Research Institute of Canada (FERIC) observed a new Koller K301 yarder commercially thinning a young Douglas-fir and hemlock stand near Enumclaw, Washington.

DESCRIPTION

The Koller K301 yarder (Figure 1) is a mobile 8.5-m tower mounted on the chassis of a Ford F600 truck. This unit is suited for uphill yarding only, but Koller has indicated that a third haulback-drum option exists to facilitate flat-ground or slightly downhill yarding. The total weight of the truck, tower, winch, and cable is approximately 6800 kg. The purchase price, including an SKA 1 carriage, is approximately US$126 000. The tower and winch set can be purchased for US$41 000. Other trailer-mounted 3-drum yarders are also available from Koller.

The tower is hydraulically raised and lowered by a cylinder attached to the deck of the truck. The 118-kW, 6-cylinder diesel engine of the truck powers the yarding unit. The skyline drum has a line capacity of 500 m of 16-mm diameter cable, the mainline holds 550 m of 9.5-mm cable, and the four guylines each carry 30 m of 16-mm cable. The mainline has a maximum line speed of 5 m/s and a maximum line pull of 1787 kg. The K301 observed has a Koller SKA 1 carriage (Figure 2) running over intermediate support jacks. Yarder controls are located at the back of the truck above the trailer hitch. The Koller K301 is operated with a 2- or 3-man crew: an engineer (chaser), a chokerman, and an optional faller/slasher. The yarder operator and the chokerman communicate by means of a whistle Talkie Tooter communication system. Larger mobile towers are also available from Koller.

Figure 1. Koller K301 yarder.

Figure 2. Koller SKA 1 carriage.

2601 East Mall, Vancouver, B.C., Canada V6T 1Z4 Telefax: (604) 228-0999 **Telephone: (604) 228-1555**

1-910916

OBSERVATIONS

The yarder was demonstrated on Weyerhaeuser's Cascade Tree Farm, east of Enumclaw, Washington, in a young 33-year-old Douglas-fir plantation with some naturally restocked hemlock. At 18 years, the stand had been precommercially thinned to 740 stems/ha. The commercial-thinning operation FERIC observed further reduced the stem density to 370 stems/ha. The trees harvested averaged 22 m in height and 25-cm dbh. Stems were manually felled, limbed, bucked, and topped at 12.5-cm diameter. To avoid scarring standing trees, stems were bucked to merchantable lengths between 5 and 12.2 m in 0.6-m intervals. All logs yarded to roadside were then moved to a log deck by a Clark 667 rubber-tired line skidder. They were then loaded by self-loading logging trucks and hauled to the Weyerhaeuser sawmill at Enumclaw.

The skyline, supported by two intermediate jacks, reached approximately 270 m down a 45-50% slope. The support jacks were attached approximately 6 m up guyed trees. Trees were hand felled in a herringbone fashion with butts towards skyline corridors. Each corridor accessed a strip of felled and bucked timber approximately 45-m wide.

During yarding, the gravity fed SKA 1 carriage is sent down the skyline to the desired location and locked in place. The locking mechanism is activated by pulling the carriage back up the skyline a few meters. This action automatically releases the 3-5 chokers which can then be pulled out and attached to the desired logs. After hookup, the mainline pulls the logs to the corridor and up into the carriage. The skyline clamps release when chokers are pulled into the carriage. The turn is then pulled to the yarder, where the engineer unhooks the chokers.

DISCUSSION

Koller representatives and thinning contractors present at the site stated that similar Koller yarders working in slightly larger stems produced approximately 85 m^3/shift. Although this operation was a demonstration, FERIC felt that the productivity would be approximately 7-8 m^3/h based on an average log size of 0.15 m^3 and an average turn size of 0.3 m^3. Productivity could have been much higher if the logs were removed tree length. Scarring of standing trees was minimal. Weyerhaeuser indicated that under normal operation the contractor would employ an additional faller/slasher. FERIC estimated the hourly operating cost to be C$166.82 for the K301, skidder, and 4-man crew, which results in a cost of C$20.85/$m^3$ to place logs in log decks, ready for hauling.

CONCLUSION

The Koller K301 mounted on a light truck is an inexpensive yarder compared to conventional highlead logging equipment. It can be used to uphill yard steep slopes in the British Columbia Interior. The yarder could be paired with conventional ground-based logging equipment to yard areas where site sensitivity is high, or to selectively harvest Interior Douglas-fir.

INFORMATION

The information contained in this report is based on limited field observations and is published solely to disseminate information to FERIC 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. More information may be obtained from:

Paul Mansur or Joe Mahon
Koller USA Corporation
8828 NE Killingsworth St.
Portland, Oregon
97220
Tel.: (503) 257-9778
Fax.: (503) 257-9780

Dennis Araki, R.P.F.
Senior Researcher, Harvesting Operations

 ISSN 1180-4432