FOREST ENGINEERING RESEARCH INSTITUTE OF CANADA
Eastern Division

FERIC

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

April 1990

Field Note N°: Cable Yarding-10
Previous Reference Sheet N°: Cable Yarding-9

CABLE LOGGING EQUIPMENT FOR EASTERN CANADA - A REVIEW

INTRODUCTION

Cable logging in Canada has largely been restricted to operations in coastal British Columbia. In eastern Canada, a plentiful wood supply on flat accessible sites has generally relegated the status of cable yarding to that of an experimental curiosity. Past experience with these systems have been less than successful mainly because of low piece volumes, high labour requirements and an inexperienced work force. In recent years, environmental concerns, fibre supply shortages, the increasing distance between mill and traditional fiber sources, and the diminishing tree volumes on flat sites have revived interest in this logging method. According to provincial estimates, about 1.0 million m^3 of wood are available annually on inaccessible slopes in eastern Canada. These sites are often found on old timber limits situated in river valleys and near mills. Hence, this timber combines two very desirable characteristics: a high yield per hectare and low transportation cost. The problem however is *how* to extract this timber at a reasonable cost. Cable logging provides one option for harvesting much of this timber in an environmentally-compatible manner, dependent on the economic viability of such operations.

CABLE LOGGING SYSTEMS

Cable logging systems are characterized by their cable geometries. Two main categories exist: skyline systems and highlead systems.

In skyline systems (Figure 1), logs are suspended by a carriage which rides on a large diameter skyline cable. The carriage can be self-propelled or pulled by two cables (haul-in, more often called mainline, and haul-back lines). In this system, the skyline provides the lift required to skid the logs. As the skyline provides lift, drag is reduced and less power is required to haul in the load.

Highlead systems use two cables: the haul-in and the haul-back (Figure 2). The haul-in cable is powered by a winch in the yarder and is used to skid the logs, which are choked and attached to the butt-rigging. The butt rigging consists of chain and swivels at both ends. The haul-back cable, which is attached to the opposite end of the butt rigging, is powered by a second winch in the yarder and is payed out during the in-haul cycle. Unlike skyline systems, highlead systems cannot develop much lift, in theory, lift is provided only within a distance of four times the height of the top pulley on the spar (Cable logging Handbook, LIRA, 1983). Beyond this distance, the system becomes no different than ground skidding.

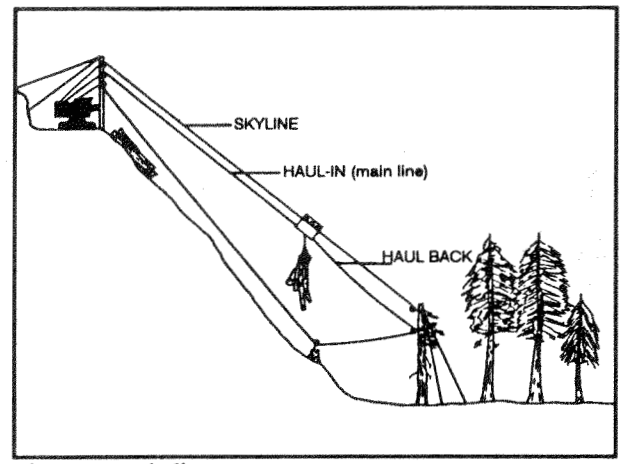

Figure 1. Skyline system geometry.

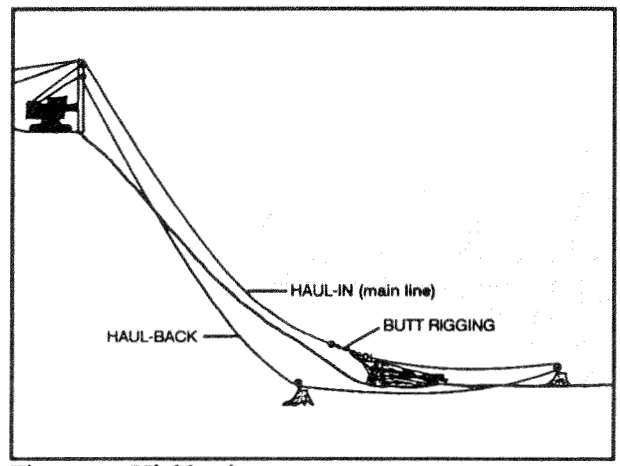

Figure 2. Highlead system geometry.

Table 1. Equipment specifications for 6 cable logging systems[1]

GENERAL						
System	Christie	Ecologger	Gabriel	Island Logger	Smith Timbermaster	Télétransporteur
Location	Nova Scotia (Parrsborough)	New Brunswick (Edmundston)	Newfoundland (Corner Brook)	P.E.I (Egmont Bay)	Quebec (Mont-Joli)	Quebec (Portneuf)
Operating range	~ 250m	~ 300m	~ 350m	~ 100m	~ 450m	~ 200m
Crew size	3	6	4	2	4	2
Carrier	Trailer mounted	Tree Farmer C7	Truck mounted	Trailer mounted	Trailer mounted	---
Gross weight	5000 kg	14100 kg	N/A	N/A	N/A	1000 kg
Powerplant	57 kW	97 kW	N/A	26 kW (PTO)	60 kW (PTO)	21 kW
Cost	US $67 500 (1986)	CAN $110 000 (1978)	N/A	CAN $10 000	CAN $68 500 (1983)	CAN $85 000
Development	Commercial	Commercial	Prototype	Prototype	Commercial	Prototype
CABLE SIZES						
Skyline	16 mm	19 mm or 22 mm	---	---	13 mm	19 mm
Haul-in	14 mm	19 mm	19 mm	11 mm	9 mm	---
Haul-back	11 mm	14 mm	14 mm	9 mm	9 mm	---
Guylines	14 mm	19 mm	---	N/A	13 mm	---
OPERATING SPEEDS						
Haul-back	6.6 m/sec	5 m/sec	5 m/sec	4 m/sec	4.2 m/sec	1.1 m/sec*
Haul-in	6.6 m/sec	5 m/sec	5 m/sec	3 m/sec	6.3 m/sec	0.8 m/sec*
MAXIMUM LINE PULLS						
Skyline	10 000 kg	19 000 kg	---	---	N/A	12 000 kg
Haul-in	9000 kg	13 600 kg	13 600 kg	1360 kg	2000 kg	2400 kg**
Haul-back	9000 kg	13 600 kg	13 600 kg	270 kg	N/A	N/A
Load capacity	N/A	N/A	N/A	N/A	1500 kg	1020 kg
CARRIAGE						
Make	Christie	Christie	---	---	Smith	Télétransporteur
Weight	200 kg	N/A	---	---	N/A	1000 kg
Power	---	---	---	---	---	21 kw
TOWER						
Height	9 m	12.8 m	4 m	4.3 m	7.3 m	5 m
Guyline	3	4	0 (outriggers)	3	3	0 (excavator)
Backspar	tree or stump	tree or stump	stump	tree or stump	tree or stump	skidder
SUPPORT EQUIPMENT						
Type	Skidder	Skidder	Pulp porter	Farm tractor or light duty truck	N/A	Excavator and skidder
Remote controls	None	Yes, partly	None	None	None	Yes, fully

N/A Not available
* Carriage drive
** Carriage winch
1 These specifications are for systems as they are currently being used in eastern Canadian operations. Specifications and prices may have changed for more recent models of the commercially-available machines and the reader is asked to contact the manufacturer to obtain this information.

EXISTING AND PROTOTYPE SYSTEMS IN EASTERN CANADA

In recent years, FERIC has studied a number of cable logging systems in eastern Canada. The RMS Ecologger was studied in Newfoundland in 1976, the Smith Timbermaster was evaluated in cooperation with the MER in Quebec from 1983 to 1985, while the Télétransporteur, a prototype system, was studied briefly in Quebec in 1989.

There are currently six systems known to be operating in the Atlantic provinces and Quebec. The Gabriel system in Newfoundland, the Télétransporteur in Quebec, and the Island Logger in Prince Edward Island are prototype systems. The Christie Yarder (Nova Scotia), the RMS Ecologger (New Brunswick), and the Smith Timbermaster (Quebec) are commercial systems. The Gabriel and Island Logger are highlead systems, the Christie and the Timbermaster are skyline systems with haul-in and haul-back winches, while the Ecologger can be either highlead or skyline. The Télétransporteur is a skyline system with a radio-controlled self-propelled carriage. The technical specifications of these machine are provided in Table 1.

Other commercial small-scale yarding equipment is also available but is not currently operating in eastern Canada.

FURTHER INFORMATION

All of the operational systems discussed will be evaluated in the summer of 1990 by FERIC.

Evaluation criteria will be productivity, mechanical availability and operating cost. Readers are invited to contact FERIC for further information on these systems.

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.

Jean Courteau
Wood Harvesting, Eastern Division