

Timbermax “*Traction-Winch T10*” Steep Slope Operation in British Columbia’s Monashee Mountains

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Introduction

Winch-assist systems from New Zealand, Europe and the Pacific Northwest have gained popularity in British Columbia (BC) over the last three years. The various systems operating in BC range in cost and size with different configurations of anchor machines and integrated winches with various safety features. Benefits for the forest industry have included improved safety performance and more efficient harvesting operations on steep terrain. Logging contractors need to choose the equipment they use for steep slope operations wisely; this can be challenging for those interested in winch-assist systems for small operations on moderately steep slopes.

TIMBERMAX (www.timbermax.ca) manufactures the single line hydraulic Traction-Winch T10 system which is engineered and designed by Inovforest (www.inovforest.com) and distributed by Top Down Enterprises Inc. (www.topdownent.ca) based in Kamloops. FPIinnovations observed the first Traction-Winch T10 operating in the Monashee Mountains near Lumby, B.C. The Traction-Winch was mounted as an attachment on an excavator to assist uphill and downhill skidding operations.

Harvesting Site

The second growth site contained a mix of Douglas-fir, western red cedar and western larch. The average stem size was estimated at 40 cm diameter. Timber within the harvest area was mostly mechanically felled (by a Climbmax steep slope machine), bunched and oriented to promote good productivity during the tree length skidding phase (Figure 1). Rocky sites within the harvest area were hand felled. During observations the Traction-Winch T10 was mounted on an excavator located on a large roadside landing to assist uphill skidding operations (Figure 2). This set-up location was roughly 40 meters above a 65% rocky slope and was chosen to access 1000 m³ of volume to be skidded uphill for processing.



Figure 1. Harvest site (65% slope).



Figure 2. Excavator mounted Traction-Winch T10 with assisted skidder at roadside landing.

Crew and Equipment

The crew members had considerable experience in steep slope harvesting operations within the Monashee range, but were new to using the Traction-Winch T10. They were still becoming familiar with its best application at the time of the site visit.

The Traction-Winch T10 is the smallest of the T series and is designed to assist lighter equipment on steep slopes. The larger T14 and T20 versions will become available for heavier equipment. Costs are estimated to range from \$200,000 for the T10 to \$280,000 for the T20 (plus installation costs). The observed Traction-Winch T10 was mounted on a Hitachi 290 Forester excavator with approximately 10,000 hours (Figure 3). The contractor indicated that the excavator mounted option is preferable as the base machine can be used for building access trails where upper roads do not exist. Then the Traction-Winch can be installed in less than one hour to be used as a winch/anchor machine on the upper slopes. The contractor used the Traction-Winch T10 to assist a Tigercat 630E grapple skidder for both uphill and downhill operations – with the Traction-Winch T10 being operated remotely from the skidder.



Figure 3. Hitachi 290 Forester mounted with the TIMBERMAX Traction-Winch T10.

Figure 4 shows the mounting points used on the front of the Tigercat 630E grapple skidder. During downhill skidding operations, the rear point on the main boom was used to connect the winch line. The operator wasn't concerned with additional wear on the grapple boom. He noted that this is a high point on the machine which works well during downhill operations for control and assisted skidding. However, the high connection point may affect the machines center of gravity and risk of rollover if operating at a high angle from the winch or on conditions where high stumps or broken terrain exists.



Figure 4. Mounting points on front of Tigercat 630E grapple skidder.

The winch utilizes a hydraulic accumulator (Figure 5) and has 450 meters of 16mm line lead through a front swivel mount which allows for operation up to 45 degrees from the center (Figure 6). The base machine is set up with the tines off the thumb for embedding into the ground for stability and anchoring.



Figure 5. Traction-Winch (note hydraulic accumulator and communication antennae).



Figure 6. Traction-Winch T10.

The Traction-Winch T10 system uses the “iWinch Control System” which is mounted in the skidder or assisted machine (Figure 7), and displays gauges such as fuel, temperature, etc. for the base machine. A movement detection system in the base machine can send an alarm to the skidder. A drum camera allows monitoring of spooling.

Rope tension measured by pressure displacement of the hydraulic system is displayed and recorded in a data logger which allows analysis of events that could affect the integrity or life of the rope. More accurate rope tension can be measured with an optional load cell. Sensors also detect the slope angle and the direction of movement – uphill or downhill, of the skidder. There is a two-way communication system between the base machine and the skidder than can operate up to 500 meters without line of sight. There is portable remote control (Figure 8) which allows for out of the cab operation and has been used up to 150 meters away from the base machine. The winch lights flash and a horn blast prior to engaging the winch to alert the crew.

The manufacturer emphasizes that the operator's safety should not be reliant on the winch. Slope tests are recommended where the rope tension is set to zero to check if the machine will hold on the slope unassisted.

The contractor commented that this system may provide cost savings by reducing the amount of skid trails requiring construction for accessing small pockets of volume associated with steep slopes. It was also shared that the amount of soil disturbance may be decreased due to building fewer temporary access trails as well as providing traction assist to create less site deg (e.g. rutting or compaction). This will be especially valuable when operating in areas with more sensitive soils or environmental constraints.

This system may also have application when harvesting areas during winter months, when heavy snow fall creates traction issues and operational challenges or when skidding heavy wood.



Figure 7. iWinch Control System monitor mounted inside the skidder cab.



Figure 8. Out of cab remote control.

During the initial observations, uphill turns of approximately 4-5 m³ each were observed on short pitches of 65% slope. Videos of the Traction-Winch T10 operation can be viewed at the FPInnovations Steep Slope Initiative website <http://steepslopeinitiative.fpinnovations.ca/videos/>

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