

Safety Alert OF THE MONTH

August 2011

PLEASE PASS THIS ON TO PEOPLE AND ORGANIZATIONS IN BC'S FOREST INDUSTRY

Cable yarding is a common practice in British Columbia forests, particularly in coastal operations where it is estimated that 70% of the harvest is by cable yarding.¹ In the Interior where mountainous terrain is common, operations use cable yarding as an alternative to ground based systems.

While there are nearly as many types of yarding configurations as there are trees in the forest, a yarder tip over is a common risk for all.



Because of the enormous tension heavy loads place on the yarder, tree's and anchors; cable yarding failures are very dangerous. When a tailhold tree or stump fails it can destabilize the yarder. Yarders can weigh up to 120 tonnes and may seem incredibly steady but the forces applied when pulling a turn of logs, tensioning guylines or operating from an unstable surface can easily topple this equipment.

A yarder tip over often results in serious injury or death.

Three fatalities were recorded in 1994, 1998 and 1999 from yarding tip overs, two of which were caused by failures of the stumps or guylines.

In May of 2006, a 23 year old logger was killed in Oregon when the yarder tower tipped, crushing him beneath. That same year, a Madill 123 went over on the island. A log penetrated the cab and injured the operator.

More recently, in 2008 a forestry engineer operating a yarder by remote control was killed when 2 of 3 established guylines failed, toppling the yarder.

If workers around the area do escape injury, the downtime and repair costs for a tipped over yarder are also often significant.



Log penetration of the cab during tip over

Planning

Safe Work Procedures

Anchors

Terrain stability

4 focus areas to prevent a yarder tip over

¹ Technology Road Map for Forest Operations in Canada – Industry Canada



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Planning

When a decision to use cable yarding methods is made and, long before workers arrive on site, planners should: consider the layout of the landing (including sufficient room for traffic and other equipment that may be working in the area); have a clear plan for equipment placement on steep slopes (including the use of jump up landings if appropriate); assess stability considerations for equipment (while yarding or moving) and; assess the availability of stable anchors or alternatives.

Possible alternatives may include: rock anchors, deadmen (buried log) and a machine anchor (a cat/excavator used as a tailhold behind the yarder)

Crews must also plan for road changes and other activities on site to reduce delays and stay safe. If the landing is too small to pile wood safely a log loader may be required to work in conjunction with the yarder.

Anchors

When selecting anchors, crews should consider:

The number of guylines - Placement of guylines - Stability of the stumps

Manufacturer recommendations provide guidelines and diagrams for placement of guylines. Crews should review these and be familiar with company policies for dealing with issues such as steep slopes or availability of anchors.

Many factors affect the stability a stump provides as an anchor. Some species of trees have deep roots while others have shallow root systems which can affect the holding power of the stump.

The way the anchors are positioned around the tailhold in relation to the direction of the pull can cause the load to be unequally distributed and reduce the supportiveness of the stump. Stumps should be pull tested to the amount of tension yarding will produce.

The notches should be placed as close to the bottom of the stump as possible without cutting off the roots to prevent slabbing. In this example, top stump is ideal, the middle stump is too high and the bottom stump too deep.



Terrain Stability

To increase Yarder stability a flat, level surface that is firm enough to prevent the equipment from shifting under load is preferred. Part of the planning process should include an assessment of the ground stability on the landing and any hazards noted should be clearly communicated to the crews prior to work starting. When moving to a new location, be aware of how heavy rain, traffic, ground disturbance or other factors may have impacted stability along the roadside and in the new location. Snow cover, debris or other equipment may make it difficult to see the hazard. Inspect culverts or other road structures to confirm they will withstand the weight of the equipment. When in doubt, stop and re-assess.

Predicting the holding power of a stump is difficult - Inspect stumps daily.



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At times it may be necessary to crib or block up the yarder to bring it to level or improve visibility for the operator, but this changes the way the load impacts the force on the anchors and may reduce stability. Crews should discuss any potential risks when doing so and check that the anchors are still sufficient for any modifications made.

Safe work procedures

Proper instruction and orientation to safe work procedures are essential to provide a good foundation for keeping everyone safe onsite and to maintain production.

Workers should have clear instructions and expectations on placement, angles, use and inspections of anchor stumps and guylines. They should be trained and competent in all aspects of machine operation and the effects of guyline tension on stability.

Regular crew talks to reinforce safe work procedures could include discussions around load weights, terrain considerations and how forces are applied during operations.

A qualified supervisor should always confirm that the operator has worked on the make & model of equipment being used (yarder controls are not standardized). A competency assessment should be completed prior to or during initial operation and as required for safe yarding. On-going coaching and mentoring continually reinforces safe work practices – **never walk by an unsafe act.**

Additional Resources

[Cable Yarding Handbook – WorkSafe BC](#)

- Alternative anchor systems
- Safety wrap for spiked guylines
- Twisters, jill-poke supports and dead weight anchors
- General Planning considerations

[Centre for Research on Occupational & Environmental Technology](#) - Oregon Fatality Assessment and Control Evaluation (OR-FACE) Cable yarding fatality investigation report

[Oregon State University – John Garland](#)

Technical paper on the basis for productivity improvement in cable harvesting.

[WorkSafe BC – Safety/Hazard Alerts](#)

Searchable database for industry hazard alerts

Special thanks to Vince Devlin, Ken Jorgenson and Roger Seguin of Western Forest Products for their assistance in compiling information for this Safety Alert.



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Included are excerpts from regulation pertaining to cable logging. [Click here for more.](#)

26.40 Anchors

- (1) A standing tree may be used for anchoring lines or fastening blocks only if
 - (a) a suitable stump is not available, and
 - (b) the tree is effectively tied back to another anchor, except that a secondary anchor tree need not be tied back.
 - (1.1) A standing tree must not be used to anchor guylines if a worker would be endangered were the tree to be pulled over.
- (2) A stump or tree must not be used as an anchor for a line or for fastening a block until it has been determined that it is suitable for use as an anchor, and it must be inspected daily to determine that it remains suitable for continued use.
 - (2.1) An anchor to which a haulback block is attached must have a notch of sufficient depth to retain the strap or must provide equivalent security by other effective means.
- (3) Repealed. [B.C. Reg. 20/2008, effective May 1, 2008.]
- (4) Repealed. [B.C. Reg. 20/2008, effective May 1, 2008.]
- (5) If a log, pipe or other apparatus buried in the ground is used to anchor a guyline or skyline, the method and equipment used must be acceptable to the Board and
 - (a) the guyline or skyline must not be directly attached to the anchor,
 - (b) a suitable strap or line of equal size and strength to the guyline or skyline with eyes in each end must be used, with one wrap around the anchor, and both eyes attached to the guyline or skyline with a shackle, and
 - (c) the eye connection of the anchor strap must be visible for inspection.
- (6) Any anchor system not otherwise referred to in this section must be used in accordance with
 - (a) its design specifications and manufacturer's recommendations, or
 - (b) if those specifications or recommendations are not known, a method acceptable to the Board.
- (7) Repealed. [B.C. Reg. 20/2008, effective May 1, 2008.]
- (8) If an anchor system has 2 or more legs, bridle blocks of adequate strength must be used to distribute the load equally.

[Amended by B.C. Reg. 253/2001, effective January 28, 2002.]

[Amended by B.C. Reg. 20/2008, effective May 1, 2008.]



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26.41 Guylines

- (1) Guylines for a mobile yarder must be positioned
 - (a) as specified by the manufacturer, or
 - (b) in a manner acceptable to the Board.
- (2) Guylines must be rigged to provide a 45 degree or larger angle between the guyline and a line drawn plumb through the guyline fairlead.
- (3) If it is not practicable to comply with subsection (1) or (2), or if suitable anchors are not available, additional steps must be taken to ensure the stability of the yarder.
- (4) Guylines must be attached to the supported structure by guyline shackles, or other fastenings providing equivalent security.
- (5) Safety devices with breaking strength at least equal to that of the guylines must be installed at the top of mobile spars to prevent guylines or their assemblies from falling.
- (6) Guylines over a travelled road must be rigged to clear all traffic, or if this is not practicable,
 - (a) the guylines must be conspicuously marked, and
 - (b) signs warning of limited clearance must be posted on the road.
- (7) A guyline must be secured to its anchor stump in the following manner:
 - (a) a notch of sufficient depth, or another means of equivalent security, must be used to retain the wrapping lines;
 - (b) sleeve shackles, knob and bell, screwy hooks or line clamps compatible with the guyline size must be used.
- (8) If spikes are used to secure a guyline to an anchor stump, there must be at least
 - (a) 8 spikes in the first wrap, 3 spikes in the second wrap and 8 spikes in the last wrap if the guyline is attached to the yarder, or
 - (b) 3 spikes in the last wrap if the guyline is attached to a back spar.
- (9) If spikes are used to secure a guyline to an anchor stump, there must be a minimum of 2 1/2 wraps of the guyline around the anchor stump.

[Amended by B.C. Reg. 20/2008, effective May 1, 2008.]

Figure 26-1 Positioning guylines for mobile yarders
Repealed. [B.C. Reg. 20/2008, effective May 1, 2008.]

