

# The Future of Cable Logging

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**ABSTRACT** - The shift from old growth logging to second-growth and plantation timber harvesting favors mechanized operation. Spar (or tower) yarding on mountain terrain has come under increasing cost pressure from timber owners as they try to compete in the global market place. New development of steep-slope felling machines allow for improved productivities of swing-grapple yarders. These systems allow the separation of the operational phases resulting in additional productivity gains.

## **BACKGROUND**

The global forest industry is moving from harvesting native old growth to second growth and plantation timber. We are now logging smaller timber on more favourable terrain that has already been roaded.

Spar yarding on mountain terrain has come under increasing cost pressure from timber owners as they try to compete in the global market place. This system is dying out because it is slow to set-up, requires too much labour and is not very productive.

Most tower yarders log less than 60,000 tons per year with a 5 man crew. Good cable loggers are getting hard to find. Tower yarders restrict the productivity of downstream loaders, processors and trucks and have a very poor safety record.



Figure 1: Berger Mark VI tower yarder operating in second-growth forests

Skyline logging systems desperately need to improve the gathering function in second growth timber to reduce cost through better cycle times and optimum turn size. Logging contractors who have stayed with these obsolete yarding systems are simply going out of business.

Preset chokers, electric chokers and motorized drop line carriages have improved cycle times and the gathering function on skyline towers. Timber owners find skyline methods extremely expensive due to high labour content and relatively low productivity, hence they will only use skylines where they are forced to by environmental legislation. Remote pockets of quality old growth timber are now often logged by helicopter at higher cost in order to eliminate environmentally unpopular new road development.

### **MECHANIZED HARVESTING - FELLER BUNCHER AND SHOVEL YARDING**

Shovel logging provides a low cost alternative on downhill slopes to 40% and distances to 800 ft. from the road. Shovel logger productivity can run to 100,000 tons per year in coastal timber with a single operator in a safely guarded cab.



Figure 2: A 3800C log loader that can be used for shovel yarding

Now that most of the harvesting is in second growth, steep terrain felling machines are the optimum way to gather and orient turns on slopes to 60%. The latest sawhead shown here is a 360° Quadco 28" intermittent swing saw. It can cut literally any size tree, directionally fell it and once the cutting disc is retracted it acts like a grapple to make bunches and orient the tree with butt to the road for yarding. The productivity of this unit is around 650 tons in an 8 hour shift and most companies operate double shift, so one machine can cut about 250,000 tons annually.

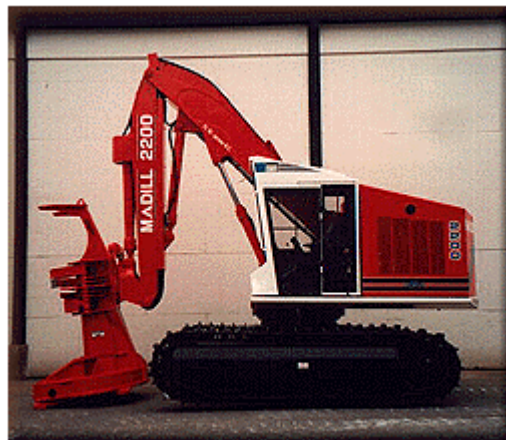


Figure 3: The Madill 2200 Feller-Buncher

### **Mechanized Cable Yarding Operations – Feller Bucher and Swing Grapple Yarders**

Feller bunching is particularly advantageous where swing grapple Yarders can be employed and raises yarder productivity into the 100 ton per hour range with a two man yarding crew at distances up to 1200 ft. Not only is labour cost cut by 2/3, there are also huge benefits in feller and yarding crew safety. The Madill 124 swing yarder shown here logs 160,000 tons per year. The day I took this photo it yarded 1,100 tons.

The secondary advantage of swing grapple Yarders is their ability to pile at roadside and move away thereby eliminating the congestion and unsafe working environment of a landing.



Figure 4: The Madill 124 Swing Yarder in grapple configuration

If the four phases of harvesting ie: falling, yarding, processing and loading can be divorced by a time span of even one week, each machine is no longer limited by the mismatch in production rate of the others.

To maintain productive cycles, mobility at the back end of a cable operation is equally important. The trend here is to use 30 tonne excavators with raised swivelling fairleads. In many plantation forests old growth stumps are no longer available so loggers must either dig dead man anchors, use bulldozers or old feller bunchers for iron stumps. Iron stumps are quick to move and have the advantage that they will never suddenly let go or break a guyline. They make quick road changes and provide that sorely needed lift at the back end. With a mobile tailhold and mobile guyline anchor the whole side can bring in the lines, move, set-up and be logging in another block in 1 hour.

Maximum productivity from each machine becomes a major issue where stand density is low and trees are small. In low density stands a mobile yarding side will log 8 to 10 acres a day. By divorcing the phases, each machine can work at 100% of its capacity every day without waiting to be fed by the previous phase or encountering delays due to landing or road congestion. There is no longer a need to build costly landings that add to site degradation. Divorcing the phases takes all the panic out of breakdowns since the other phases keep on producing. Repairs can now be done properly and in the most economic fashion.



Figure 5: Excavator used as mobile tailhold

Where oversize timber and steep pitches dictate felling by hand, shovel loggers can be used to make optimum yarder turns. A swing grapple yarder cycles every 60 seconds and is usually faster than the shovel. Shovel logging in a yarder setting can help to pull away from sensitive riparian zones or to clean off areas where cable deflection is poor. Shovel logging to a yarder really helps to maintain high production every shift. In some cases shovel loggers are doing hot hand offs to grapple yarders. Looking closely you can see that the yarding grapple is on and the shovel logger hasn't let go yet.

Many crews will grapple the front of the setting and quickly switch to a mechanical slack pulling carriage farther out on each tail block. This requires a 3 man yarding crew.

### **ROADSIDE PROCESSING**

Windrow storage naturally leads to mechanical processing at roadside. Mechanical processors have a production rate of 50 tons per hour and usually operate double shift to keep up to a grapple yarder in bunched wood

Total mechanical harvesting with divorced phases and no people on the ground leads right into double shifting, with a crew rotation of four-ten hour days on, four days off , and ultimately a 20 hr/day, seven days a week operation to maximize equipment utilization. We now have contractors who clock 5500 hrs/year on their equipment. No people on the ground translates into a perfect safety record.

An inventory of processed logs at roadside lends themselves to high production loading. Big butt and top loaders easily load 160 tons per hour and virtually eliminate truck waiting time. Daily production usually runs about 1200 tons.

### **THE REDESIGNED 255B SLR SWINGER**

For loggers who want the easy move and rig up of a swinger but may still need to skyline, Madill has redesigned the Thunderbird 255B SLR. The Madill 255B is versatile for running skyline interlock, shotgun, high head, or slack skyline modes. It has a 450 HP cat 3406E engine with a twin disc 5 speed powershift transmission. The 255B can put up 2000 ft. of 1 1/8 swaged skyline and operate with a motorized drop line carriage if desired.





Figure 6: A redesigning the TB 255B SLR results in a versatile yarder. Shown here is an example of a TSY 255

The future is already here. Whether we like it or not cable logging is moving to around the clock mechanized high production systems in plantation forests.