

History of Cable Logging in Tasmania's Southern Forests

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Abstract

Logging methods in Tasmania have developed from the earliest 'hand and horse' days, through the steam-powered winch era to the complex cable systems used today. There are currently about 16 cable machines operating in the State and most of these have the flexibility to run a number of carriage and rigging options to suit log size and other operating constraints.

Introduction

From the earliest period of European settlement, Tasmania has been a timber producing and exporting State. The

advantage of high quality hardwood forests adjacent to deep water and sheltered anchorages gave Tasmania a competitive edge against the other States in both the mainland and overseas markets. During these early days, logging activity was confined to the coastal forests where trees were felled and either manually sawn into boards, or hand hewn to make beams for bridge and wharf construction. Wooden tramways were built into the forest where the sawn timber and beams were loaded onto trolleys which were then pulled by horses to the water's edge for loading onto sailing ships. This paper briefly outlines the main developments in cable logging methods from those very early days to the present.



*Photo 1. Hand hewing blue gum beams in the Southern Forests.
(Courtesy: Forestry Commission, Tasmania)*

Steam era

The first attempt at mechanisation in the forest industry came in the 1830s when water was used to power sawmills. A major catalyst for change occurred in the 1870s with the introduction of steam. This resulted in a complete change of direction for the industry as logs could now be brought to a single location for processing. The recovery from each log was dramatically improved and the sawmill owners could guarantee consistency of supply to the market place.

Though there was a rapid expansion in the use of steam to power sawmills, little action was taken to improve the logging methods of the day. Bullock teams were being used to drag logs from the stump to a tramline where they were loaded onto trolleys which were then pulled by horses to the mill. During the 1880s, some sawmill owners began looking at alternatives due to the increasing distances from forest to mill, the lack of natural grasses in the forest to feed the animals and the high cost of importing forage.

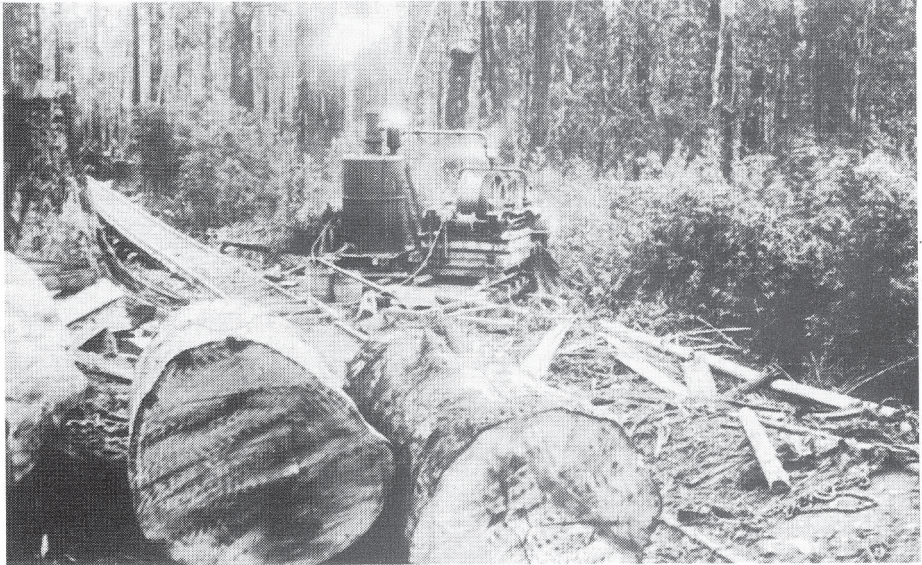
The first attempt at mechanising logging operations in the State was in 1884 when a single-drum, steam-powered winch was built. It consisted of a single drum bolted to wooden rails and was driven by a direct-gear steam cylinder which could develop a nominal 8 hp. A vertical tube boiler with an attached water tank provided the steam (Cheynoweth 1987).

To log an area, the yarder winched itself and its boiler to where it was to be set up. The landing had to be large enough for the yarder and the loading skids, there had to be access for the tramway and adequate supplies of firewood and fresh, clean water. In many cases, the firewood had to be brought a considerable distance, usually on the tramway. Once in position, both the yarder and boiler were levelled by building a log platform under them and the yarder was then chained to a stump to prevent any movement.

As there was only a single drum, men, horses or bullocks were used to pull the rope out to



Photo 2. Yarding with horses. (Courtesy: Forestry Commission, Tasmania)



*Photo 3. Single-drum steam yarder, Southern Forests 1890s.
(Courtesy: Forestry Commission, Tasmania)*

the log (Photo 4) which was then yarded into the landing and loaded onto a trolley for subsequent transport to the mill. This system, though primitive in design when compared to modern day technology, was successful and modifications to improve the yarder's capabilities were soon made, the most notable being changes to the boiler to increase steam capacity and mounting trolley wheels to the sled so that moving the yarder became easier.

The improvements being made were not regulated and it was not until a fatal boiler explosion in the early 1890s that the regulations were changed to make an annual inspection mandatory. This took some time to take effect due to a lack of inspectors and the isolation of most logging operations.

The introduction of steam did not result in the working bullocks being pensioned off. For at least another 40 years they continued to play an important part in many logging operations; in some as the sole means of yarding logs, and in others as a supplement to the yarder by pulling scattered logs to within reach of the mainrope. On occasions



*Photo 4. Horses were used to pull the rope out.
(Courtesy: Forestry Commission, Tasmania)*

they were also used to move yarders from one place to another.

By the 1890s, there were a number of single-drum steam yarders operating throughout the State. Their use had enabled the sawmillers to increase production and to extend their logging activity into areas that had previously been considered inaccessible (Cheynoweth 1987).

By the turn of the century, the forest industry was in trouble. Despite a high quality resource and good markets, investment had declined (Row 1980). Control of the Crown forests rested with the Government of the day - purchase, lease, or reservation being the only means of access. The purchase of Crown land was open only to *bona fide* farmers. There was no security in a Crown lease as there was nothing in law to protect the sawmillers' investments against the claims of would-be farmers, and the reserves established under the Waste Lands Act were small and easily cancelled. This meant that capital investment in sawmills, logging machinery and tramways had to be weighed up against the insecurity of tenure due to the difficulty of gaining assured, long-term legal access.

Government policy had, by deliberately preferring agricultural development, discriminated against sawmillers, but this was about to change. With a change in Government, investment in the forest industry was encouraged by amending the Crown Lands Act to guarantee access for an extensive period to any individual or company able to meet the obligations of a Crown lease (Row 1980). The new terms were attractive, the time was right and the response was swift.

Sawmills that had been shut down were reopened and negotiations started with the Government for further amendments to the Crown Lands Act. The amendments sought were to vary the way of working timber leases to achieve economies of scale and to reduce transport distances. The regulations as they stood limited the size of each lease, prevented

amalgamation of leases and required each lease to have its own sawmill which had to be sited at the discretion of the Commissioner of Lands.

The negotiations were successful and the Act was amended in 1899, which led to the granting of concession licences over Crown forest. With these changes, new companies were formed and investment to upgrade and increase the capacity of existing sawmills became available, which in turn forced change on the logging industry.

As sawmill capacity increased, so did the demand for an increased, consistent log supply. The steam winches of the late 1800s were being upgraded continually to improve performance and offer some degree of flexibility in their use. Typical of this upgrading was a design by Kennedy and Sons of Hobart which consisted of a single-winch drum mounted on a wrought iron frame to which locomotive wheels were attached. Twin eight-inch cylinders were powered by a vertical tube boiler which developed a nominal 13 hp but could, when required, develop up to 40 hp. The winch drum was geared direct but could be disconnected to power a transverse gear which allowed the yarder to move on the tramline under its own power (*Tasmanian Mail* 1890).

Improvements to the mobility and power of these single-drum yarders continued to be made but these had a limited effect as yarding distances were limited by the capacity of the animal used to pull the mainrope out to the log, the terrain the animal could walk over and by the restraints imposed by ground yarding. Despite this, innovations continued to be made to improve efficiency, the most notable being the introduction of a 'bull block' which enabled a herringbone extraction pattern to be worked, thus increasing the size of the area that could be worked from each landing and the use of a steel 'shoe' in front of the log which reduced friction between the ground and the log.

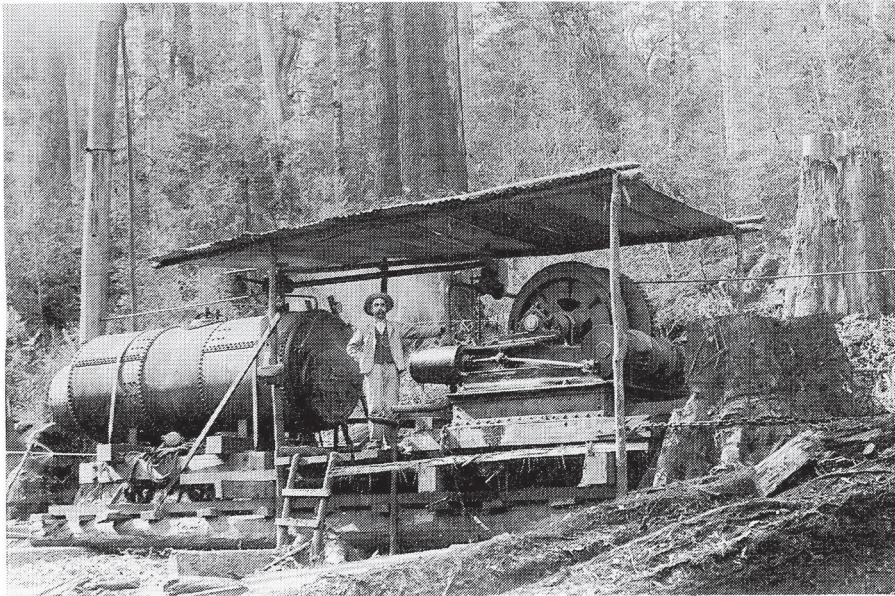


Photo 5. Steam yarder, early 1900s. (Courtesy: Forestry Commission, Tasmania)

Manufacturers were also continuing to improve machinery design and this led to the introduction in 1910 of double-acting cylinders geared to chain drives which allowed a second powered drum to be added (Simpson 1973). This second drum held a rope which was used to pull the mainrope out to the bush, eliminating the need for either horse or bullock. This increased both the distance that could be yarded and the speed with which the mainrope could be returned to the bush. The tailrope which was usually half the diameter of the mainrope was pulled from the yarder by hand, taken around the area to be logged, and then back to the yarder. The tailrope and mainrope were then spliced to each end of a short piece of chain, to which a single choker was also spliced. Despite the improvements in machinery design and capability, no changes were made to the cable system itself and ground yarding was considered to be common practice.

Most sawmills, because of their relatively small size and limited production capacity, continued to rely on single-drum yarders but the larger companies, notably the Huon Timber Company, continued to look for

improvements, which led to the introduction of North American technology and logging systems (Row 1980). Two double-drum, steam-powered yarders, a Williamette and a Lidgerwood, were imported for use in the Southern Forests, as was North American expertise for setting up and running a highlead yarding system. Though these yarders were worked for a number of years they were not considered to be a success. Prior to their introduction not enough recognition had been given to the differences in forest type between the west coast of North America and Tasmania. There were difficulties in trying to work a highlead system in a selective logging rather than a clearfell operation, the rigging was too light for the weight of the wood, local expertise in rigging was not available, and the conservative bush crews preferred the simplicity of ground yarding.

The increase in yarding distance and rope speed required changes in communication which led to the introduction of whistle signals. A thin wire was attached to a whistle on the yarder, then to a nearby springy recoil pole and was then taken out into the bush. Pulling on the wire activated the yarder's

whistle which told the operator what was required (Simpson 1973).

The depression of the 1920s led to the collapse of the Tasmanian timber industry. Depressed local and world markets, low tariffs on imported timber and high shipping costs to the mainland forced the larger companies, who relied on the mainland and export markets, to close and in many cases, sell up (Row 1980).

Assets, which included sawmill and logging equipment and the steel rails from tramways, were sold, with the best of the equipment purchased by mainland or foreign buyers. Small family owned and operated mills survived, albeit with hardship, as their costs were low and they could afford to produce sawn timber for specific low volume local markets.

Modern era

The transition from steam to petrol and diesel power in the 1930s was the catalyst for another major change in direction for the logging industry as machinery was no longer tied to a separate, stationary power source. Tractors replaced yarders as the principal machine in log extraction, railway lines replaced tramways and the use of log trucks opened up areas that had been too steep to build tramways.

Though the operational emphasis in Tasmania's logging operations had changed from cable to ground-based equipment, cable equipment was still in demand. Small operations continued to run steam-powered yarders while the large companies were using tractors with double-drum winches as yarders, or to run loading systems from conventional logging operations, and as transfer systems in log yards.

To operate the tractor as a yarder, a standing eucalypt of sufficient size was selected and topped. Guylines and two lead blocks were hung on the tree, the tractor was positioned in

place and tied back, the tailrope was run through one lead block then around the setting and joined to the mainrope which had been run through the second lead block.

The drums held up to 400 m of 22 mm mainrope and 900 m of 14 mm tailrope, and could be independently driven through the tractor's power take-off shaft. The usual practice was to log the whole setting before any logs were loaded out. .

To load from these operations, a wooden heelboom was rigged to the base of a standing tree. The heel rack was made of two logs about 10 m long, joined together by wood braces about 1 m long. Two blocks were hung in the tree and the mainrope was taken through one block and down to be shackled to the front of the heel track. The tailrope was taken through the second block, over another block mounted in the front of the heel rack and shackled to log tongs.

To load, the tongs were positioned slightly off-centre of the log and the tailrope tensioned until the end of the log was seated against the rack. The mainrope was then tensioned lifting both the heel rack and the log, a truck backed under and the log was lowered onto it.

For an overhead loading operation, two trees about 50 m apart were selected, topped and guyed. A skyline was attached to the top of the lead spar, run through a block on the tail spar down to a suitable anchor, tensioned and tied off. The tractor with its double-drum winch was positioned in line with the two spars and tied back to either a stump or a man-made anchor. The mainrope was taken through a block on the lead spar, down over the sheave in the skyline carriage, through the fall block, then up to be shackled to the base of the carriage. The tailrope was then taken through the second block on the lead spar, across to the tail tree, around a block rigged on the tail tree and back to the carriage. Log straps or tongs were attached to a spreader bar which was also shackled to the fall block.



*Photo 6. Loading with a heelboom.
(Courtesy: Australian Newsprint Mills Ltd)*

To lift a log, the tongs were positioned, the slack was taken out of the tailrope and held taut against the brake while the mainrope was wound in. The tailrope, while tensioned, prevented movement towards the lead spar while the purchase achieved by running the mainrope through the carriage gave lift. The log could be moved either forward or back by increasing tension on one rope while slowly releasing tension on the other.

Heelboom and overhead loading systems continued to be used through the 1940s, 1950s and 1960s but were gradually phased out as mobile loaders became more common. However, it was not until the early 1970s that the last overhead cable system was shut down.

The late 1960s saw a resurgence in cable logging activity with the arrival of purpose-built North American yarders. The first two in the State were a Skagit SJ4 and a Madill 009, each designed and built to handle a different forest type.

The Skagit was a self-propelled mobile yarder designed to yard and load small wood. The Skagit was mounted on a four-wheel drive chassis, with an integral mast and boom



*Photo 7. Loading with an overhead cable system.
(Courtesy: Australian Newsprint Mills Ltd)*

which could swing through 180 degrees, and had self-tightening powered guylines. Yarding distance was limited as the main drum only held 200 m of 19 mm rope but line speeds were exceptionally fast. By contrast, the Madill was mounted on a tank undercarriage, had an integral 90 foot tower with self-tightening guylines and a 300 hp engine. The Skagit was used for some time in the north of the State, primarily in pine and other small wood operations, while the Madill was, and still is, being used in oldgrowth operations in the south.

During the 1970s, three more Madills were brought into the State, all for oldgrowth operations in the south, but it was not until the mid to late 1980s that the dramatic

increase in cable activity started, with Tasmania's machine population increasing from four to 16 over a four-year period. Most of these yarders have a multi-system capability and are capable of running a number of carriage and rigging options which can be changed to suit the terrain being logged, the log size being handled and any operating constraints imposed by the Forest Practices Code.

The changes that have evolved from the first small steam driven single-drum yarder to today's technology, although spectacular, are no more significant than those that must take place to meet the needs of an industry in the current environmental and economic climate.

References

- Cheyneweth, W. (1987) Locomotives of the Sandfly and Catamaran Collieries, Southern Tasmania. Unpublished manuscript.
- Crown Lands Office (1886) Report on Southern Sawmills. Unpublished report.
- Crown Lands Office (1905) Tasmanian Forestry.
- Crown Lands Office (1886) Deputy Surveyor General's Report.
- Perrin, G.S. (1887) Report on Southern Sawmills. Unpublished report, Forestry Commission, Tasmania.
- Row, M. (1980) The Huon Timber Company and the Crown. *Tasmanian Historical Research Association* 27(3).
- Simpson, T.E. (1973) Origin and Expansion of the Timber Industry of New Zealand. *Tasmanian Mail* 1890. Archives Office of Tasmania.

Glossary

- anchor* A natural or fabricated object used to tie back a yarder.
- bull block* Large block with a throat of sufficient width to allow butt rigging to pass through it.
- butt rigging* A system of swivels, shackles and chain which connects the tail rope and main rope and to which chokers are attached.
- cable logging* Any yarding system which uses a stationary machine with powered chains, spars, blocks, wire rope and/or butt rigging to yard logs from the stump to a landing.
- carriage* A load-carrying device which travels freely on sheaves running on a wire rope for yarding or loading logs.
- fall block* A heavy block, usually balanced so that most of its weight is at the bottom. Used in skyline logging and overhead cable loading systems.
- ground lead* In cable logging, where there is no significant lift so that logs are dragged along the ground.

<i>heelboom</i>	A loading boom with a grapple or tongs which lift one end of a log against the underside of the boom to steady it.
<i>highlead</i>	A cable system in which a lead block is hung on a spar or tower to provide lift to the logs being yarded.
<i>lead block</i>	A block on a spar or tower through which the mainrope passes.
<i>mainrope</i>	Primary yarding rope used to pull logs from the stump to a landing.
<i>skyline</i>	A rope extended between the yarder and tailhold which provides lift and on which a carriage travels.
<i>tailrope</i>	A rope used to return the mainrope and rigging to the next log.
<i>tailspar</i>	A rigged spar on the backline used to elevate a skyline.
<i>tie back</i>	A wire rope used to tie back a yarder to a stump or anchor.
<i>yarder</i>	A machine equipped with winches which operates from a stationary position to yard logs from the stump to a landing.