



ADDING VALUE

Natural Heritage Trust
Helping Communities Help Australia

SE NSW PRIVATE FORESTRY INFORMATION SHEET # 12.

MOBILE SAWMILLS

As a means of overcoming marketing difficulties experienced by forest growers due to relatively smallholdings, poor timber quality and inaccessibility of some forests for commercial harvesting, on-site processing should be considered. Research (JVAP) has found that mobile sawmilling has the greatest potential for on site processing. This is because the returns for sawn timber can be high and the costs associated with mobile sawmilling can be relatively low. Mobile saw milling is taken to include the production of green, air dried and kiln dried sawn timber using sawing equipment which is taken to the farm site, operated there, dismantled and removed.

Mobile saw mills have the potential to contribute to both industrial-scale operations and farm forestry:

- At the industrial scale mobile sawmills have the potential to use timber salvaged following natural disasters and commercial operations and harvesting in existing forests.
- At farm forest level mobile mills have the potential to deal effectively with small-scale relatively isolated stands of timber, which have not attracted commercial harvesting operations in existing forests.

There are numerous mobile mills in the Australian market ranging from simple lightweight frames to which chainsaws can be attached, to complex horizontal bandsaw mills, single circular saws units and twin circular saw units.

Mobile mills have a number of advantages including:

- Inexpensive to purchase.
- Can be operated by one person.
- They can be taken to the log to mill on site, avoiding some transport costs.
- They are able to supply niche markets not served from industrial processors.
- Small volumes of logs can be economically processed.

However, there are also some significant disadvantages with most mobile mill systems:

- They have limited facility to turn the log, making implementation of grade sawing strategies difficult.
- The dimensional accuracy and product finish of some types of mobile mills may not be as high a quality as industrial mills.
- They are labour intensive and require heavy lifting close to ground level.
- They are slower to operate with relatively low product throughput.

There are six main types of mobile mills:

1. **Chainsaw mills** – Which are cheap, but labour intensive with low conversion percentage because of wide kerf with the need for double handling and poor timber finish.
2. **Horizontal bandsaw mill** – Have high conversion rate due to narrow kerf, consequently relatively low fuel costs. They can cut wide boards, but sawn product requires resawing to produce dimensional timber. The blades require frequent sharpening and setting to maintain an accurate cut.
3. **Single Circular Saws** – Have low power requirements and produce dimensional timber with two passes of the saw and are capable of cutting in both directions but have wider kerf than a bandsaw.
4. **Double Circular saws** – Can handle very large logs, cut dimensional timber with one pass of the saw and have facility to return sawn timber to the operator with the return of the carriage. They have a wide saw kerf and have difficulty with partially sawn timber.
5. **One-person Bench Sawmills** – These mobile mills enable accurate sizing of products, have high productivity and labour saving log handling facilities; they are relatively expensive and are the least mobile of all the mills.
6. **Swing saws** – Are an older style mobile, mill using a large circular saw blade mounted on extension arm and wheeled over the log in front of the operator. They are unable to saw dimensional timber accurately. They are used for sleeper cutting and as a break down saw in combination with other processing.

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Chainsaw mills

Chainsaw mills allow for inexpensive, low volume milling of timber. Generally used by the enthusiast for the collection of feature grade timbers. The length of the chainsaw bar determines the width of the cut.

There are two types of chainsaw mills:

1. Rail mills

A rail is fastened to the top of the sawlog. The chainsaw is then bolted to a roller head, which is mounted in the rail. The roller head has adjustable side arms to determine width of the cut. The chainsaw is drawn through the log in a vertical position as the cut progresses. The rail guides the blade maintaining a parallel cut. Rails come in various lengths and can be added too if need be. Some models come with hand winches.

2. Slabbing mills

The chainsaw is mounted horizontally in a box type frame and clamped in position at either end of the bar. As logs are not uniform (or flat on one side.) the first cut has to be made by mounting a flat guide on the top of the log. This guide may be timber or metal, so long as it is wide enough to keep the saw frame stable. After the first roundback is removed the saw frame will hold the bar parallel and at the correct depth to the previous cut. Repeated cuts are made horizontally.

Single circular sawmills



Lucas Mill Single circular-saw.

Single Circular sawmills consist of a base frame, a set of longitudinal rails, and a saw carriage. The base frame consists of two independently erected end frame sections, which provided support for the saw carriage. The sawing unit can move laterally (with in the carriage structure or as one with the rails), as well as along the rails.

The sawing unit contains a single circular saw and is mounted on the saw carriage. The saw blade support is designed to permit operation of the saw blade in both horizontal and vertical positions (that is it can be flipped through 90 degrees to effect cuts in both horizontal and vertical planes). The power source is an internal combustion engine, which is incorporated into the sawing unit. The operator pushes the saw carriage along the log and controls the sawmill.

Horizontal bandsaw mills

Horizontal Bandsaw mills consist of a travelling saw carriage and self contained bed onto which the logs are placed. The saw carriage consists of a large horizontal bandsaw mounted on an elevated platform (the sawing unit) which in turn is mounted on a trolley. The saw unit can be raised and lowered to vary the thickness of each cut. A small petrol motor mounted on the saw unit powers the band wheels. The saw carriage travels on a pair of steel rails, which are incorporated into the design of the sawmill bed. The bed does not require foundations of any sort although timber sleepers will help to stabilise the mill on soft ground or if remains in one place for an extended period of time.

Squared timber can be obtained by squaring the log prior to slabbing, or by resawing slabbed pieces.

However their disadvantage is the slowness of cutting, and the difficulty in producing squared. (Scantling) timber. For these reasons, the bandsaw mills are largely used to cut large sections of timber from higher quality older, larger trees.



Laidlaw Bushmill. Horizontal bandsaw.

Productivity ranges of mobile mills

The Joint Venture Agro-forestry Project research has shown that of the mills surveyed the twin circular saw mills provided the greatest productivity when measured in cubic meter of sawn timber per hour.

Type of Mill	Cubic Meters / Person/Hour
Chainsaw mills	0.15 - 0.02
Bandsaw mills	0.25 - 0.40
Single circular sawmills	0.40 - 1.00
Twin circular sawmills	1.20 - 2.40
Bench-type units	1.00 - 1.60

Products and Product Prices

Mobile saw millers can provide a number of sawn timber products from a variety of trees species. The specific product targeted in individual cases will depend on among other things the species, quality and quantities of the sawlog and the intended end use of the product.

Principle end-uses of sawn timber included the following:

- **Agricultural construction**:-these timbers are not subject to standards in terms of species, colour, strength, amount of defect size variation and dryness and include timber for animal shelters, storage-sheds, fences, crates feeding troughs and bridges. A JVAP survey showed that 30% of mobile mills operators produced agricultural construction timber as their main product.
- **Manufacturing**:- timber for manufacturing includes furniture as well as pallet crate material. Furniture timber can range from slabs with knots and barked edges to knot-free (select grade) wide boards for use in cabinet making. Virtually any timber can be used for furniture providing it is workable with common tools and suitably dried before use. The JVAP survey showed 25% of mobile mills produced furniture timber as their main product. Pallet and crate materials are low value primary products. The JVAP survey showed another 25% of mobile mills produced pallet & crate as their main product.
- **Residential, Industrial and Institutional Construction**:- It may be difficult to supply construction timbers as large volumes and regular flows are often required. Most of this timber has to be “Stress Graded ”and is mainly sourced from industrial scale sawmills. The JVAP survey showed no mobile mills had graded construction materials as primary product although a number of mill operators had qualifications to stress-grade timber.
- **Miscellaneous**: - Timbers for general public consumption such as carvings, mouldings and turning. The JVAP survey showed no mobile mills had this type of materials as primary product although most stocked this type of timber.

Representative products and sawn timber returns

HARDWOOD PRODUCT CATEGORY	REPRESENTATIVE PRODUCTS	REPRESTATIVE RETURNS (\$ 1997)
Green Paling &Pallet Grade (GP&P delivered)	Paling &Pallet	170-300
Green General Construction (GGC off-saw)	Non stress graded building materials for Sheds, stockyards etc.	280-450
Green Furniture Grade (GF off-saw)	Wide boards slabs etc.	320-830
Green Furniture Grade Speciality (GFS delivered)	Wide knot free boards for use in furniture and cabinet making	450-900
Kiln Dried Furniture Grade (KGF ex kiln)	Wide knot free boards for use in furniture and cabinet making	1150-1500
Air-dried Furniture Grade (AFG ex shed)	Wide boards slabs etc.	1000-2500
Kiln-dried Furniture Grade (KFG Delivered)	Wide boards slabs etc.	2500
Air-dried Furniture Grade Speciality (AFS ex shed)	Wide boards slabs etc.	1100-5000

Price ranges for various hardwood products

