

# Chainsaw Milling



## Introduction

This leaflet will be of interest to farmers, woodland owners and those with occasional sawlogs, especially where you have a use for the timber and where cost/quantity/location might make it difficult to justify owning or hiring a mobile mill.

It should be stated that Chainsaw mills are **not** the most efficient way to convert wood for two main reasons:

- (i) it is a relatively slow process with low fuel efficiency
- (ii) the chain creates a wide 'kerf' or blade thickness, meaning a high proportion of sawdust is generated.

They are also hard work on the operator. However, with correct technique and where circumstances demand, smooth accurate boards can be produced for a wide variety of end uses. If you already own a good chainsaw, the cost of a chainsaw mill could be repaid by the first couple of decent logs converted. Many farmers, foresters and others working with trees will often be able to use saws that they already own with a few adjustments, vastly increasing the range of possibilities without expensive initial investment.

Accuracy is the accumulation of paying attention to a number of small details, which are described below. We only write information about subjects we are proficient in undertaking ourselves and we don't have the time available to have done everything, so any comments and improvements on the information provided here are welcome from anyone with experience.



## Basic principles

Chainsaws are normally used to cut *across* the grain of trees, for example when cutting a log into rings for firewood. However, a chainsaw can be adapted to cut efficiently *along* the grain, for milling logs into planks boards or beams. This is done by altering the chain and using a guide to obtain an accurate cut along the log.

There are several types of guide available. This leaflet will concentrate on the 'Alaskan' type mill, originally produced by Granberg, but the principles are the similar for other mills, such as the vertical 'Lumbermaker' type originally produced by 'Haddon'.

### 'Alaskan'



Advantages: Accuracy, good for sawing 'through and through' producing 'live edge' boards

Disadvantages: First cut is time consuming, saw needs to have a long bar to accommodate the mill and therefore a large saw is required eg: 90cc plus.

### 'Vertical' eg: Haddon Lumbermaker



Advantages: Smaller chainsaw can be used to achieve similar cutting diameter to Alaskan, easy to fit, can saw vertical plane easily

Disadvantages: can be less accurate in sawing boards as the chainsaw bar can flex causing uneven thickness





An ideal scenario is to have one of each type. The first cut and 'through and through' cuts made with the Alaskan, with side cuts in the vertical plane with the 'Lumbermaker'.

## Required Equipment

- A chainsaw ideally larger than 70cc, the larger the better. For example, a Husqvarna 365 would mill logs up to around 12 to 15 inches in diameter, especially in softer species such as cedar or fir
- Some kind of straight edge to create the first cut, which depends on the type of mill used
- The chainsaw mill
- Wedges, measuring tapes and chalk/crayon is useful
- Usual range of chainsaw sharpening files etc
- Fuel and oil – allow about 1 tank of fuel per couple of runs on medium sized logs and additional oil than standard chainsaw work. **It is sensible to increase the petrol:oil mix to around 30 to 40 : 1, as the saw will be used under constant load**
- Ideally a fork lift or similar machine, but at least a log bar to move and turn logs
- Timber 'stickers' banding and strapping equipment
- PVA / emulsion paint for the end grain



## Safety

As with all chainsaw operations full PPE must be worn and basic training is highly advised. MWMAC can offer courses on basic chainsaw maintenance and provide information on current sources of funding for training in Wales. A dust mask and/or full breathing apparatus is also advised as the operator will be working close to exhaust fumes and sawdust. This work should only be carried out in the open air and not in buildings or enclosed spaces. Pay attention to manual handling techniques, and especially wearing steel toe capped boots as boards are heavy and can have a sharp edge.

## Setting up the first cut

### *Using the 'Alaskan' mill*

This is achieved with the aid of a straight guide. A ladder is often used, which should be at least the length of the log, with any protrusions removed.

Most logs come with a taper toward the butt end. It is advisable to remove some of the worst taper on the top of the log before setting up the ladder.





### *Adjusting for taper*

It is important that the straight edge is set up parallel to the **centre of the log** and not simply lying along the top of the log. The centre usually runs 'pith to pith' as follows:

If taper is not taken into account, the grain in the sawn boards will not be straight causing 'run out'. This will lower the value and utility of the timber.



*Here is a photo of a plank from the centre of a log, which was correctly set up for the first cut. The grain is exactly straight with the pith running along the whole length of the plank:*

### Method

(i) Measure from the pith to outside of the log at **both** ends.



The difference between the two measurements is simply the amount by which the ladder must be raised with wedges at the smaller end of the log (in this case about 2 ¾ inches). Once wedged, the edges of the ladder are now the same distance from the pith at both ends and parallel to the centre of the log.

(ii) Now the ladder must be secured to the log. This can be done with large metal staples (steel 'U bolts' can simply be sharpened with a grinder to make these up yourself) taking note how far the tips penetrate into the log, which must be **above** the first saw cut.



(iii) Measuring from the small diameter end of the log (the end with the wedges) the depth of the first cut is determined. You need the saw to comfortably **miss the staples** holding the ladder down, in this case 4/14 inches. If you wish to re-saw a further rail from the slabwood (eg: a 4" x 2") then allow for this now, optimising the recovery.





(iv) The Alaskan mill is then set to the required depth to make the first cut (in this case 4 ½ inches).



*There are many other ways to make the first cut to increase efficiency and accuracy. For example, aluminium rails can be bought or made. Logosol and Granberg both make 'first cut' systems and a search of the internet will bring up many options.*

## Using the Mill

### Oil

For bars up to about 30 inches secondary oiling is probably not required, though pouring extra oil on the bar before starting will help. The saw should have the oil pump set to maximum – this can be done with reference to the owners' manual of the saw. If the bar and chain tend to heat up during sawing, extra oil is necessary. Again, there are several oiling systems available online.

### Use of Saw

Start the saw and warm it up. Slide the guide rails over the straight edge and begin sawing.







You need to keep a close eye on the four contact points between the guide rails where they rest on the straight edge, to ensure that they remain in contact. If one corner starts to rise the cut will not be straight, *which will also affect subsequent cuts.*





## Technique

You are aiming for a smooth constant cut. It is best to find a comfortable angle/position for the saw and to avoid rocking it back and forth as this will create marks on the sawn boards. Proper attention to sharpening the chain (see below) will have a significant impact on sawing smoothness.

After a couple of feet into cutting the log you may feel the saw start to bind slightly. At this point, pause and insert wedges to open up the kerf. It might be necessary to add oil to the bar at these points. If an assistant inserts the wedges make sure the saw pauses cutting, not only for safety but also since inserting the wedges while running the saw causes it to judder creating marks in the timber.



Proceed to the end of the cut, engage the chain break and remove the saw/mill. It is sensible to leave the saw running for a short while, rather than immediately switching off, to allow engine and other parts to cool down at the same rate.

The second and subsequent cut can now be guided straight on the face of the log. Re-set the Alaskan mill to the thickness of plank required and make the second and then subsequent cuts.





### Tips

- It is easier where possible to mill the log on a slight downhill slope
- Remove the side cover periodically on the saw to clean out sawdust
- Regularly remove and clean the air filter

At this point the 'vertical' mill could be used to square the log at right angles to make posts or beams.

## Stacking and Drying

Once milled the timber now needs to be stacked and dried properly to prevent twisting and cupping. This is an important but often overlooked step and should be carried out immediately after the log is sawn.

A sawn board will begin drying immediately at different rates – and it will dry more quickly through the ends than through the long grain. This means

- (i) the ends of the log should be sealed with PVA (mixed with water), emulsion paint or similar, to reduce moisture loss through the end grain and
- (ii) timber must be stacked properly and banded together to reduce distortion. This should be carried out as follows:



- Place the bottom slabwood on bearers
- Place 'stickers' at equal intervals along the board, including close to the ends. The stickers should be of equal dimensions
- Place the next board on top, repeat the sticker patterns, directly above the first set
- Repeat until all boards are stacked
- Now use a proper banding tool to band the whole pack together. The bands should be near to the stickers

- Making the stack up on pallet forks at waist height will aid manual handling





Boards will typically take about 6 months to air dry to around 20% moisture content. They can be further dried by a kilning process for indoor use.

## Ripping Chains

You will notice very quickly that rip sawing with a standard logging chain, sharpened at 30 degrees or so, is hard work both on the operator and the saw. Dust will be very fine and it will not produce a good finish on the timber. The bar will usually heat up to unacceptable levels. The reason for this is:

- (i) that the cutting angle is at too sharp an angle to 'rip' through the grain efficiently as it is sharpened to cross cut through the fibres, and
- (ii) there are too many cutters on the chain to allow sufficient room for sawdust to clear.

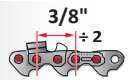




The solution is therefore to use a special 'ripping' chain. If you are only milling a few boards, posts or beams, sharpening an ordinary chain to a 10 degree angle (angles are on most filing gauges) will be more than sufficient and the difference will be noticeably better. Using 'semi chisel' chain when sharpened at 10 degrees tends to produce a smoother cut, though we have tended to use chisel chain with good results.





For producing more regular volumes of timber a 'full skip' chain is very useful. This means that there is an extra drive link is inserted between the cutting teeth, reducing the overall number of cutting teeth by about 1/3<sup>rd</sup> the normal number. The following chart is from Oregon and shows the specification of Oregon 3/8 pitch 'LPX' chains and JPX, the latter being the skip chain:

**SPECIFICATIONS**

Chain Pitch	
Cutter Style	<b>Chisel</b> 
Kickback Reduction	<b>Bumper Drive Link</b> 
Sequence	<b>LPX</b>  <b>JPX</b> 

The photo below shows the difference in layout between a normal chain and full skip: (Bottom is normal, middle is full skip, top is semi-skip):



Full skip chains can be bought online, though can be difficult to find in the UK. For further guidance contact us through our website [www.coed.cymru](http://www.coed.cymru) If you have the tools to make up chain loops it is possible to make your own, though this is time consuming.



This is the chain we use, which we made ourselves using Oregon parts from FR Jones & Co

Once acquired skip chains should be kept for milling only and treated as an investment. They are not recommended for general use due to increased kickback risk and being unnecessary.

All the usual rules for maintaining chains, bars and saws apply.





For further information, including for accredited courses in basic chainsaw maintenance in Wales please contact us:

w: [www.coed.cymru](http://www.coed.cymru)

e: [gareth@coed.cymru](mailto:gareth@coed.cymru)

ff: 01686 650777 (Coed Cymru)

w: [www.mwmac.co.uk](http://www.mwmac.co.uk)

e: [enquiries@mwmac.co.uk](mailto:enquiries@mwmac.co.uk)

t: 01597 433117 (mwmac)

