

SCROLL SAW TIPS & TECHNIQUES

A beginner's guide

Although a scroll saw is a relatively simple machine, easy to operate and reasonably safe to use, the production of fine (in both senses of that word) articles requires a certain knowledge and practiced skills. The following is a sharing of some years of experience. It should be helpful to those wanting to learn the craft. For others it may improve their outcomes, and hence their satisfaction and enjoyment of this craft. Much of the following is plain common sense, but sometimes the obvious eludes us. We tend to expect things to be more difficult or complicated than they really are. We make no apology for stating the obvious.

Safety. Scroll saw work requires close concentration. Most instructions say, "Keep hands 2" from the blade." However, small pieces need fingers close to the blade, but preferably to the side. Preferably turn the saw off when talking to others, consulting plans, etc.

As a first point you need to know the **limits of the scroll saw** and only use it within those limits. The maximum depth of cut on most saws is about 50mm in a soft-medium hardness timber, even less in hard timber. As a general rule the rate of cutting is about 15cm per minute on straight cuts in timber up to 5mm thick and something less on complex curves and/or thicker timber. Trying to work outside these limits will damage the work, the saw or both.

To begin, make sure the **machine is firmly attached** to the bench or stand, either by clamping for temporary stability, or by screws or bolts in a more permanent position. Some heavier models will sit still for light work. However, higher speeds tend to make scroll saws vibrate so firm installation is then required. Some saws have adjustable feet. Check these for stable standing.

Familiarise yourself with the position and action of the **ON/OFF switch**. You may need it in a hurry.

Most saws come with an **adjustable hold down clamp**. This can be useful especially with thicker timbers, which have a tendency to lift off the table on the upward stroke. This "chattering" is due to the friction between blade and timber. Hold down clamps can be a hindrance, obscuring the pattern and hindering steering of the workpiece. Many experienced scrollers discard the hold down clamp.

Friction is increased when blades have been used for a long time, especially in hard timber. Loss of the width of cut because of wear on the set of teeth also causes overheating, burning on the timber and broken blades. It doesn't pay to continue using a worn blade. As a general guide expect to get about 3-4 meters of cutting in soft-medium timber; less in harder timbers and then change the blade – don't wait for the smell of smoke.

A **sawdust blower**, if fitted, should be positioned to blow from just above, before and slightly to the side of the cutting point to blow sawdust away from you.

Most scroll saws have a **variable speed control knob**. There are two speeds to be aware of; blade stroke speed and material feed speed. Unfortunately, there is no knob to control the second! But please remember that a faster blade stroke does not have to mean a faster material feed. The intricacy or otherwise of the work will determine the feed speed. Experience will enable you to feel how fast to feed various materials without putting backward pressure on the blade. However, a slower feed speed, as with thicker timber, doesn't mean a slower stroke speed. In fact, the faster the stroke, the smoother the cut. It also enables you to use a faster feed when you come on from an intricate section to a straighter part of the pattern.

Blade fitting. Blades are fitted both top and bottom to the working arms of the saw either by a pinned end sitting into a claw, or by clamping the flat end of pin-less blades in the

same area. Saws may have either or both methods. Be sure to place the blade with teeth pointing forward and down. Don't laugh! Both mistakes are easily made. Very thin blades are easily reversed in your fingers. With reverse tooth blades you can wrongly place the reverse teeth at the top.

Blade selection depends on several considerations; the material to be cut (especially its thickness), the width of the kerf (blade cut) needed, and with experience, your personal preference. There are a great variety of blades, and suppliers. Bunnings only stock one type and size!! It is really a subject on its own, so just a few basics here.

Pinned blades can only be used on saws that have the claw top and bottom to hold them. (The pins can be removed or cut off if they need to be used in a clamp blade saw.) They are usually thicker with larger teeth. They have the advantage of being quick and easy to install, but lack the flexibility we shall see with pin-less blades.

Reverse tooth blades will keep the underside of the workpiece free of splintered edges, and make a smoother cut. They require a firm holding down of the material because of the upward pressure by the reversed teeth on the upstroke. If possible set the blade so that the reverse teeth do not come out the top of the material, avoiding the possible damage to the top edge of the cut. (For method of blade adjustment see the centre of page 3.)

Skip tooth blades have various combinations of teeth and gaps designed to remove sawdust more efficiently. In thicker timber some teeth in the centre of the cutting stroke do not emerge from the timber and can therefore clog up and cause overheating, burning and/or blade breakage. Regardless of the blade being used, regular backing off from the cutting edge helps to overcome the problem.

Spiral Blades cut, or rather, eat into timber whenever it is moved while the blade is operating. It requires a firm grip and very steady control of the material to stay either on line or within the area being cut away. This said, they can be very useful in filigree and similar work. If you are going to cut yourself on the scroll saw, you have a greater chance with the spiral blade!

Blade tension is very important for clean accurate saw cuts. A control knob, usually at the rear of the machine, raises and lowers the upper arm. With the blade in place, raising the upper arm increases the tension on the blade. Pluck the blade like a harp string and raise the tension until you hear a high-pitched note. This high tension helps maintain a consistent blade direction and make a cleaner cut. Both top and bottom blade clamps need to be very tight to prevent the blade pulling out. Special note for the Excaliber/General saws – the knob at the rear of the top arm is NOT a tensioning device. It raises or lowers the top arm relative to the table and thus changes the "angle of attack". The arm is normally set to be parallel to the table and should be checked periodically.

As a general rule, the higher the blade tension the more accurate the cut. However the high tension will also result in more frequent blade breakages – and yes breaking blades is quite normal and to be expected. You should try to develop a quick reaction to a blade breakage to avoid damaging the work and/or the saw, hence the need to know where the on/off switch is.

Some lower blade clamps allow the blade to extend below the clamp. This can be utilised to **use more of the blade teeth**. Shortening the length of blade under tension by lowering the top arm and extending the blade out the bottom has two advantages, Firstly, the shorter length is more stable; less able to twist and wander. Secondly, when the part of the blade doing the actual cutting is worn, unclamp the bottom, raise the upper arm until the excess blade is drawn up through the clamp, then re-clamp the end and re-tension the blade. You will now be using fresh teeth in the cutting area. Alternately, a piece equaling the portion of blade extended below can be cut off the top of the blade, retaining the advantage of a shorter blade under tension.

If your saw does not allow for the extension of blades below (as with pinned blades) the same purpose can be achieved by installing a piece of timber on the table, the thickness at least the same as the portion of cutting stroke that is worn. Again you will be using teeth not previously actively cutting.

Having selected and installed the blade, you should **check blade angle to the saw table**. Don't assume that the blade is at 90° to the table just because it looks perpendicular. Place a protractor, with bottom edge flat on the table, directly behind the blade and line up the blade to the angle required. For much scroll saw work this will be 90°. A simple way to get absolute accuracy for 90° is to cut a shallow line in a block of wood sitting flat on the table, and then slide it around behind the blade. If the back of the blade fits easily into the cut without sideways pressure, you have exactly 90°. If not, minute adjustments to the saw table need to be made. Also check the "front to back" alignment of the blade with a small square or protractor to make it as vertical as possible. As noted above some saws have an adjustment for this but for those that don't the adjustment is made by repositioning the blade in the clamps.

Accuracy with this setting is vital where pieces have to fit next to each other as in parquetry and puzzles.

Adjusting the angle of the blade means that either the table has to be tilted, (there is a knob for this), or the working mechanism is tilted (as with the "General SS") with the table staying horizontal.

Angle cutting, (ie with the blade at other than 90°) can be used to produce many interesting articles and results; spirals that can form bowls, circles that when glued together form baskets, and much more. A protractor is used if exact angles are required. Of first importance is to decide on the direction of the cut that your pattern needs to achieve the result wanted. (For example you may want one face of the timber to be uppermost in your item.) Then you must continue in that direction for the whole item. It may be prudent to do a sample on scrap timber before you ruin your expensive choice timber by making a simple mistake in your direction of cut.

Following lines. Freehand flowing lines and curves are a good practice exercise in getting the feel of your saw. However, most of what we do requires the use of a pattern of lines to follow. The first thing to do (on scrap timber) is to find the direction this particular blade is cutting. We naturally expect blades to cut straight forward. Very few do. Next, remember to feed the line to be cut directly into the teeth at the angle at which this blade cuts. Turn the piece into the blade. The temptation is to try to steer the blade through the timber. The result is that side pressure is put on the blade, which, if it doesn't break, will only continue on its own merry way, and not the direction you want, Relentless steering is required with a firm control of the timber.

As far as possible continue to move the cut forward. Stopping, except at corners, is apt to leave a rough patch in your cut. Hence, on straight and curved lines try not to stop. On curves, anticipate the turn. It's rather like steering a car.

Most projects will have a pre-determined **pattern** printed or drawn on paper. It is possible to transfer the pattern to the timber work with carbon paper but often the colour of the timber makes this difficult. The usual approach is to fix the pattern to the work. The preferred method is not to glue the paper directly onto the work but to use a suitable substrate and glue the pattern to that. Suitable substrates are "blue painters tape" (not masking tape) or clear self-adhesive "shelf lining". These have several advantages – they help to lubricate the blade; they are very easily removed; they leave little or no residue and on thin veneers they help reduce cracking/splitting of the veneer.

Once you have fixed the pattern to the work, decide on the sequence and direction of cutting. Where needed put pencil notes on the pattern, especially if doing angle cuts that require a specific direction of cut. Also mark the position of any entry holes.

Where to cut? On the line or to one side?

If both sides of the line are part of your work you must stay on the line. This means that tight corners become a challenge. With a fine blade it is possible to turn completely around by pivoting the material slowly around the turning point while keeping the side and back of the blade pressed against the timber. By this method, which needs practice, even sharp pointed turns can be reasonably achieved. When using a deeper blade, tighter turns are made slightly easier if the sharp rear edges of the blade are rounded. Do this by holding an emery pad against these edges with the blade working.

It is easier **when one side of the pattern is waste material**. Now it is possible to cut on the outside of the line and if necessary, sand back to the line.

Now there are several **techniques for cutting into sharp corners**.

1. Cut into the corner, then back out far enough to cut across the waste and into the corner from the other direction.
2. Back out completely and start at another point of the pattern and cut back to the corner in question. If backing out is too far or difficult, unclamp the bottom of the blade, lift it out, re-clamp and then start at another point.
3. Ignore the tight corner, cut across waste and continue on. Don't forget to come back later to cut into the corner from both directions.

These methods all presume the blade is set at 90° to the table. If it is an angle cut, the second method described above is best used. Reset the same angle on the opposite hand and then cut back along the pattern to the corner in question. (For example, if you have been cutting clockwise at 45°, you must now go anti-clockwise set at 135°.)

Larger Patterns may cause difficulties if they are longer than the distance from the blade to the end mechanism. You may not be able to cut continuously through on a pattern line. Be conscious of this limit. It sets a challenge to your ingenuity, and every different pattern has its own version of the challenge, which is multiplied by 10 if you are angle cutting!

Waste material at each end should be cut off first. Then cut in from each end to meet in the centre.

If all else fails, then remove the blade and turn it around so that the teeth are facing backwards. Sounds easy enough? Have you ever sat backwards on a bicycle and ridden it? It is possible, but requires much practice and numerous band aids. Good luck with your trick cycling. You could, of course use a spiral blade.

Cutting pieces **starting away from the edge** as with letters A B D O.

Drill a hole, large enough for the blade to pass through, away from the line and in the piece to be removed. Drills can tend to damage timber surrounding the hole. On thin veneers entry holes can be made with a stout darning needle rather than a drill. This has the advantage that the hole will "self heal" during the gluing up and finishing stages of the work. In either case lightly sand the back of the work to remove any burrs and ensure the work sits flat on the saw table.

If the piece to be cut out is to be put back in situ, as with many child puzzles, then a drill hole just wide enough for the blade must be drilled on the line, preferably in a corner. It will be less obvious there in the finished product.

Feeding the blade through the hole, especially a fine hole, is easiest done by unclamping the bottom of the blade, lifting the arm, then lowering the blade through the hole. With smaller pieces you may unclamp the top of the blade, lift the arm and feed the workpiece down over the blade. Using this method with larger pieces and holes away from the edge is like trying to win the lottery.

ooooOOOoooo

So you have finished your work. No! Don't rush away to show off your masterpiece to the admiring multitude. First release the tension on the blade, (a simple lever action on some saws; an unwind knob on most); clean sawdust and scraps away to the bin, and if it has not recently been done, a drop of light oil on accessible moving parts will ensure a good start next time.

HAPPY SCROLL SAWING

A presentation to the Scroll Saw Special Interest Group of the Woodcraft Guild ACT.
17/02/2019,

by David X 2.