

# SAN JOAQUIN FINE WOODWORKERS ASSOCIATION

## SCROLL SAW 101

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### Saw Selection Considerations

#### Cost

- Each individual has to determine how much they want to spend based on their personal situation and how they intend to use the machine
- “The pleasure and satisfaction derived from owning a quality machine will far outlast the sting of paying a little more than you thought you could afford.” *Patrick Spielman*

#### “Pin-end” vs. “Plain-end” blades

- Pin-head blades significantly affect the ability to make inside cuts
- “Pin-head blades are like training wheels on a bicycle – no one wants to use them once they learn how to ride.” *Patrick Spielman*

#### Ease of changing blades

- Don't under estimate the importance of this feature
- Check the ease of tensioning (cam, screw, ramp? Dave Summers to explain)

#### Ease of threading blade for inside cuts

- Even more important is the ease of threading the blade through a drilled hole to perform an inside cut
- As you graduate to more intricate projects, this feature will become exceedingly important

#### Vibration

- A vibrating machine usually indicates poor engineering or careless workmanship
- Vibration could also indicate parts are under stress which could cause serious problems later

#### Speed adjustments

- Depending on work performed, this may not be important
- Convenient location of speed control a consideration

#### Throat capacity

- This will determine how large a work piece you can cut
- “One can always cut small pieces on a large saw, but you can't cut larger pieces on a small saw.” *Patrick Spielman*

### **Dust blower**

- Having a well designed dust blower contributes to accurate cuts and makes for a much more pleasurable cutting experience
- If dust blower is connected to hold down you will be required to use hold down
- Adjustability is important to blow dust away from operator, not block the light, and to compensate for different thicknesses of material

### **Table size and adjustability**

- Is the table size adequate for intended work?
- Does the table easily tilt for bevel cuts?
- Does the table tilt both ways? This is a nice feature, but is not essential (J.C. to explain).

### **Overall quality of workmanship and performance**

- Arms should not move side to side
  - Side to side movement usually indicates bad or cheap bearings
  - Side to side movement will contribute to high frequency of blade breakage
- Check for blade wobble (blade will be a blur vs. a straight line)
  - Some newer saws have adjustment to align clamps to eliminate wobble
- Check quality of visible parts – they will reflect the quality of the non-visible parts

## **Saw Set-up and Accessories**

### **Dedicated stand vs. bench top**

- Many times a function of available space
- A dedicated stand set at the right height and angle can make sawing a more pleasurable experience
- Some stands are an integral part of the overall design and cannot be separated
- Some models do not operate smoothly unless mounted to their specially designed stand
- A mobile base can be important for those with small shops

### **Light and magnifying glass**

- This accessory is just so nice to have that you really have to get one
- One made for your particular saw is best, but after market add-ons are available as well
- Some prefer to wear safety glasses or other headgear with magnification

### **Foot switch for on/off**

- Perhaps the most important accessory
- Allows you to keep both hands on the work piece when starting and stopping a cut

### **Arm lift for ease of threading inside cuts**

- You can purchase mechanical arm lifts from some scroll saw manufacturers
- You can make your own (Roger to demo intricate arm lift)

### **Small square to ensure table and blade are square**

- Squareness of the blade to the table needs to be checked before cutting and often - this is critical if cutting jigsaw puzzles, for compound sawing and stack cutting
- A small machinists square or one made primarily for scroll saws can be used
- J.C. to demo method to confirm square with scrap of wood.

### Blade Storage

- Dave Dunlap to explain his blade storage system
- J.C. to explain his blade storage system

### Reference and Pattern Books

- Patrick Spielman's "*The New Scroll Saw Handbook*" or similar reference book can be a great source of information
- Scroll saw patterns are available in books, magazines and on the Internet

### Small Drill Press Chuck and Very Small Drill Bits

- Needed for drilling very small holes to insert blades for inside cuts
- Small chuck available at Ideal Saw Works
- Drill press generally preferred to insure straight holes (especially important for stack cutting)
- Dremel drill motor can also be used

### Secondary Table Cover

- Can create a near zero clearance insert
- Lexan better than plexiglass (J.C. to explain)
- Creates a perfectly flat and smooth surface

## Blade Selection

### General Information

- 3/0, 2/0 & No. 2 blades are used for very fine and delicate cutting of veneers and all thin woods up to 3/16" thick.
- No. 4, 5 & 7 blades are best for general purpose hard and softwood cutting, including average fretwork and tight-radius patterns in softwoods 1" to 1 1/2" thick.
- No. 7, 9 & 12 blades are for heavier and faster cutting of softwoods up to 1 1/2" thick and hardwoods 1/2" to 1" thick.
- Blades with the same specifications may vary from one manufacturer to another.
  - A No. 5 blade from one company may be closer to a No. 7 from another company.
- As a general rule, as material thickness increases, select wider blades with fewer teeth per inch.

### Blade Types

There are essentially only 3 major types of blades for most wood-cutting jobs.

- **Skip-tooth blades**
  - Cut fast and provide a smooth cutting surface
- **Double-toothed blades**
  - Better chip removal
  - May work well with wood veneers
- **Ground skip-tooth blades**
  - Regarded as sharpest and longest lasting
  - Good chip removal
  - Cut cool and minimize burning
  - However, they are double the cost of skip-tooth blades

### **Blade Manufacturing Processes**

Scroll saw blades are made from 3 different processes.

- **Punched (stamped) or Notched**
  - Punched from pre-tempered steel
  - Alternately set teeth create a wide kerf
  - Medium to smooth cut
  - Available with plain or pin ends
  - Cost one-fourth of milled blades
- **Milled blades**
  - Made with milling cutters in soft steel and then heat-treated
  - Has a slight burr which causes it to “track” slightly
  - Variety of tooth shapes including skip, reverse-skip, double tooth, spiral, crown-tooth & metal cutting
  - Not available with pin-ends
- **Ground blades**
  - Best performance
  - Teeth formed in hardened high-carbon steel with a double pass of a stone-grinding machine
  - Generally have reverse lower teeth
  - Track straighter
  - Produce sand-free, polished surfaces on most woods
  - Most expensive, but last 3 to 4 times longer
  - Only available in Nos. 5, 7 & 9 (*this may have changed since book published in 2002*)

### **Reverse Tooth Blades**

- Teeth located at lower end of various types of blades
- Developed by Olson Saw Co. in the 1950’s to eliminate tear-out on underside of cut
- Olson developed these blades in response to a request from Playskool to develop a blade that would not splinter at the bottom of a cut
- On very thin material reverse teeth may splinter top of cut

### **Two-Way Cutting Blades**

- Designed to cut on both the upstroke and the downstroke
- Advantage is a smooth, splinter-free cut in a variety of materials

- Acrylic plastics
- Softwoods
- Disadvantages:
  - Slower cutting
  - Tendency to lift material
  - Leaves “fuzz” on top and bottom

### **Spiral Blades**

- Simply regular tooth blades that have been twisted
- Designed to cut in all directions
- Cuts considerably slower, leaves rougher surface and comparatively large kerf
- Hard to follow a line – tends to follow grain
- Useful when work-piece is too large to rotate on saw

### **Thickwood Blades**

- Comes in one size without an assigned No. – wider than a No. 12
- Limited in radius cuts
- Designed for soft and hardwoods up to 2”
- Very smooth cutting surface
- Do not come with reverse teeth

## **Blade Speed and Feed Rate**

### **Machine Speeds**

- Machine speed not as important as feed rate
- For almost all wood-sawing, the highest machine speed is best
- Slower speeds are important when cutting unusually hard wood, metals and plastics
- Slower speeds are normally best for controlled sawing of thin wood, veneers, soft metals, bone, ivory, rubber and laminated plastics
- General “rules of thumb”:
  - Higher machine speeds for simple profiles in hardwoods, softwoods, hardboard, plywood and paper products over   ” thick – this covers about 95% of general cutting jobs of most woodworkers
  - Medium machine speeds for cutting 1/16” to   ” thick softwoods, for cutting puzzles, and for some inlay work
  - Slower machine speeds for marquetry work, thicker plastics and jewelry making

### **Feed Rate**

- Often, if slower machine speeds are recommended, you can get by with a slower feed rate
- As a general rule, a slower feed rate will result in a smoother finish

- The old saying “haste makes waste” is usually true when it comes to fine scroll saw work
- Remember to relax and let the blade do the cutting – if you push the blade sideways it will cause deflection and the cut will not be square
- The most common tendency of beginners is to push sideways when straying from a line

## Techniques

### Inside Cuts

- Use a drill press to bore the holes for inside cuts – little bits break very easily
- This is where you use your small drill chuck
- The smaller the bit, the faster the drill speed
- Cut the smallest pieces first

### On-the-Spot Turns/Cornering

- On-the-spot turns and nonstop cornering are skills that require practice
- An on-the-spot turn is the ability to spin the work piece on a very small radius (half the size of the blade’s width)
- The cleanest corners are made with narrower blades
- The work piece needs to be turned as quickly as possible
  - It is easy to forget to firmly hold down the work piece when turning quickly
  - It may be a good idea to use the saw’s hold down when learning to quickly spin a work piece

### Bevel Cuts

- This is where a table that tilts both ways comes into play
- If you tilt the table just a few degrees and cut a circle, you will find that the circle will not pass through the hole
- If you tilt the table the other direction and cut a circle, the reverse will be true
- This little trick opens up a whole new world of giving dimension to your projects.

### Compound Sawing

- “Caution: Compound Sawing is addictive” *Diana Thompsom* (author of “*Compound Scroll Saw Creations*”, Fox Chapel Publishing Co., Inc., 2002
- Compound sawing is simply making two cuts on the same work piece to achieve a three-dimensional figure
- The pattern consists of two sides, the front and profile views
- After cutting one profile, the work piece is taped, glued, or clamped together for the second cut

### Inlaying

- Inlaying is the process of inserting contrasting material into a surface, usually for the purpose of visual decoration
- In scroll sawing, there are two primary techniques
- Vertically stack-cutting
  - Stack-cut two or more pieces of contrasting wood

- Use as fine a blade as possible with perfectly square blade
- Hard to avoid visible, glue-filled kerf line
- **Bevel-sawing**
  - Requires a good quality scroll saw capable of making true, unwavering cuts in heavy stock
  - May yield considerable waste

### Stack Cutting

- You will find that it is just as easy to cut a stack of four \_” pieces of wood as it is to cut one or two – so why not do 4?
- Table must be perfectly square to blade or pieces will not match
- Each layer must be flat and tight to the next layer – space between layers can cause tearout
- A hot melt glue gun works nicely to stick pieces together for stack cutting
- You can also fasten pieces with nails, staples and double-sided tape

## Tips

### Patterns

- **Sources**
  - SJFWA provides a variety of jigsaw puzzle patterns
  - A multitude of pattern books available
  - The Internet
- There are several methods for transferring patterns to a work piece
- The fastest, most accurate, and easiest way to apply a pattern to the surface of wood is to temporarily bond a photocopy to the work piece using spray adhesive
  - Remove all dust particles from surface
  - Apply a thin, uniform coat of adhesive only to back of pattern
  - Spray adhesive should specifically indicate it is for “repositionable bonds” such as DURO All-Purpose Spray Adhesive

### Use Packaging Tape to Eliminate Burning

- Inexpensive clear or colored packaging tape, applied over the line of cut can virtually eliminate burning on difficult to cut woods (it somehow cools the cutting action)
- You can place the tape directly on the wood and place the pattern over the tape – this allows you to use a more aggressive bond on the pattern – or you can place tape over the pattern

### Safety

- Wear your safety glasses
- You may want to consider hearing protection
- Use a foot controlled on/off switch to keep both hands on the work piece
- Get a nice comfortable stool to sit on
- Try to devise some sort of a dust collection system so you do not inhale the fine dust particles created from scroll saw cuts

- **Very fine dust is created by the scroll saw and that little blower puts it right in the air.**

## **Scroll Saw Related Web Sites**

[www.scrollsawer.com](http://www.scrollsawer.com)

[www.mikesworkshop.com](http://www.mikesworkshop.com)

[www.advancedscrollsawpatterns.com](http://www.advancedscrollsawpatterns.com)

[www.unclejohns.com](http://www.unclejohns.com)

[www.wooders.com](http://www.wooders.com)

[www.scrollerltd.com](http://www.scrollerltd.com)

[www.woodworkersbookclub.com](http://www.woodworkersbookclub.com)

## **SJFWA Member Contacts for Scroll Saw Information**

<b>Gene Asbil</b>	<b>431-1688</b>
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<b>Chris Grothe</b>	<b>276-1172</b>
<b>Roger McCoy</b>	<b>436-1688</b>
<b>Ray Schaad</b>	<b>435-6761</b>
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