

Byrnes Saw Operation Tips

The Model Machines or "Byrnes Saw" is the gold standard for model shipbuilders. Because I use this saw to produce all of my stripwood, I would like to pass on some of my thoughts on its operation.

All of their products are extremely well built allowing for both a high degree of accuracy and durability. I am still using the original table saw that I have used to produce over 500,000 strips. Routinely I receive comments from new customers, many of whom are long time modelers, who say that they have never received stripwood products that are so precisely milled. I credit my Byrnes saw for this success.

I hope that you find the information shown on the following pages helpful. It is based upon my personal experience and there are many ways to accomplish any given task, so there is no perfect right or wrong way. If you have any comments or suggestions, please drop me an e-mail at HobbyMill@cinci.rr.com

Setup

If you are new to table saw operation or even if you are a veteran, I always suggest picking up a basic table saw book from your local library. Many of the basic operational and safety tips that are applicable to a full size table saw are also applicable to a modeling saw.

Locate your saw on a very stable bench or table with ample clearance. My strips are all 24" long, so I need at least that much clearance in front and back of the saw. Ample space on each side or nearby for tools and wood supplies.

Task light overhead along with good lighting in your shop. If you cannot see your wood being milled, then you will not achieve the saw's potential for accuracy.

Apply wax to the table periodically. I have a spray designed for table saws, but car paste wax will do.

I change blades regularly throughout the day so I have the following next to my saw.

- **Small Phillips screwdriver for screws in zero clearance plate**
- **Zero clearance insert plates for different kerf blades**
- **Open end wrenches for the arbor nut and shaft end for changing blades**
- **Allen key used to tighten or loosen blade height adjustment**
- **Spare blades for different cutting operations**
- **Mitre gage for modelers - I'm mostly ripping strips, so I store this elsewhere**
- **Calipers**

Dust Control

- **I wear a good quality mask whenever I am in my shop**
- **There is a dust port on the saw and you can hook up your shop vac to it with an adapter**
- **My shop vac has a fine inner bag for drywall sanding and also a HEPA filter**
- **You can add an electrical outlet available from Sears that you plug both saw and shop vac into. The outlet allows you to control both your shop vac and the saw by using the switch on the saw.**
- **Of course you can also hook your saw to your central vac system**
- **It's the dust that you can't see that is the stuff that will hurt you.**

Noise Control

- **I wear both high quality ear plugs and muffs**
- **Used to run shop vac all of the time when running saw, not sure if the noise was good on my hearing. My shop air filtration unit is located just overhead of my saw.**

Saw Blade Selection

I realize that many people use the carbide blade that comes with the saw, but I use slitting blades almost exclusively. My reasons are 1) I did not find the carbide blade to be as accurate as slitting blades and I would need to redimension wood after milling with the carbide blade. 2) The kerf of the carbide blade is .055" vs. either .030" or .040" for the slitting blades. 3) Most importantly, blade selection is greatly dependent upon the thickness of the wood. The blade should always be in contact with the wood when cutting to avoid interrupted cuts, so the thinner the sheet to be cut, the finer pitched saw blade should be used.

The only time that I use the carbide blade is to slit some wide sheets down to 1" or 2" widths. Another application would be cutting stock that is thicker than 3/8". I use my full size tools for those cuts.



The picture above shows the slitting blades that I use. I use Thurston blades, which are the same brand offered on Jim's website, but most brands should work. Notice that I added the Thurston catalog number and their specification to the picture. Note the difference in the number of teeth.

As I mentioned above blade selection is dependent upon the thickness of stock to be milled. I will provide some guidelines on which blade that I use; however some species of wood tend to have chipout. If the lower edges of your cut have chips, then use the next finer pitch blade and that will eliminate the chipping. Another factor to consider is blade deflection. If the blade is too thin, it will tend to deflect as you are cutting which results in strips that are inconsistent in width.

For sheet stock above 3/16" or 4.5mm: Use the I-293 .040 kerf blade. Actually you can use this blade on thinner stock but it has a thicker kerf (more waste) and a few less teeth than the I-292 blade (chipout sooner with thinner stock)

For stock between 3/32" (3mm) - 3/16" (4.5mm): Use I-292 .030 kerf blade. If there is chipout around 3/32", go to the #99 blade

For stock between 3/64" (1mm) - 3/32" (3mm): Use #99 170T blade. Main change in blade is the finer pitch

For stock thinner than 3/64" (1mm): Use #100 224T blade.

I also have the 4" diameter version of the .040 kerf blade as I-293 above and sometimes use it for thick cuts, but mainly I just use the I-293. The 4" version is supplied with the Byrnes tilting table accessory.

Ebony is very hard on blades, so I have a dedicated set of those blades just for ebony.

Blade Height: Set blade about 1/16" above top of material

Wood Orientation: In most cases if I am milling 1/16" x 1/8" strips, then I will mill them from 1/8" thick sheet stock. Some species such as holly tend to look better if they are milled from sheet stock that is the same as the thickness of the planks or in this case 1/16" sheets. The orientation of the grain of the stock that you are using impacts which orientation is best. I take this into consideration when I am milling sheet stock for customers if I know that they will be ripped into planks.

Cleaning Blades: I use Awesome Cleaner which is a water based cleaner available from the Dollar Store. It is also used as a pretreatment for laundry. Any tar or resin on a blade will cause burning. Just place the blades in a plastic dish, spray with Awesome, and scrub with a toothbrush.

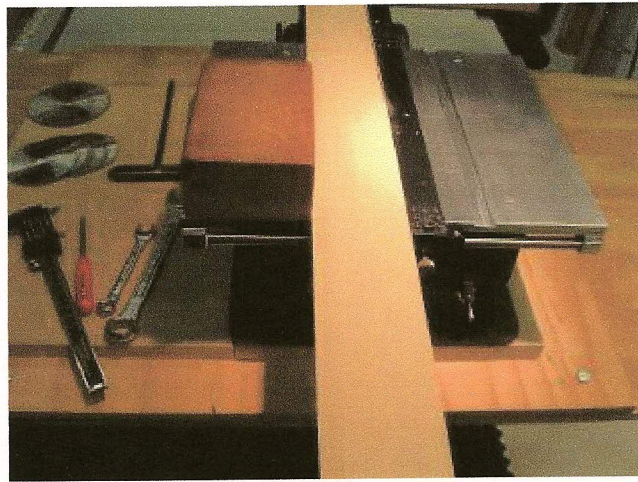
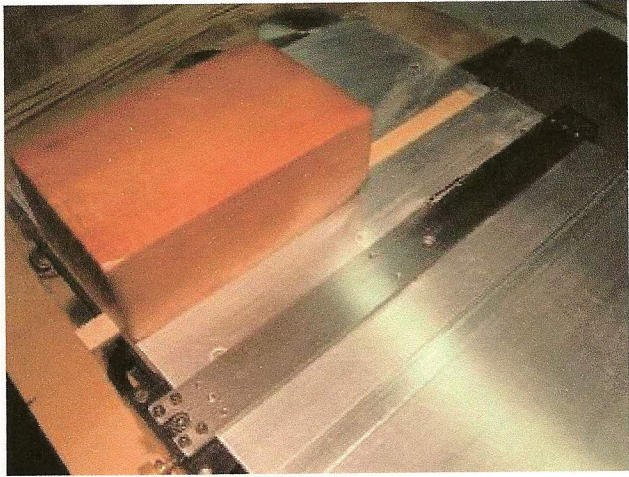
Ready to Mill

Back Taper: Use of slitting blades creates an issue because unlike the carbide blades where the cutting tips are larger than the body of the blade, the slitting blades have essentially an even thickness. The result is that wood will tend to rub against the back of the blade creating binding, burning, or kickback. At one time I had added a slitter to the saw with limited success and that idea was discarded. I am told that the fence does have .008" back taper built into it, but I have found that for many cutting operations using the slitting blades this simply is not enough. My solutions are as follows:

- Use sheet stock that has straight edges, straight grain, and with a minimum of internal stress. I do run my billets through a jointer before band sawing and this has improved quality.
- Increase back taper of the fence by .005" To do this use your calipers to set the distance +.005" over the width of the stock that you wish to mill, slide the fence over to just touching the end of the calipers and lock in front and back portions of the fence. Using your calipers, unlock the front of the fence and move it back towards the blade .005", which is back to your desired width, and then lock the front. Sometimes with thick stock, ebony, and wide planks the back taper may need to be increased up to .010".

Finger Boards: Early on I had built my own fingerboards, both top and side, but they were soon discarded. The top fingerboard was attached to the extended fence and it was more successful. I found that by removing the extended fence I could better see when the sheet stock wandered away from the fence and hence a better quality strip. The side fingerboard has the issue that it needs to be incremented after each cut. As a temporary solution I came up with a block of wood to serve as the side fingerboard. 5 years later I am still using that original block of wood. Here is a picture below. You can click on any of these pictures to enlarge.

Note with this setup once the fence is set there is no need to move it thus providing consistent strips in a minimal amount of time. I can mill just a few strips or 100's without moving the fence or saw settings.



Block of wood is: 2" thick - Keeps my hand above the table and blade

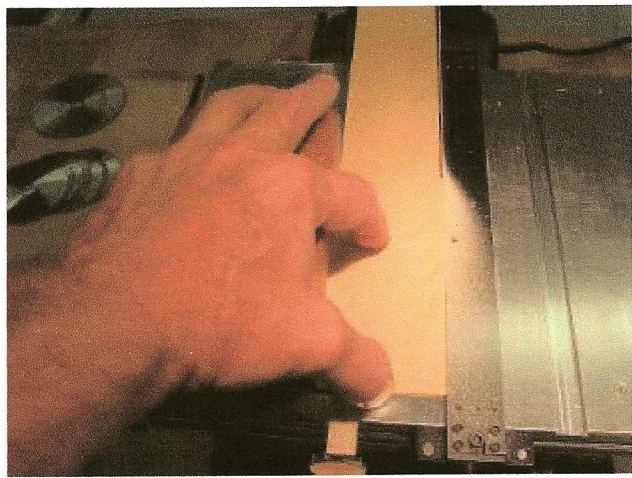
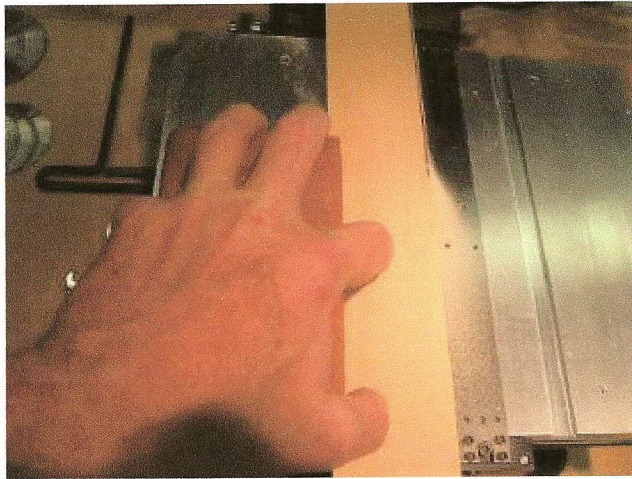
3" Wide - fits in palm, so adjust to whatever is comfortable

5" Long - Distance from front of table to just ahead of blade

Rounded on edges that fit into my hand. Keep square edges on side that contacts sheet

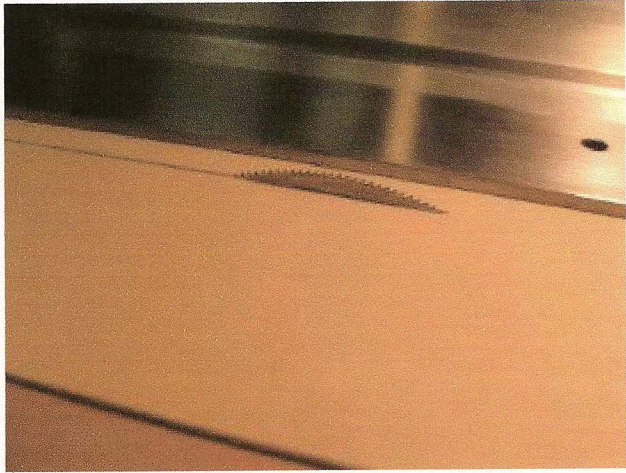
Some comments about block use:

- Can vary pressure as needed
- Keep it towards front of table and fence gives better results
- Hold with left hand, feed stock with right hand
- At end of cut, use left thumb to push back end of sheet or use push stick.
- Mill a strip off left side of sheet to square the edge and to keep block from riding up and onto sheet, especially thin sheets.
- Note wood insert in miter gage groove - keeps block steady when edge of sheet is over groove



Initially I just had my fingers up on the block. Over time I've found the above hand position is more comfortable for me. I do not recommend this nor accept any liability for doing it this way, but that is what I do. Small finger is on outside of block and using it in combination with my palm is how I apply a little pressure. The above boxwood sheet is 1/8" thick and I am milling 1/32" x 1/8" strips.





The above strips were milled for a customer order. As I am milling every 25 strips and if I switch to a new piece of sheet stock, I always mic them at each end and a couple spots in between. In the above picture the strips varied by .0005" over their length and were consistent from strip to strip. Most times the variance will be +/- .0015.

Misc. Notes:

- **After milling first strip or two, I will adjust front of fence as necessary for desired width.**
- **Some sheets where the grain moves a little, you will see that each strip is progressively wider or narrower from one end to the other...just flip the sheet end over end and that will fix it.**
- **Sometimes cutting the other side of the sheet yields better pieces...flip over.**
- **First cut I check for chipping on underside edge and change blades if necessary.**
- **Cut my strips a few thousandths oversize to allow for final finishing.**
- **Try to maintain constant feed rate of the sheet. Stopping will burn most times.**

Note in above right picture which is a 1/32" thick sheet of holly, how fine the teeth are as compared to the thickness of the sheet. By changing to the #100 blade with 224T the proportions of the blade teeth relative to the thickness of the sheet stock has been maintained. Also the teeth while cutting are always in contact with the stock and thus giving a nice smooth uniform plank. That also means no chatter. Fence is 1/8" high.