Making a Celtic Knot Pen

Ed Blysard

This is picture heavy, because a picture is really worth a thousand words...

You will be seeing the project as it progresses, no editing here, what is in the photo is what is being assembled.

I wanted to see if I could do a celtic knot in the gold and green of your sports teams colors...it is an attractive color combination, and I choose acrylic as the medium because I could get the colors close.

Using my "deli slicer" jig to cut a 5/64th thick insert strip from an gold acrylic blank.

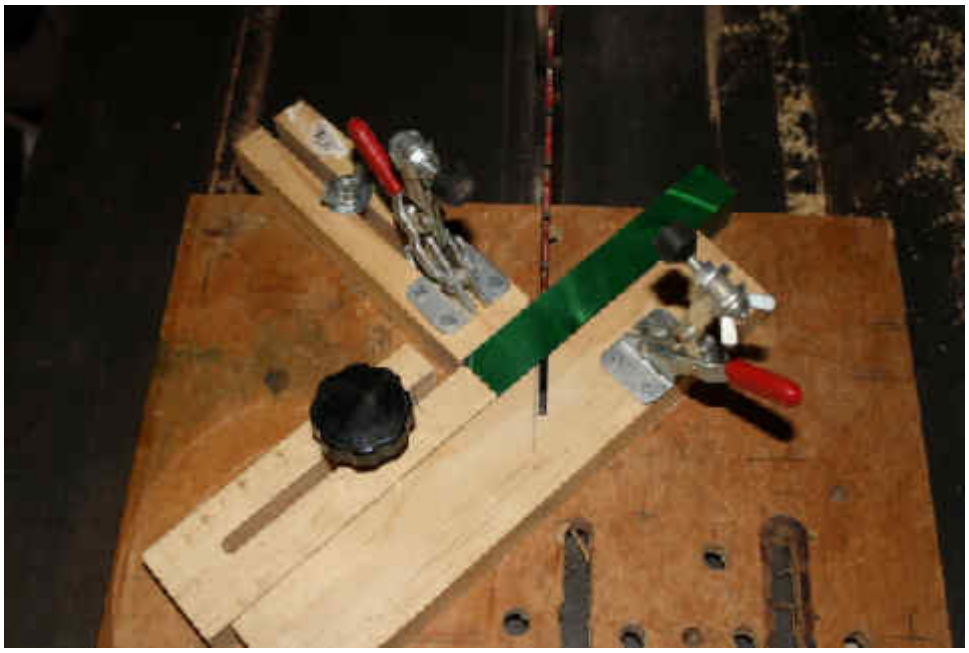
The black sheet stryene used to outline the insert...you will make a laminate sandwich with the strip and the sheet stryene.

Using medium CA and a laminate roller, glue the strips to a sheet of stryene.
I do 2 strips in case one fails or I like it enough to want to do another pen later.
I use the roller to insure the CA is spread evenly and it applies enough pressure to ensure a good, flat bond with no air bubbles.
Hit the strips with the CA accelerator, then using a hobby or Xacto knife, cut them out of the stryene.

Flip them over and glue them down again so you have a solid acrylic strip with black stryene on either side, repeat the accelerator and cut them out of the stryene, clean up the edges well and you end up with the finished laminate strip, or insert.

Using my handy "Celtic Knot" blank cutting jig, I cut a 45 degree through and through a blank.

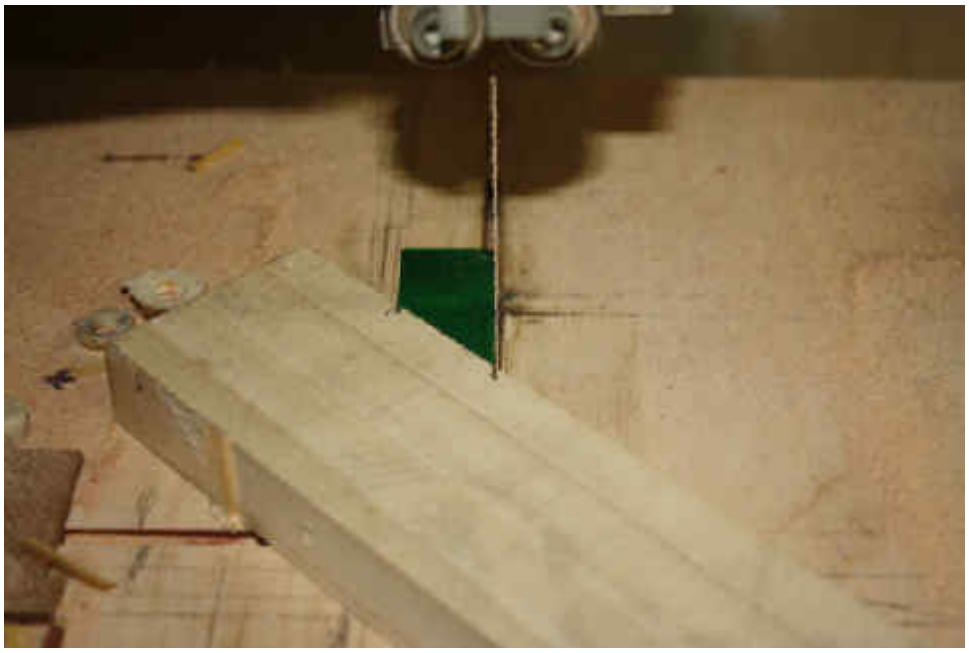
Once you have made the first cut, you can not move the end stop...every cut from here on out must be in the exact same place on the blank, just on different sides.



The kerf cut out...the laminate strip is the exact same thickness as the blade kerf, 3/32".

A 5/64ths gold acrylic strip plus two pieces of the black sheet stryene equal 3/32"..I am simply replacing the material removed by the saw blade with a insert of the exact same thickness...in this manner, the blank never changes length, so each subsequent cut will always start at the same point on the blank.

Using one of the ends of the blank to determine the length I want to cut the insert to...the sacrifical fence is at a 45 degree to the bandsaw blade.
You must make sure the blank and the inserts are the same height, (in this instance, they are both 3/4" square, so the strips I cut off earlier from the gold acrylic are the same height as the green blank body.)



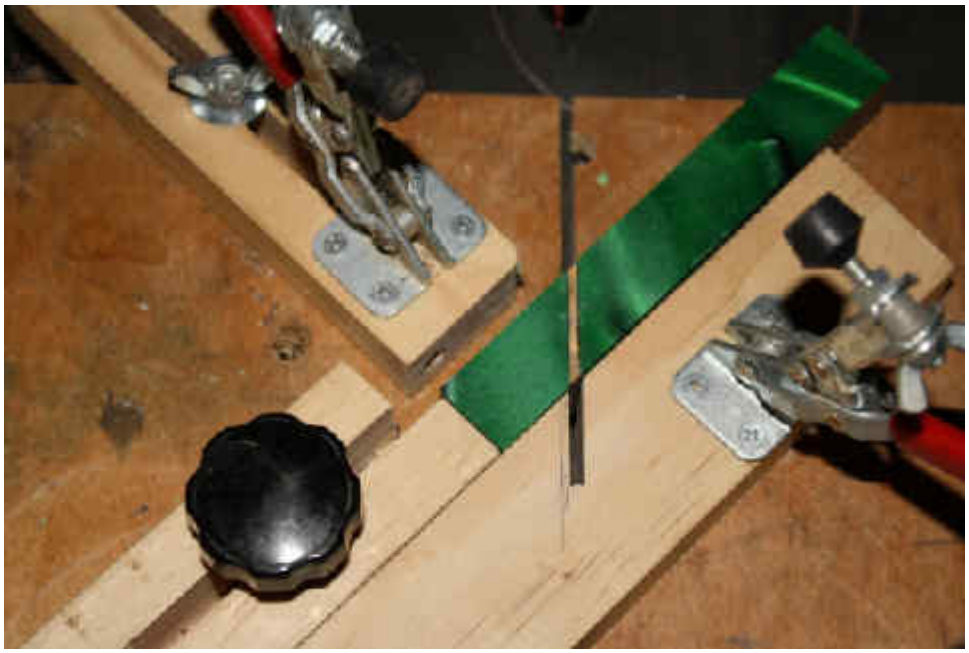
A laminate insert ready to be glued into the blank...I try to make the insert a tad shy of the blank so there is nothing to sand down after the glue up, but remember with each insert you glue in, you must clean the sides of the blank of any squeeze out, so it will fit in the cutting jig square and flat.
Precision and neatness count here...a few 1000ths of an inch off here will show up later when you turn the blank.
Most of you can see where this is headed.

My glue up jig...two pieces of 3/4" thick stock screwed together so they form a 90 degree back fence and platform...the waxed paper keeps the CA from gluing the blank to the jig..(CA doesn't stick to waxed paper)
The clamp holds one part of the blank in place so I can apply pressure on the other end.

The reason I make up the laminate insert sandwich is so you don't have to try and glue two thin strips of stryene and one strip of acrylic (or wood veneer and wood strip) in place all at once...this way you only have to deal with three pieces instead of five.

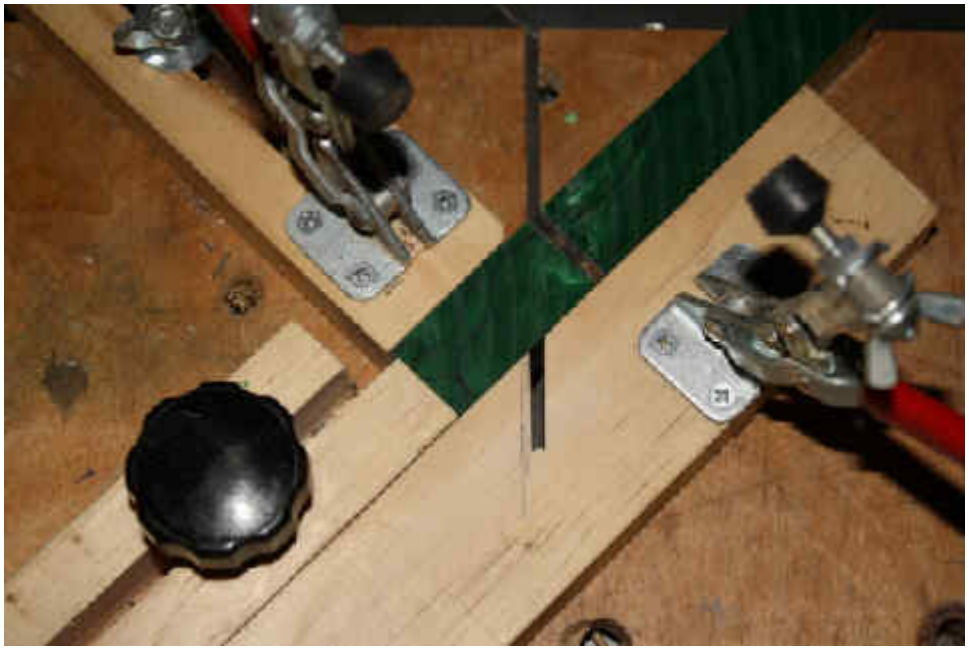
I use medium CA so I have 30 seconds of so to line it all up...the back fence gives me something to press against, and the clamp hold the other end in place so I have one hand free to apply the accelerator, plus it allows me to push against the short end of the blank also to get a good clean square joint.

This shows the blank after glue up and cleaning...it is in the same position as when I first cut it, simply to show the insert replacing the saw kerf.



You will flip the blank one turn to the left, or right as you prefer and make the second cut...this will make each of the finished knot loops or bands appears to overlap the next one.

The blank flipped over to the next side...note the saw blade is going to start cutting in the exact same place on the blank as it did on the first cut, only on the next side over.

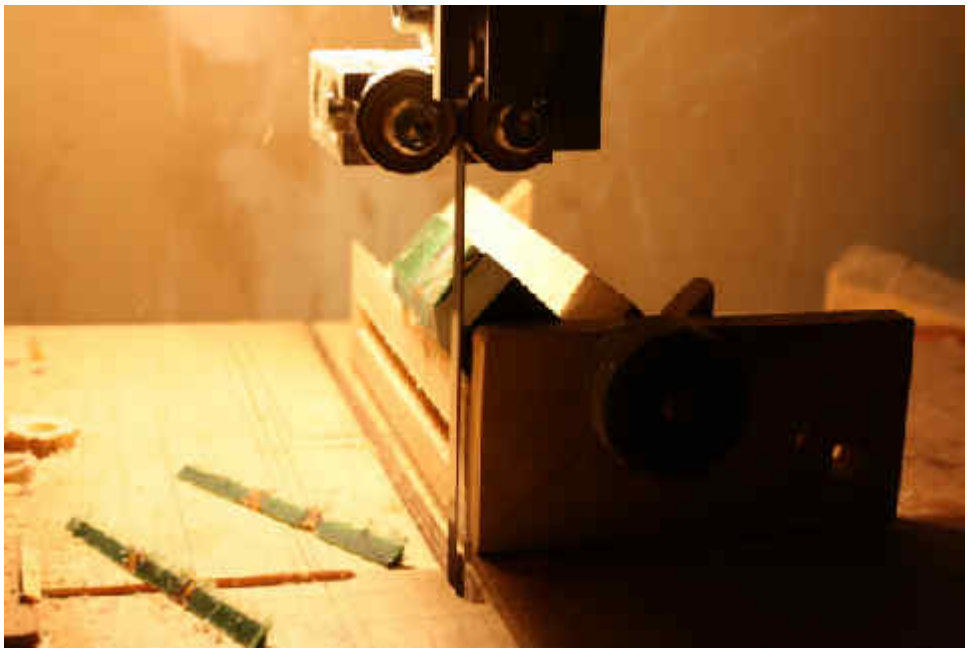


A shot of the end of the blank after the second cut...you can see the insert on a 45 degree...you will simply repeat the above cut and glue steps 3 more times.

After the second insert is glued in place...you can begin to see the "knot" forming up...each "band" or cut is nothing more than a 45 degree through and through in the same place, just on the next side of the blank.
You can use a 60 degree, or pretty much any degree cut you choose, as long as all the cuts are the same degree.
A steeper cut makes the knot a little more elongated or oval..I like the 45 degree because the knots turn out almost round.

The blank after all four cuts and inserts glued in....I know, when you first look at it, you think you have nevr made anythig so ugly before in your life but....

After knocking the corners off, you can mount it up and begin to turn it round...once you start that, you will see the knot begin to take shape.



Now, you can stop here and cut the blank to your choosen length, then drill the tube hole on a drill press, or like myself, you can round it over and drill on the lathe...I prefer the latter because it is always dead center and has zero blow out.

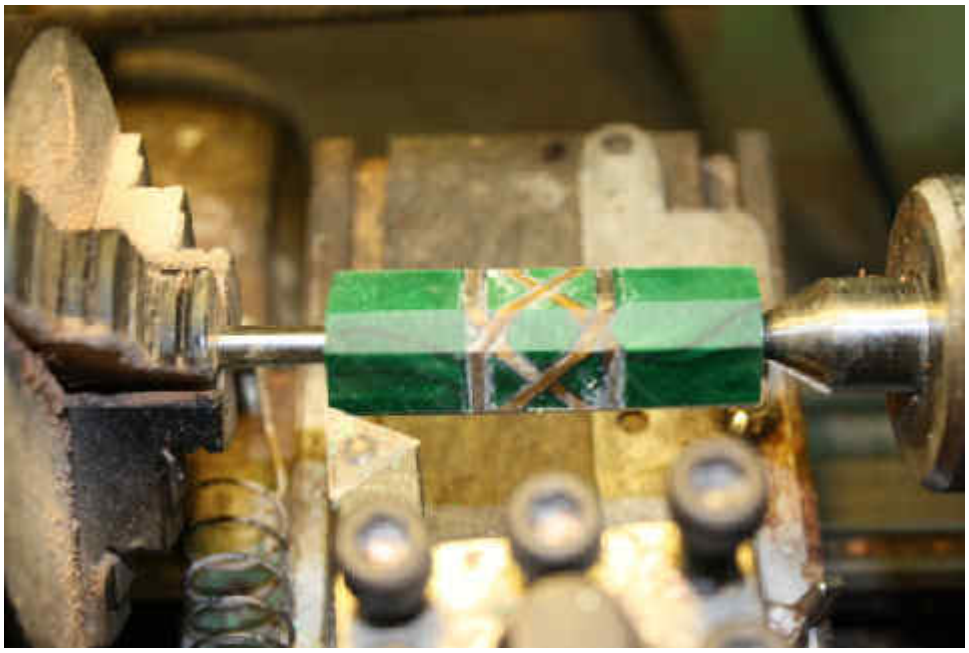
Word of warning...Do not try and drill a large bore hole through this blank, or any acrylic blank in one pass.

With the glue up and the fact that even the top notch drill bits can not eject the shaving fast enough, you will create a lot of heat trying to drill a large bore hole in one pass....instead, drill a 7mm pilot hole through and through, follow that with a 8 or 9mm, then a 10mm and finaly the 27/64th.

Depending on what pen kit you are using, you of course simply step drill up to the size of the final tube drill size...in this instance I am making a Serria, so 27/64 is the final size.

Trying to drill large bore holes in acrylic in **one shot doesn't w**ork...the shavings jam the ejector slots on the bit, create heat, and melt the inside of the blank, even with the addition of water as a coolant it still wobbles out the tube bore some, and with a glue up like this, the big bit **will catch or snag** the laminate and bust the glue joint...trust me on this, after several hundred glues up I have figured this out the hard way.

Simply step drill from the smallest drill you feel comfortable with up to your final size.
Once you have drilled the pilot hole, you are not really drilling the blank, but you are **reaming** the hole out to a bigger size...the shavings are small enough to not jam or pack the ejector slots in the bit, and you get a lot less blow out at the end of the blank.



The end results.

Some Notes

I use a Freud 80 tooth negative rake plywood blade with a light tooth off set...it is old, very old.
Designed to cut thin plywood venners for cabinet work with miminal tear.
They make a really nice melamine or veneer blade, runs about $84.00 American, about the same rake a set.

It was suggested that this become a tutorial...as I have absolutly no idea how to do that...PDF, PDR, PDQ whatever you call that stuff, any one who wants to give it a go has my good graces to try...you can note in the tutorial that it is quite OK with me to copy, modify and use the jigs, thats what this forum is all about.

I can rip the original pen blank stock to 3/4" square, and I rip the insert material at the same time.
Then both the insert and the blank match up no matter what.

If I did the partial cut, each insert would have to be shorter or less in length and each one would have to be cut one at a time as I go.
Plus the glue up is easier...with a partial cut you have to apply a lot of glue inside the cut to make sure you have a gool bond and fill.

With the through cut, you can coat each side evenly and get less squeeze out, which means less clean up.
And I am lazy, its just easier, for me, to do it this way.

The Finished Pen