

N-Loop Celtic Knot

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As Wood Turns

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Who Am I?

- First turning as a newly married graduate student needing furniture.
- Found a duplicating lathe in the BYU hobby shop.
- Turned spindles for sofa, love seat, chair, end tables, dining table.
- Duplicating lathe left very rough surface – required lots of 60 & 80 grit sandpaper.
- Purchased first lathe a year later in Peabody, Massachusetts.
 - Used
 - Thrust bearing shot.
 - No chuck.

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Who Am I?

- Weekly video published on www.AsWoodTurns.com
- Host Christmas Ornament Challenge for over 12 years.
 - Next challenge coming up November 2023

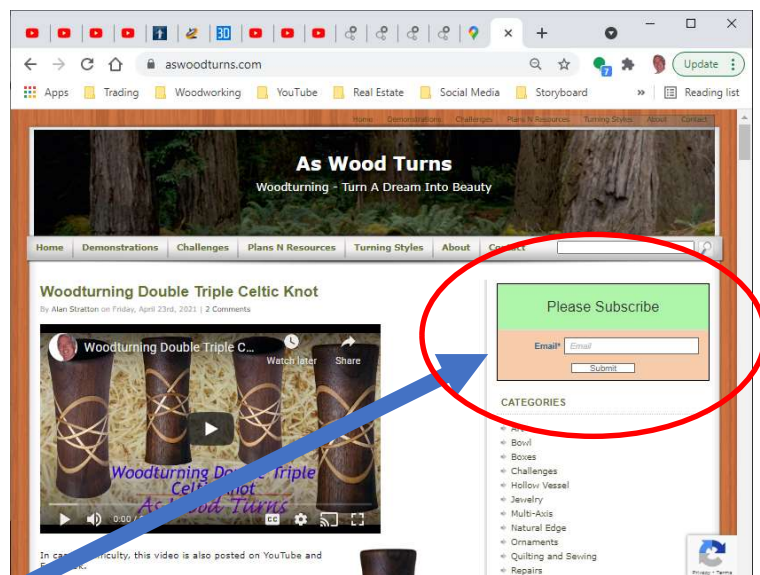
Prizes
For
Everyone

Please join with us for the
Christmas Ornament Challenge
November 2023.

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Please subscribe on www.AsWoodTurns.com

- Notification of new video
- Special Challenges
- ...



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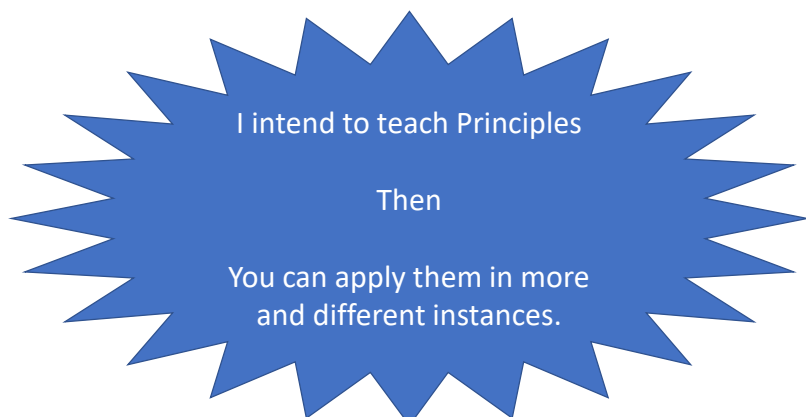
Traditional Celtic Knots

- 4 loops on square stock (2 pair)
- Why?
- Square stock is:
 - Easily milled square and 90 degrees
 - Easily aligned to flat
 - Wood Removal & Replacement ??

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Celtic Knots Requirements

1. Accurate repeatable cutting
2. Stock removal = Stock replacement
3. Stock alignment
 1. Angle (Indexing)
 2. Distance (Offset)



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Why Not 3 Loops?

1. Accurate repeatable cutting
2. Stock removal = Stock replacement
3. Stock alignment

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Why Not 5 Loops?

1. Accurate repeatable cutting
2. Stock removal = Stock replacement
3. Stock alignment

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Why Not N Loops?

1. Accurate repeatable cutting
2. Stock removal = Stock replacement
3. Stock alignment

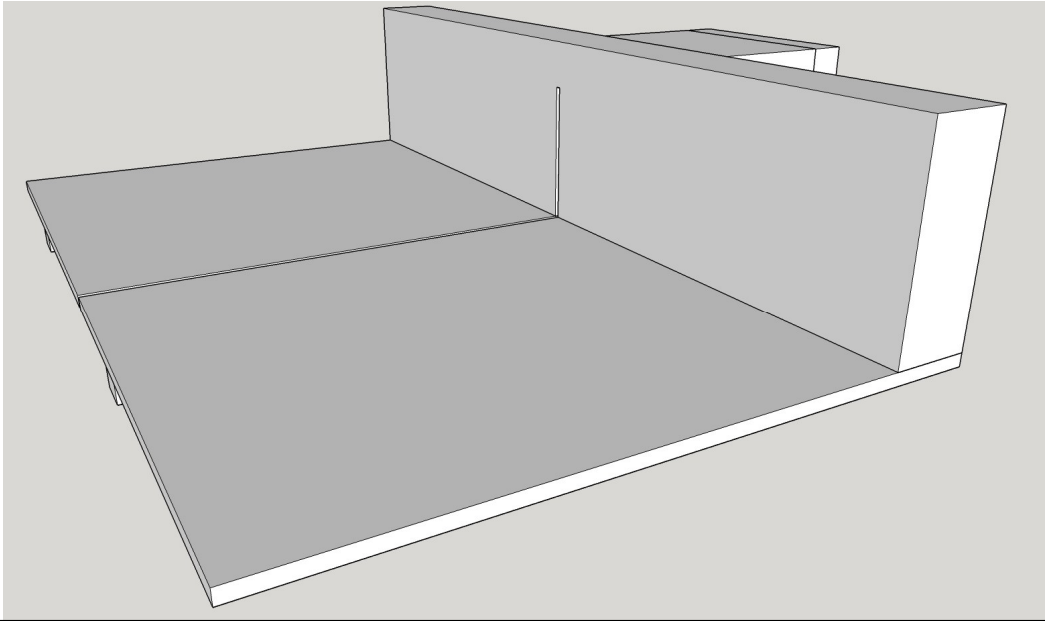
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Celtic Knot Process – Table Saw

- Table Saw
 - Therefore: limited to capacity of saw.
 - But: Very conducive to jigs and fixtures.
- Sliding Table
 - Keep it “Thin” to not take away saw capacity
- Easy Template

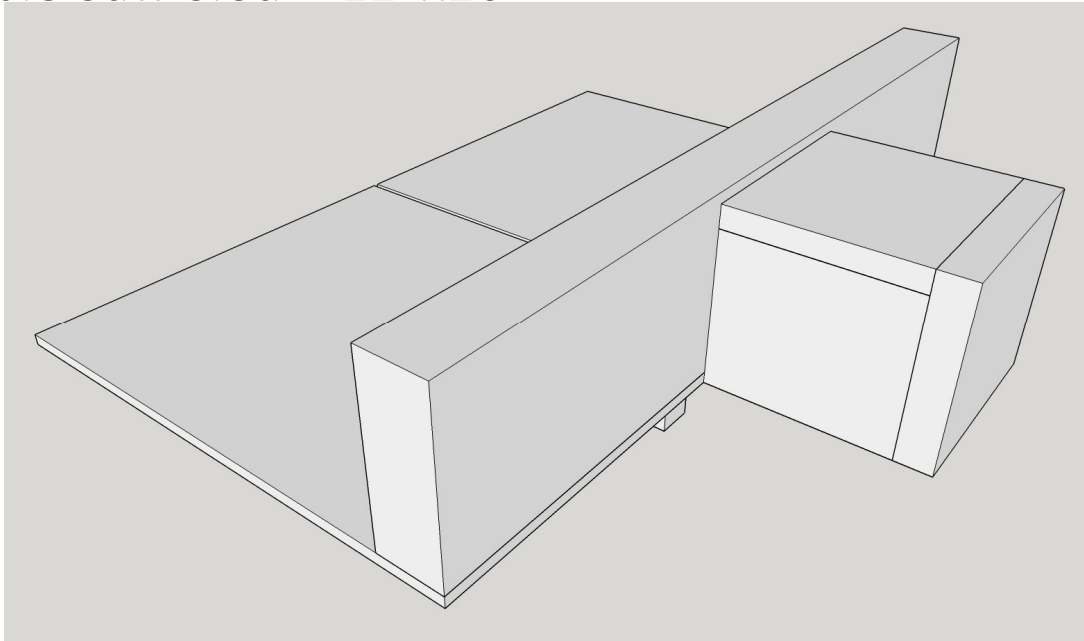
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Table Saw Sled – 12"x20"

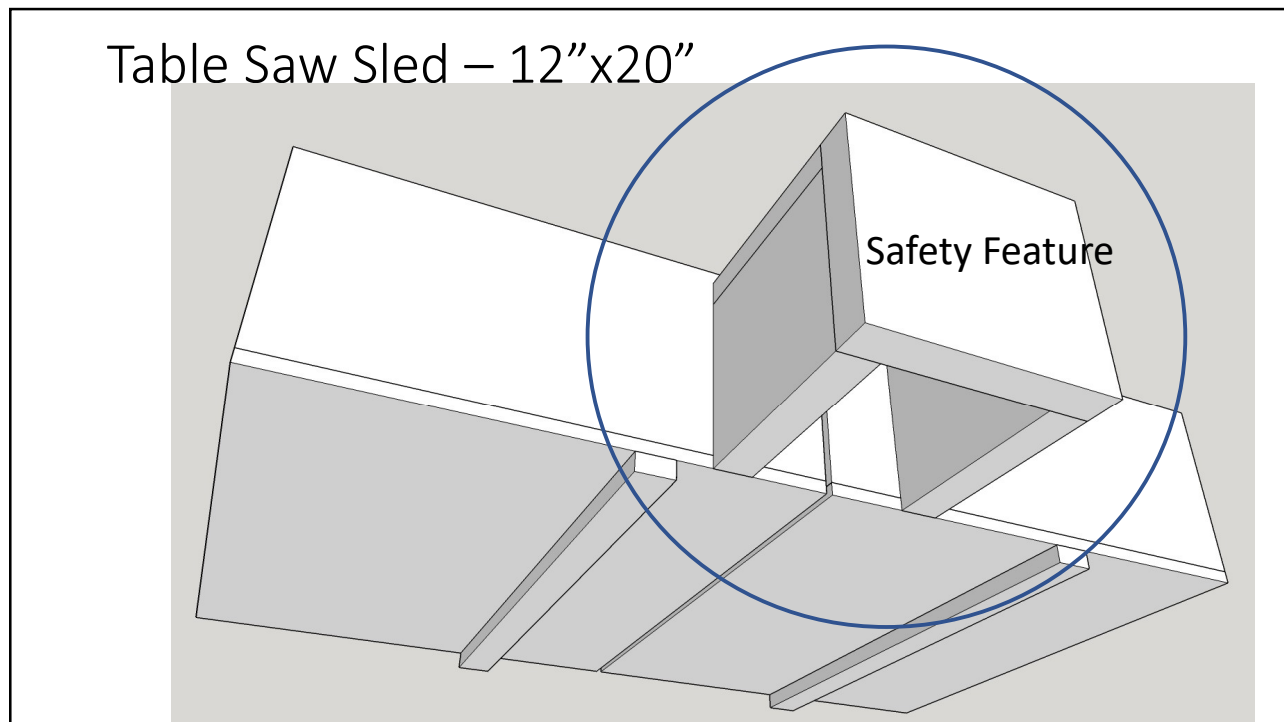


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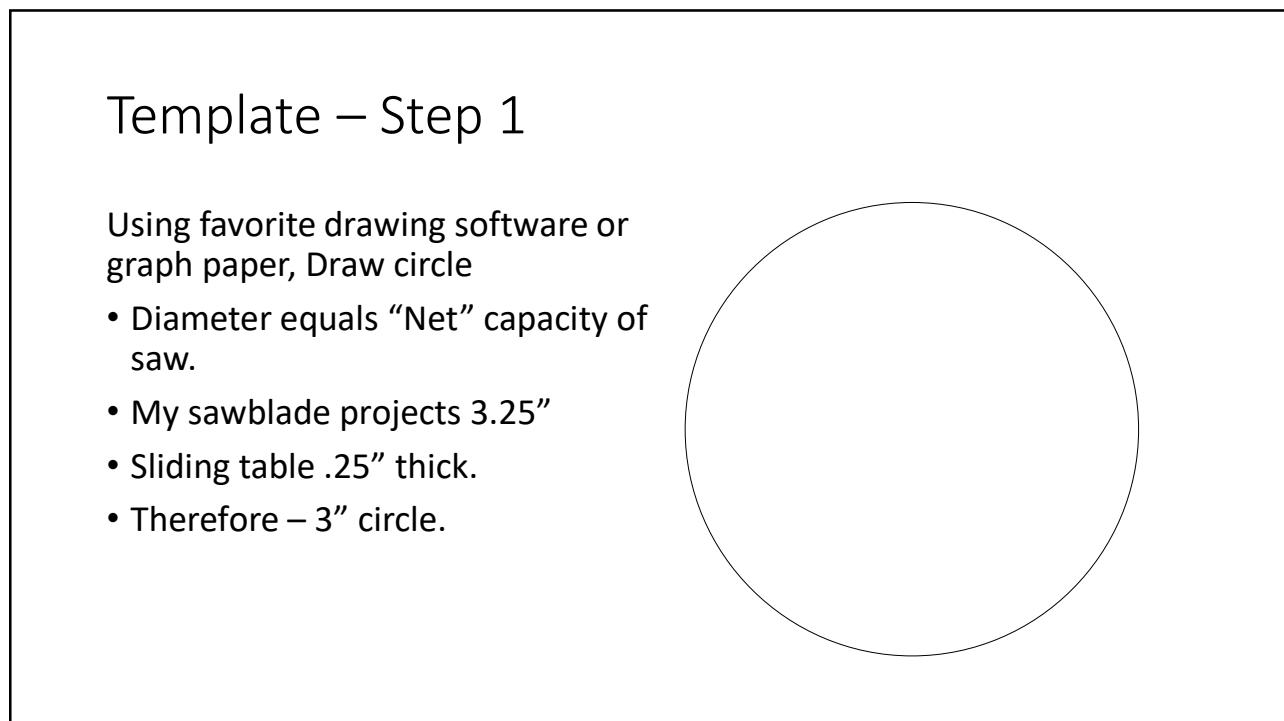
Table Saw Sled – 12"x20"



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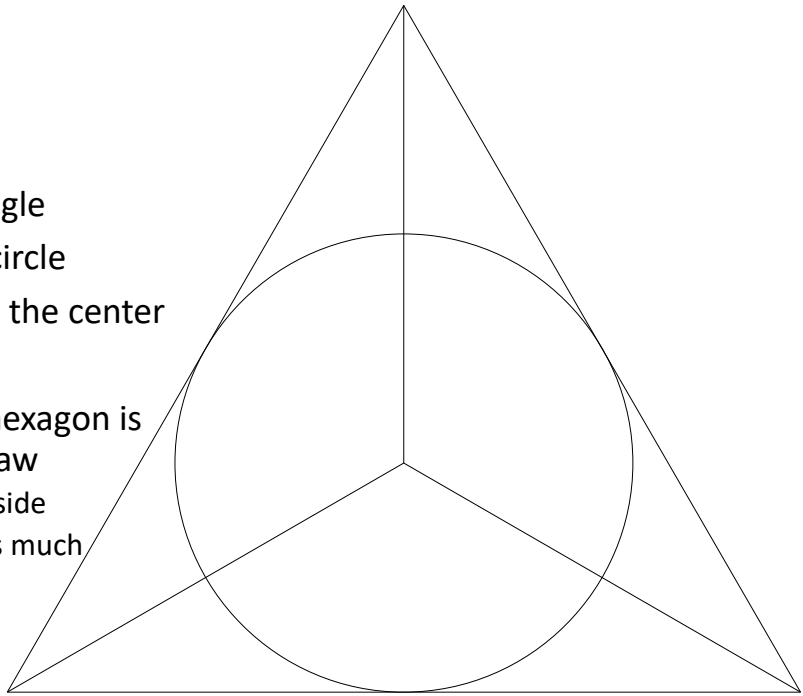
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3 Loop

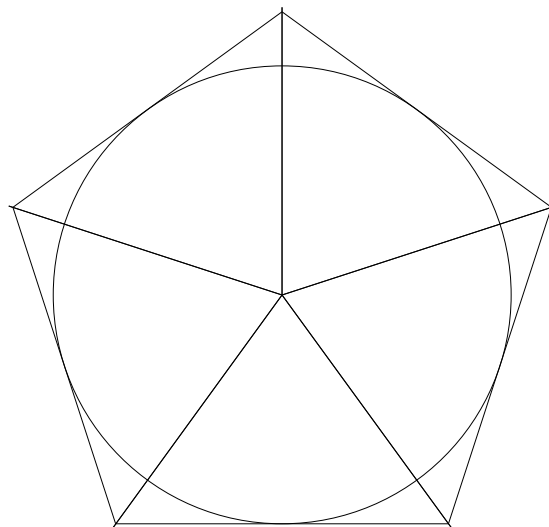
- Draw equilateral triangle
- Each side tangent to circle
- Do not forget to mark the center
- However, I believe a hexagon is easier to use on the saw
 - Skipping every other side
 - Legs do not project as much



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5 Loop

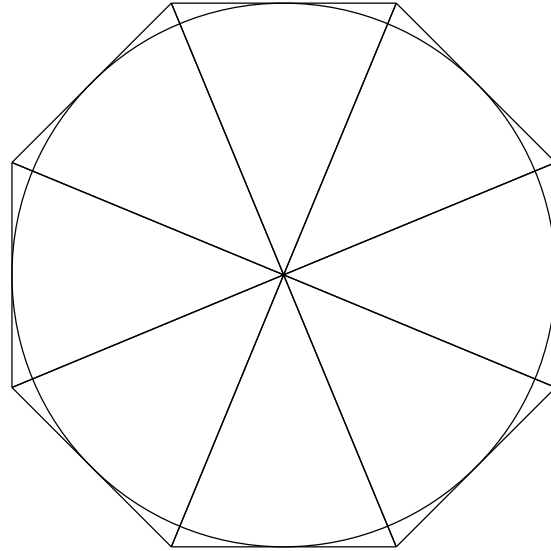
- Draw pentagon
- Each side tangent to circle
- Do not forget to mark the center



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N Loop

- You get the picture



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Variations

- # of Loops
- Skipping Loops
- Varying Angle
- Varying Distance from End
- Doubling Down

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Applications

- Handles
 - Kitchen Implements
 - Tools
- Goblets
- Vases
- Boxes
- Spindles
- Pens
- Art
- Your Imagination...

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Final Consideration

- Wood Selection
 - Similar density will improve surface
 - Contrast
 - If possible, similar response to humidity
- Glue
 - Epoxy with sufficient pot life – 20-30 minute
 - Gap filling
 - Do **not** use regular wood glue
 - Could prematurely bind
 - No gap filling properties

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Celtic Knot Process

- 1) Prepare template
- 2) Rough turn stock
- 3) Prepare wood to insert
- 4) Prepare template & Fasten to stock
 - a. Screw to center
 - b. Anchor with Hot Melt Glue (please do not allow to rotate)
- 5) Prepare Sled
 - a. Fasten scrap to position stock (hot melt glue works GREAT!
 - b. Do NOT change or adjust until project is complete.
- 6) Add temporary scrap to top of stock. (long side of cylinder that is opposite the saw blade for 1st cut)
 - a. Maximizes potential diameter without the cut separating the stock
 - b. Maintains alignment
- 7) Saw slot
- 8) Glue insert wood
- 9) Remove temporary support strips and trim insert
- 10) Repeat #6 - #9 for each insert
- 11) Finish turning project.

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Let's Do It!

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Why Not N Loops on Band Saw?

1. Accurate repeatable cutting
2. Stock removal = Stock replacement
3. Stock alignment

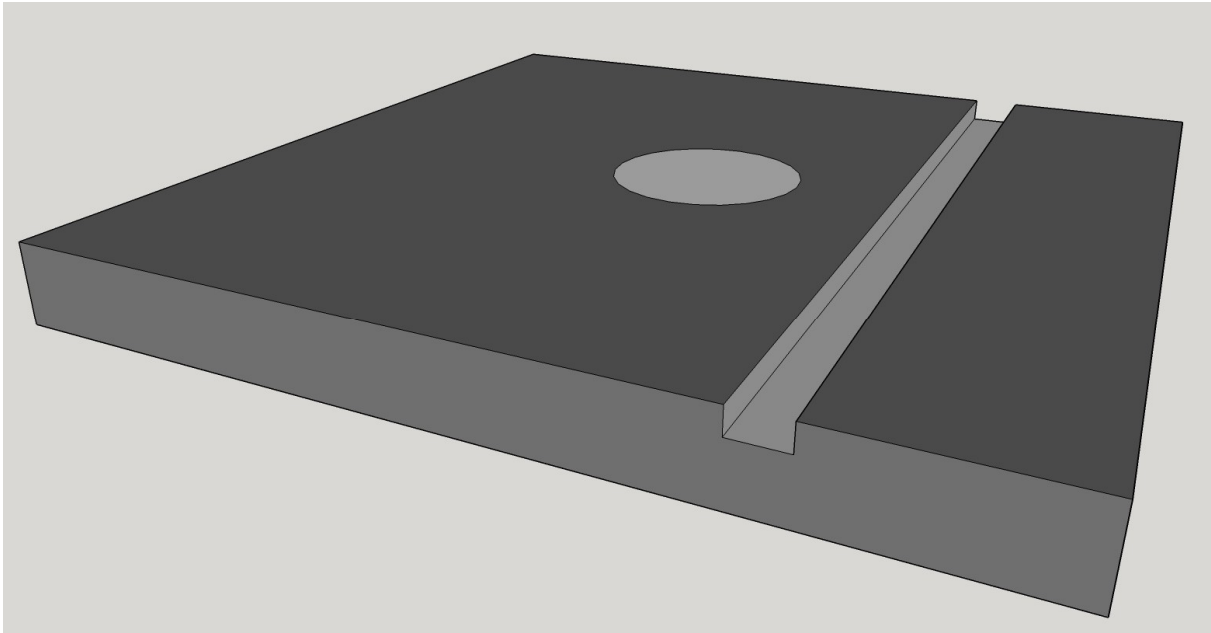
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Celtic Knot Process – Band Saw

- Band Saw
 - Still: limited to capacity of saw. (Mine is 10")
 - Also: conducive to jigs and fixtures.
- Sliding Table
- Stock Holder
- Modify Template Approach

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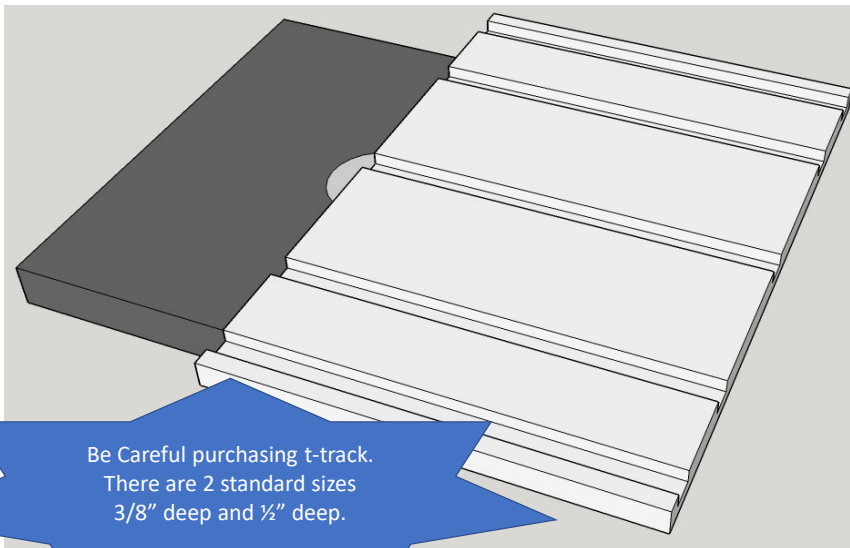
Band Saw – Table Surface



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Band Saw – Sliding Table

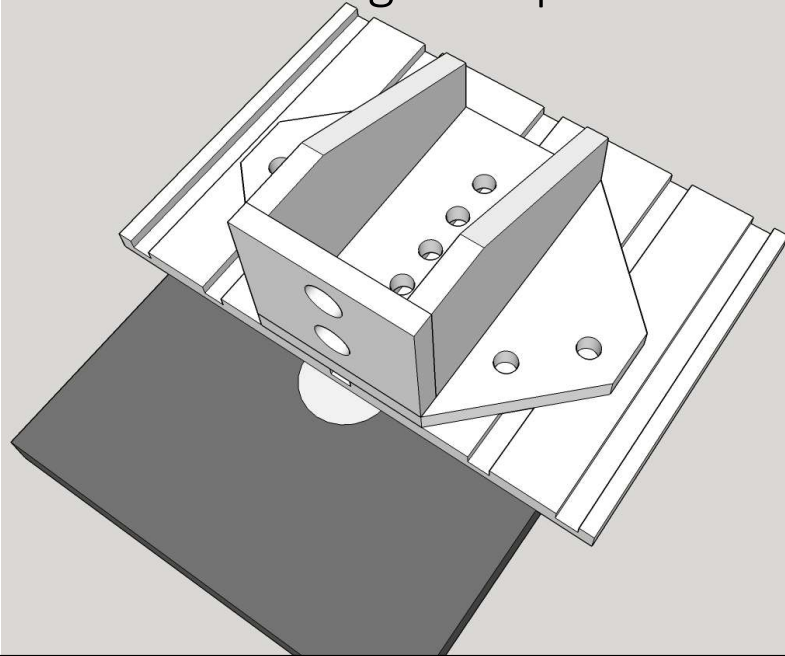
Bottom guide to ride miter slot
 Top slots for T-Track 3/8" deep for 1/4" Hex Bolts
 Or 5/16" T-Bolts



Be Careful purchasing t-track.
 There are 2 standard sizes
 3/8" deep and 1/2" deep.

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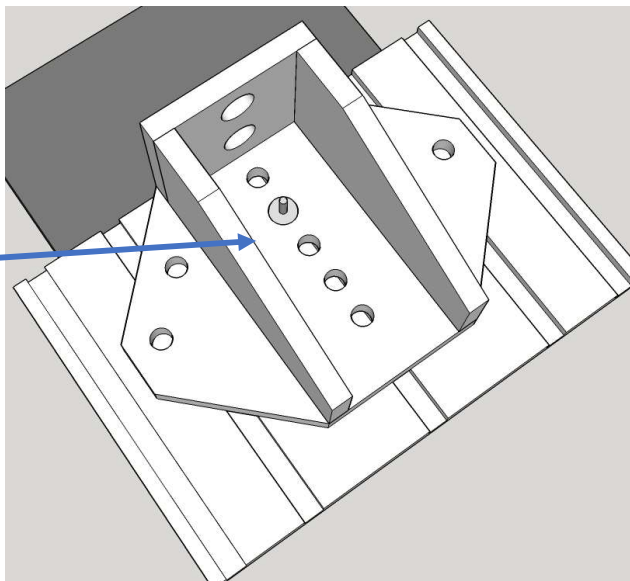
Band Saw – Pivoting Workpiece Holder



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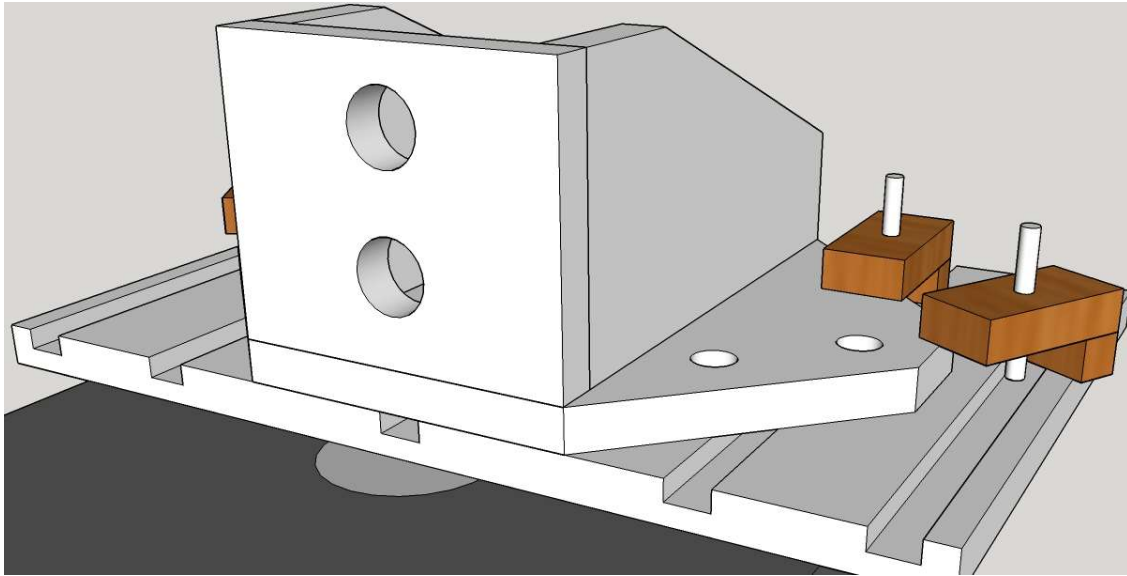
Band Saw – Pivot

My pivot:
 $\frac{1}{4}$ " Hex bolt
 $\frac{3}{4}$ " Steel standoff
 $\frac{1}{4}$ " ID; $\frac{1}{2}$ " OD
 $\frac{3}{4}$ " Steel standoff
 $\frac{1}{2}$ " ID; $\frac{3}{4}$ " OD
 Knob



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Band Saw – Hold Downs



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Etsy: <https://www.etsy.com/shop/AsWoodTurnsTools>

Band Saw - Securing Stock

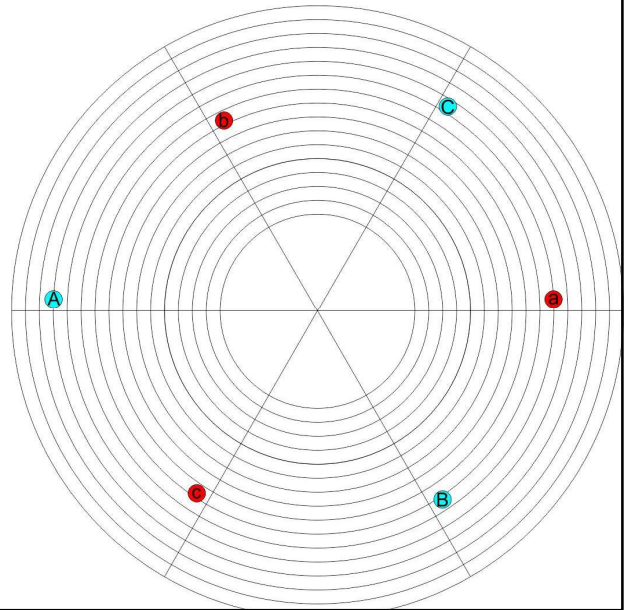
- Keep project in chuck or on faceplate
- Secure the chuck
- Safety
- Repeat cuts



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Band Saw - Templates

- Bigger
- Rays marking loops
- Mark opposite ray.
- Transfer to face of project stock
- If segmented, consider the joints
- If solid, indexing or template.



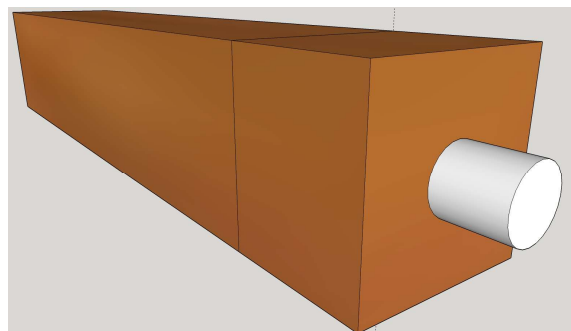
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Band Saw – Sawing Process

Indexing

Scrap wood with dowels

1. $\sim\frac{3}{4}$ " x $\sim\frac{3}{4}$ " x project depth + $\frac{3}{4}$ " –4 each.
2. Drill for $\sim\frac{1}{4}$ " dowel.
3. Wax dowel and hole.
4. Glue (hot melt) to project.
5. Insert dowel.



If you do not use these, chances are you will rotate the two pieces ever so slightly => Misaligned

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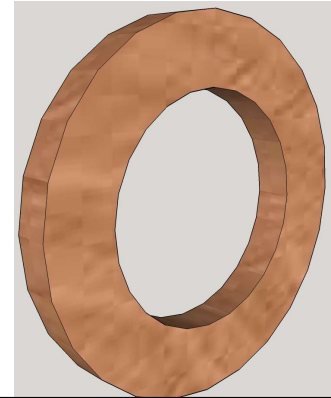
Band Saw – Spacer

1. Hole diameter equal to spindle diameter
2. Outer Diameter ~ 2" – Sufficient for chuck/faceplate to bottom on
3. Thickness equal to replacement wood minus allowance for saw kerfs

Purpose – to assure repeatable wood removal.

Either

- Measure gap & plane wood or
- Plane wood & make spacer.



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Band Saw – Setup

1. Alignment
 - a) Mark desired cut top & bottom at 180 degrees apart (as desired)
 1. Attach template, or
 2. Mark on project stock
 3. Segmented project have automatic markings but label them.
 - b) Position jig table and lock down – Do **NOT** release until all cuts complete.
 - a) Allow for spacer offset
 - b) Cut angle
2. Indexing
 - a) Ensure spacer is removed
 - b) Ensure horizontal alignment to first ray
 - c) Remove alignment dowels – Please do NOT accidentally cut them.
 - d) Saw outer cut – Be careful – Watch hand placement
 - e) Move spacer to between faceplate or chuck and jig.
 - f) Replace top cutoff and alignment dowels
 - g) Ensure horizontal alignment to target ray
 - h) Remove top portion and alignment dowels
 - i) Saw inner cut
3. Check size of replacement wood
4. Check for straight cut

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Band Saw – Glue Insert Wood

- Epoxy
 - With enough time for thorough mixing and extensive spreading
 - For me, 30 minute epoxy is comfortable.
 - Epoxy does well at gap filling
- Trim insert wood as necessary
- Keep alignment dowel with dowels ready
 - Consider waxing dowel to preclude accidental glue contact.
- Spread epoxy on all four surfaces
- Put together with alignment dowels
 - BTW the replacement wood is now oval
 - Avoid glue on dowels. If glued in, you will have to replace them.
- Allow time to harden

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Band Saw – Next Loop

1. Indexing
 - a) Ensure spacer is removed
 - b) Ensure horizontal alignment to correct ray
 - c) Remove alignment dowels with caps – Please do NOT accidentally cut them.
 - d) Saw outer cut – Be careful – Watch hand placement
 - e) Move spacer to between faceplate or chuck and jig.
 - f) Replace top cutoff and alignment dowels
 - g) Ensure horizontal alignment to target ray
 - h) Remove top portion and alignment dowels
 - i) Saw inner cut
2. Glue in replacement wood
3. Repeat until finished

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Band Saw – Finishing Up

- Complete shaping.
- Be aware now of weird grain alignment -> Turning is more difficult
 - Shear cutting with gouge
 - Coarse sanding with hard block
 - Do not use a soft pad with coarse grits

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Send me pictures

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