

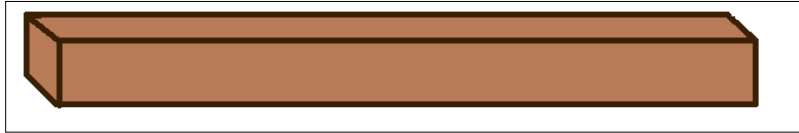
# Making a Native-American-Style flute from start to lathe:

By: Nicholas Pell

23 February 2010

## Making your blank:

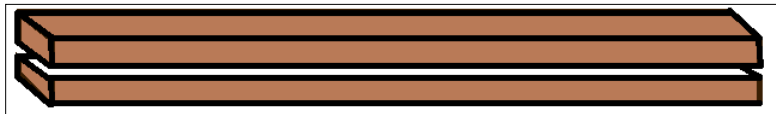
I.) Begin with the wood you desire to make you flute out of. Make sure that it doesn't have huge loose knots or nail that may ruin the machines or be dangerous to use. Essentially your "blank" should look like this:



(diagram 1)

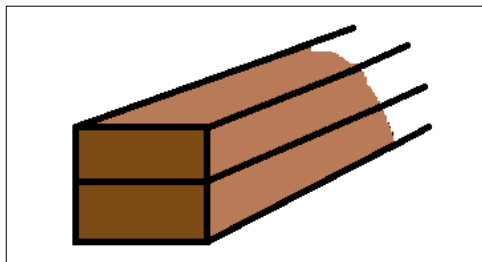
## Make sure it's straight:

II.) Make sure that there is at least one straight edge and one straight side by using the jointer. Once you have a straight edge and a straight side, use a table saw to rip the board exactly in half (lengthwise). It should now look like this:



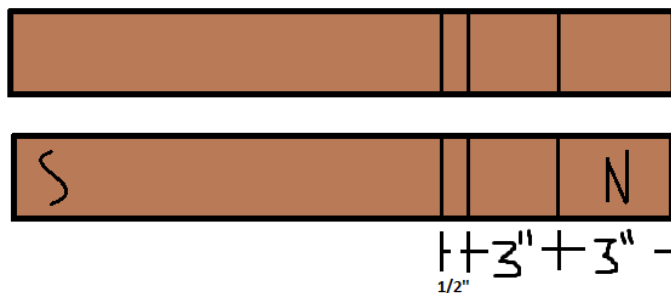
(diagram 2)

III.) When you look at the end of the boards, together they should form a square. If this is not so, secure 180-grit to a flat surface (jointer table, or table saw surface). The blanks should come together evenly. This will make for a better flute and less hassle when the two halves are later glued together. (See diagram 3).



(diagram 3)

IV.) Once you have them even, you can begin to drill the SAC and bore holes. Start by measuring 3 inches down from the north side (N) of the flute, make a line, go three inches further and mark it, and finally go 1/2 of an inch and mark that line. Using a square, transfer the lines all the way around the two pieces so that you can know where to drill the SAC and bore. (refer to diagram 4).



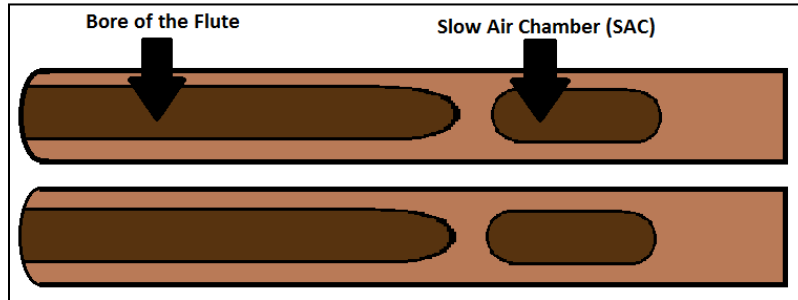
(diagram 4)

# Making a Native-American-Style flute from start to lathe:

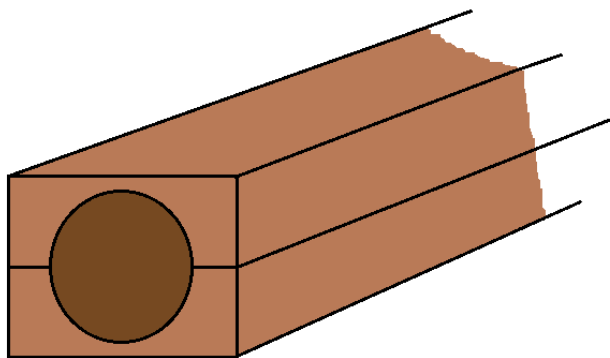
By: Nicholas Pell

23 February 2010

**Method:** (Split-case method): This means that you start out with two separate halves of the flute, drill the Slow Air Chamber and bore, and then bond them together to make a solid flute (as shown in diagram 5a. & 5b).



(diagram 5a.)



(diagram 5b.)

## V.) Drilling the SAC and Bore of the flute:

### Finding the bore length or bore size:

If your bore size (diameter) is one inch, then your bore length should be about 18 inches (measured from the splitting-edge to the south end of the flute).

(b) = bore size (in diameter)  
(L) = length of the bore

$$L = 18(b)$$

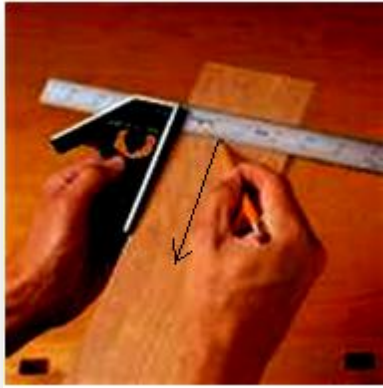
(Use this to find how long the bore length should be by substituting your bore size for b).

$$b = \frac{L}{18}$$

(Use this to find your bore size by substituting L for the length of the bore).

**\* (These measurements are approximations because some flutes will sound better a little longer or a little shorter. Use this equation as more of a guideline rather than a required format to determine dimensions).**

## Time to draw:



(Finding the Center)  
[http://www.woodbin.com/misc/layout\\_tools.htm](http://www.woodbin.com/misc/layout_tools.htm)

1.) Find the center of the board by using a square and making sure that there is an equal amount of wood on either side of the pencil. Draw this line all the way up and down one side. (Refer to Figure 1)

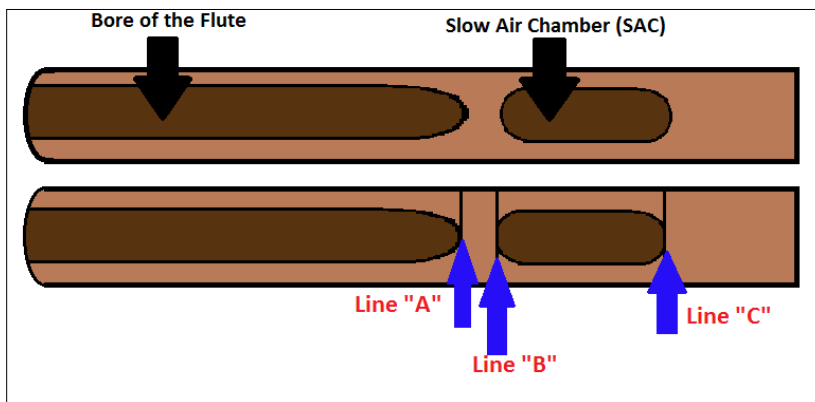


Figure 1

2.) Use a square to find the maximum depth of the bore. (Figure 2).

3.) Equip the router with the same size drill bit as your bore size and make practice cuts to make sure you're in the center.

4.) Drill the SAC and bore of the flute. **Go very slowly on this part!!** Start with the bit barely above the surface of the table and make one pass starting with the south side of the flute, lifting up completely at line "A," plunge the blank down on the bit again at line "B," and lift up again at line "C." (refer to diagram 5).



*\*Important note: (The harder the wood, the lighter the cut.) Route each half of the flute one after another so that the routes will be even and also to save you from having to adjust the height of the bit repeatedly. Heighten the bit a little (about 1/8") and repeat. Don't route more than 1/8" or you might run some safety risks. (diagram 5)*

5.) Use a caliper and take a reading of the walls on the inside of the flute. Make sure that each side is the same width. If they are not, you may have to adjust settings on the router to make up the difference. (Make sure that the walls of the flute are a little more than 1/4" so that you'll have room to round the outside of the flute later without cutting all the way through to the bore).

## VI.) Time to stop and sand:

At this point most of the work has not been too physically-exhausting, now the real work begins. Using a wooden dowel short enough and small enough to fit inside your bore and SAC, sand the inside of your flute. Wrap the sandpaper around the dowel and start sanding. It is advised that you start with the coarsest grit for this process: 100,

then move up to 220-grit, then 400, 600, 800, and even up to 2,000-grit if you really want. Now, you don't need to go crazy with sanding, but realize that *the smoother the inside of the flute, the smoother the sound will be in the end.*

## VII.) Drilling the SAC exit and True Sound holes: (Do this to ONLY ONE BLANK, NOT BOTH)

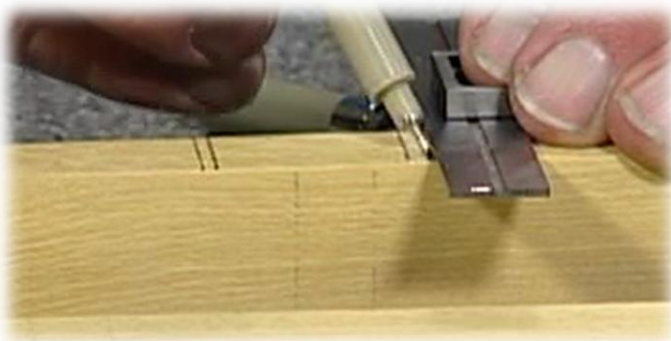
Once you have everything really smooth, it's time to move on with drilling the SAC exit hole and True sound hole:

- 1.) Looking at the inside of the flute, mark where you will be milling out the SAC exit hole and True Sound hole. The first line should be at the very bottom of the slope, right before the bore starts to level out.
- 2.) The second mark should be about 1/8" down from that (Refer to diagram 6).



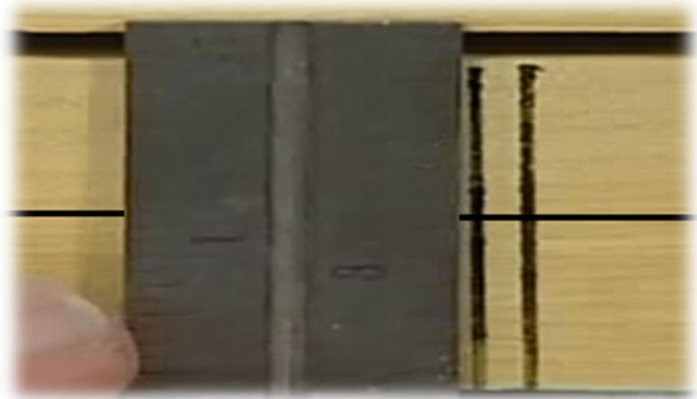
(diagram 6)

- 3.) Now, transfer these lines up to the inside wall of the flute using a square to ensure that the lines are even. Turn the flute on its side and trace the lines all the way around. (refer to diagram 7 & 8).



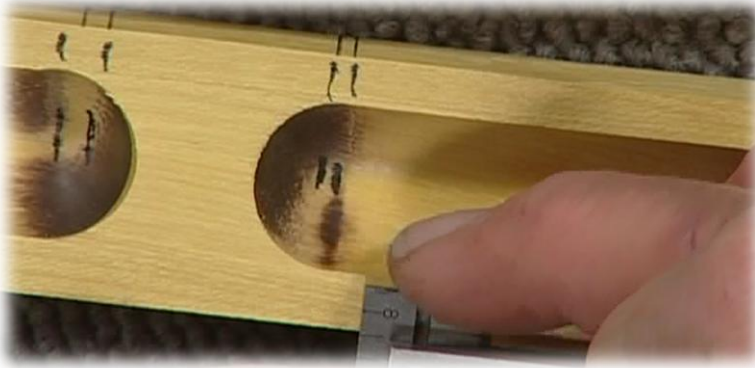
(diagram 7)

(diagram 8)

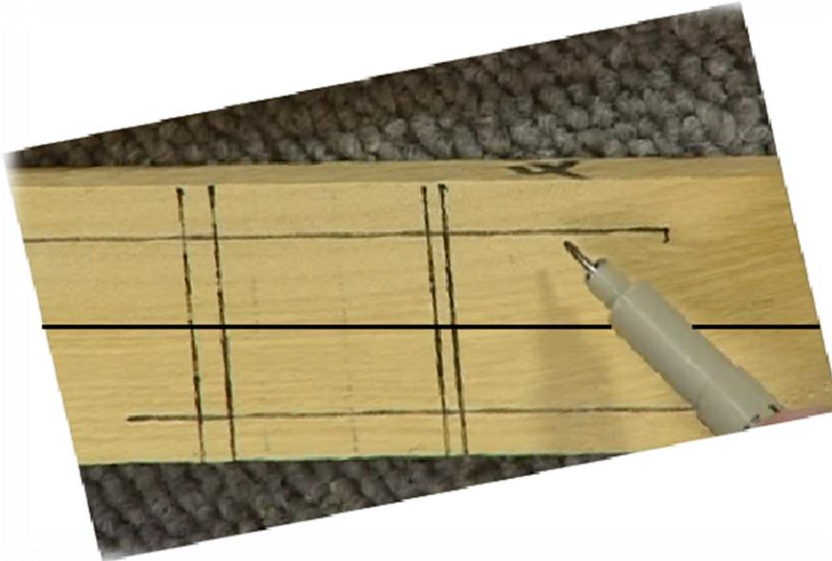


- 4.) Using the center line you found earlier, create a template for the SAC exit hole and True sound hole (the width should equal to 1/2 of the bore size).

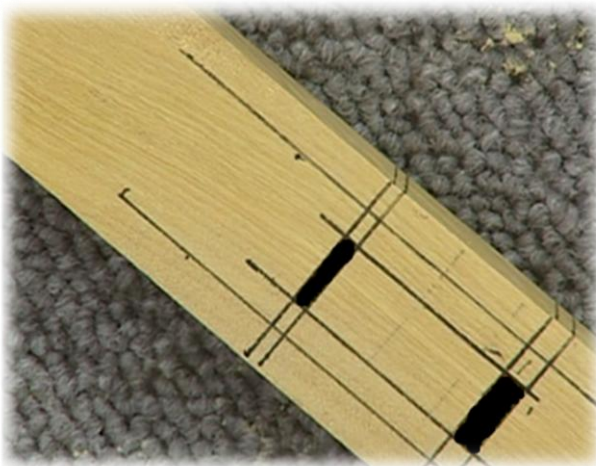
5.) Take a measurement of the width of the wall on the inside of the flute (refer to diagram 9). Transfer that measurement on the front side of that flute (diagram 10). This is essentially drawing an X-RAY view of your flute.



(diagram 9)



(diagram 10)



6.) Next, draw two lines, equal-distance from the center line. The distance between these two lines should be  $\frac{1}{2}$  the measurement of the bore size.

After you're done, this blank should look like this:

(diagram 11)

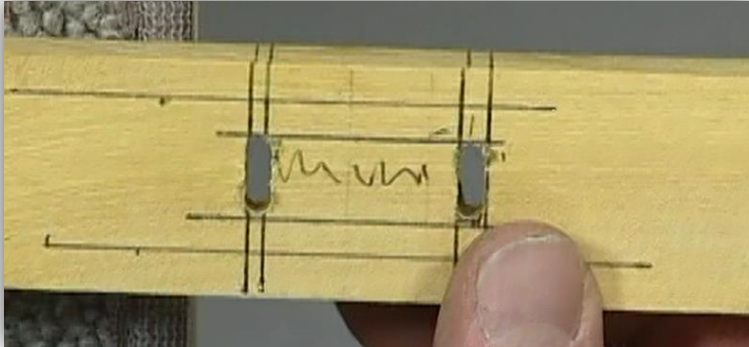
**VIII.) Drilling the SAC exit hole and True sound hole:**

# Making a Native-American-Style flute from start to lathe:

By: Nicholas Pell

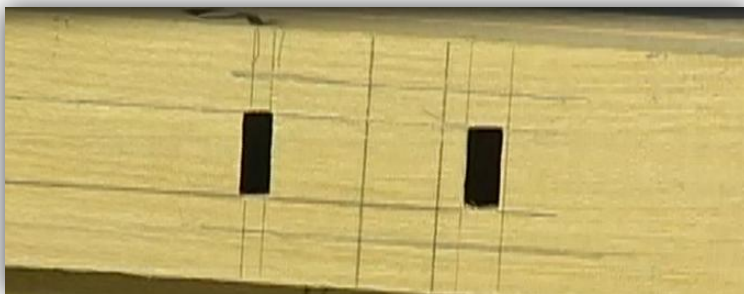
23 February 2010

1.) Using a drill press equipped with an IN-MILL bit (size 1/8"), mill out the holes that are blacked out in **diagram 11**. Only mill a small depth at a time. You'll have to make several passes until you cut through to the other side. **Your flute should now look like this:**



(diagram 12)

2.) Use a metal file to square the edges. **Your flute should now look like this:**



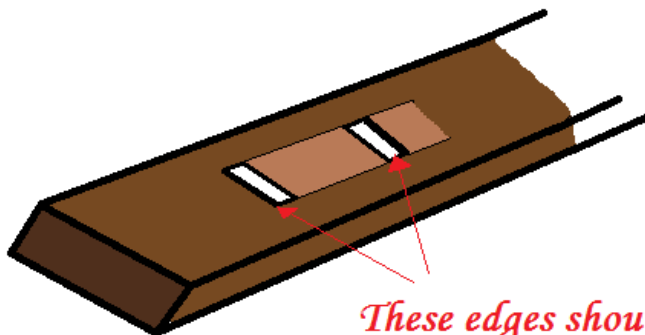
(diagram 13)

## IX.) Chiseling the ramps on the inside of the flute:

- 1.) Place your blank on a scrap of wood and secure it to the table using a clamp.
- 2.) Chisel two ramps (one leading out of the SAC exit hole and the second being the **splitting edge**). Hold your chisel at a 45° angle and slice evenly on each side. (Refer to diagram 14).



(diagram 14)



*These edges should measure 1/64"*

**\*\*THERE SHOULD BE A LIP AT THE END OF THE RAMP. IT SHOULD NOT COME TO A SHARP EDGE!!! (See diagram 15)**

(diagram 15)



## X.) Bonding the two halves together:

1.) Once you have all of the edges and ramps sanded really smooth, make sure to sand the two faces that will be bonded are smooth.

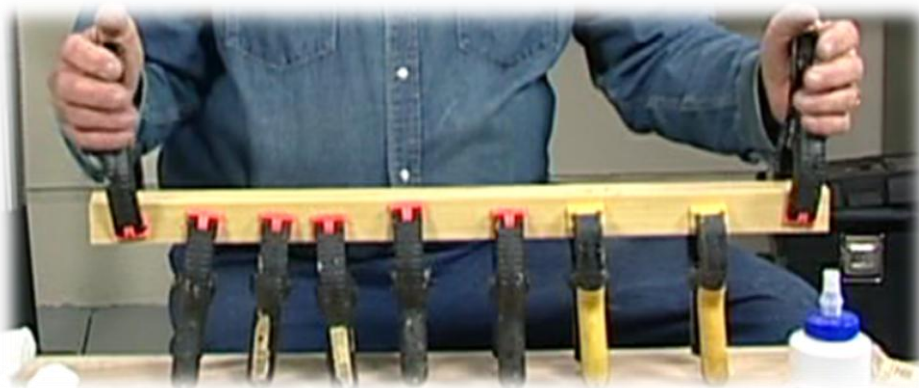
- To do this, apply sticky sandpaper to a flat surface (jointer table, table saw surface) and sand those sides evenly so that they will bond evenly. (Refer to diagram 16)

\*The suggested bonding agent is TIGHT BOND III. This is a very strong glue.

2.) When gluing the halves together, make sure that, at the SOUTH end, the bores line up to make a complete circle. It doesn't necessarily matter if the outside edges line up, as they will just be rounded on the lathe.

3.) Apply Spring clamps at each end and swab the inside of the bore so that it's nice and smooth.

4.) Apply about four or five more clamps across the remainder of the flutes to ensure a tight seal. (Refer to diagram 17)



5.) Let your flute sit overnight before turning it on the lathe.

**You Are Now Ready To Turn Your Flute.**

(diagram 17)