

Organ Donor Pipe Construction

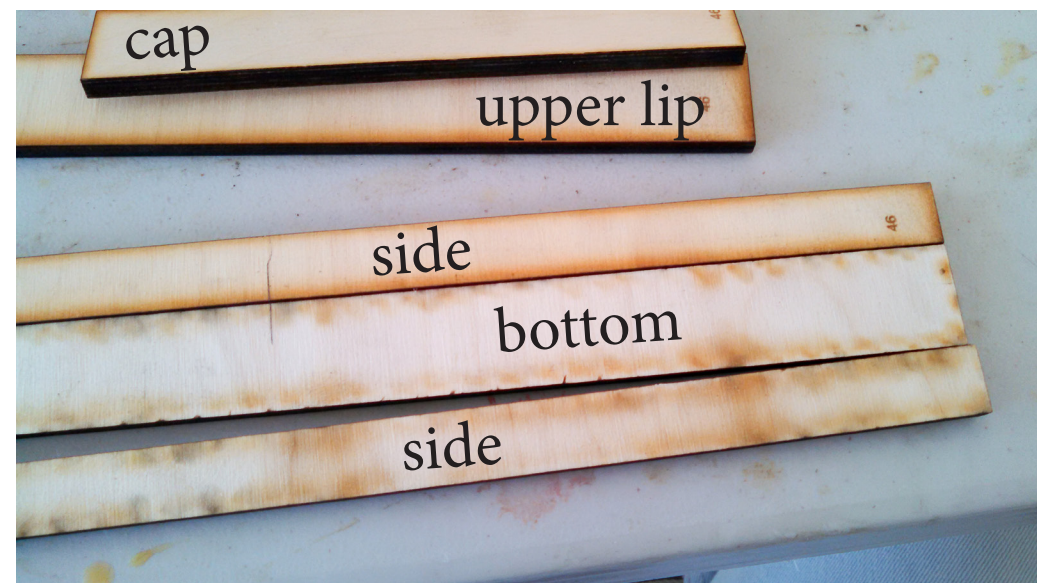
1. Marking the location of the languid



Here's all our parts!
Using a spreadsheet and equations from books, we laser cut all the parts for each pipe from one-quarter-inch thick birch plywood.



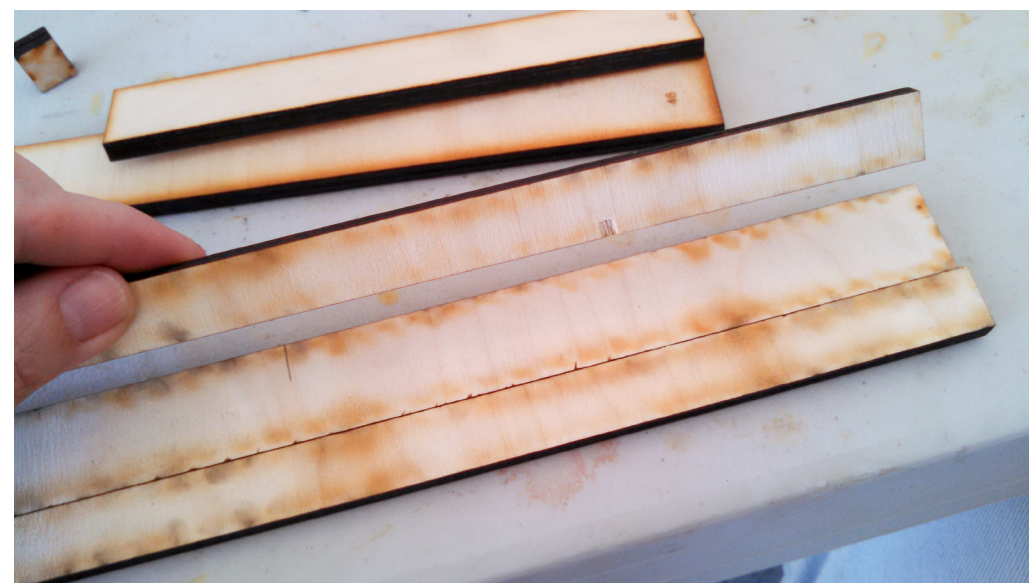
Using the *cap* piece, we mark a pencil line across the bottom and one of the sides. We want the *languid* to line up with the *cap* piece.



Here's the line we made! Now we know where to set the *languid* piece. The mark on the side we're going to use in a sneaky way to set down the *top* in the exact right spot.



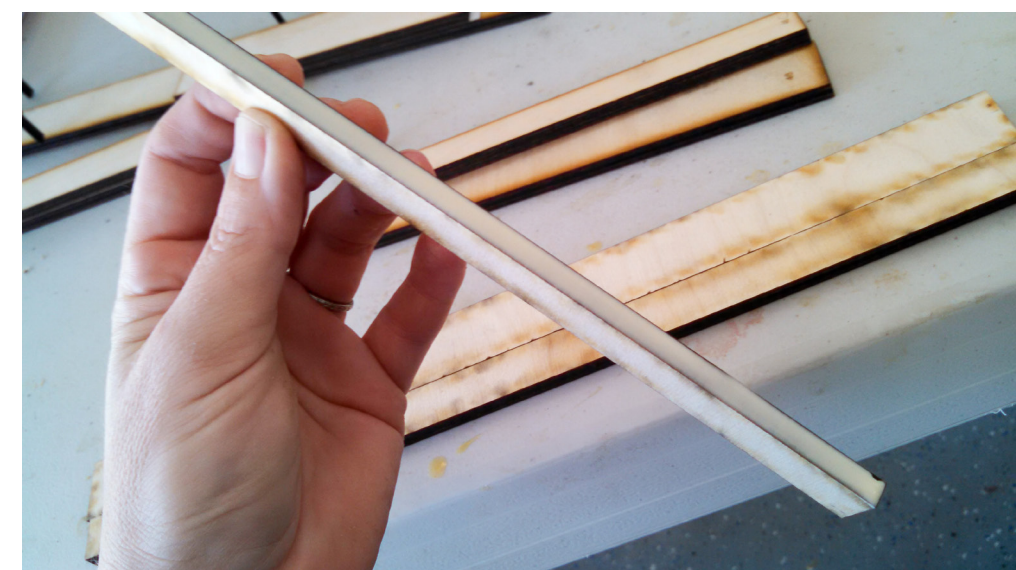
On the side piece with the pencil mark, we measure an additional distance called the *mouth gap*. We add a second mark at that point.



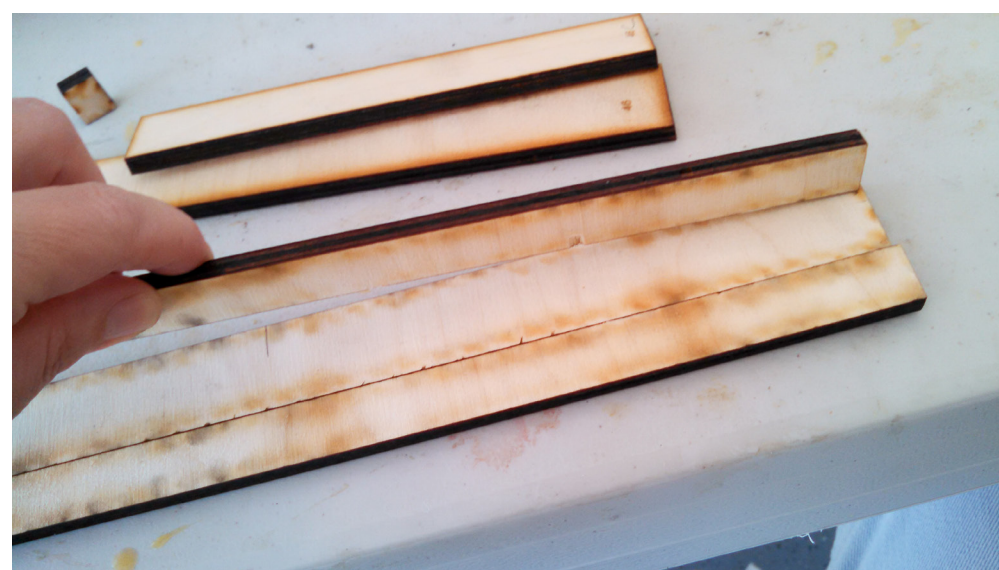
Now we turn the *side* piece over so that the two marks we made are on the outside of the pipe. The mark on the *bottom* piece is on the inside of the pipe.



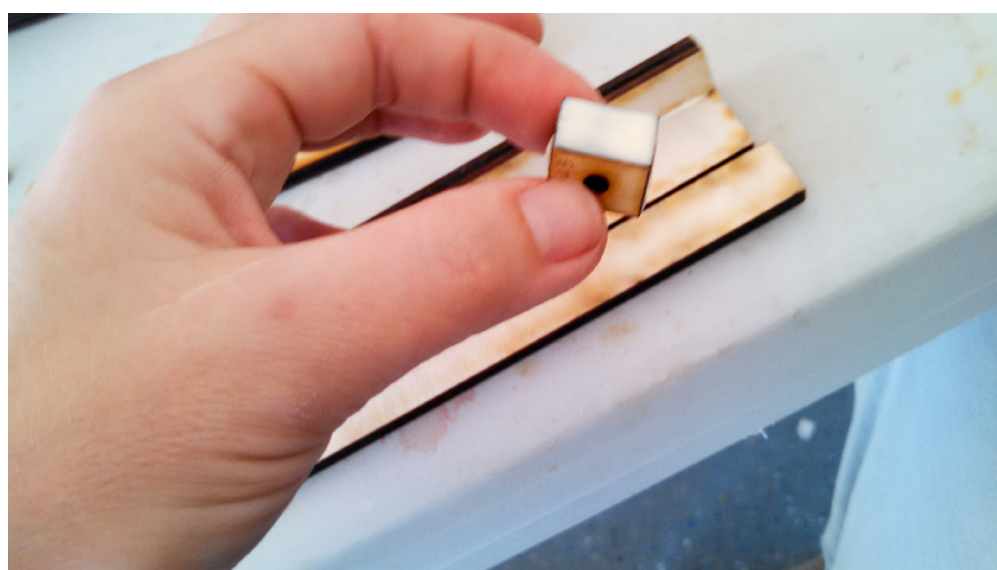
2. Glue sides, foot, and languid to bottom



Put a layer of glue on the *side* piece. Make sure it's smooth so the seam will be as air tight as possible.



Make the first joint of the pipe by pressing the *side* piece down on the *bottom* piece.



Next, glue the *foot* piece in place at the bottom of the pipe. We used two pieces glued together to make a thick *foot*. The hole for the air to enter can be seen right above my thumbnail.



Foot is now put in place! We are on our way to having a working organ pipe.



Next, the *languid* is glued in place. The position was given by our pencil mark we made earlier. I'm using the pencil to point out the *languid* piece. We put glue on the sides of the *foot* and *languid* so that the other side piece can make a good seal.



The other *side* piece is glued in place, and the entire pipe (so far) is clamped to dry. It's very important to get a good seal, so we carefully followed the wood glue instructions.

3. Glue gasket and then cap



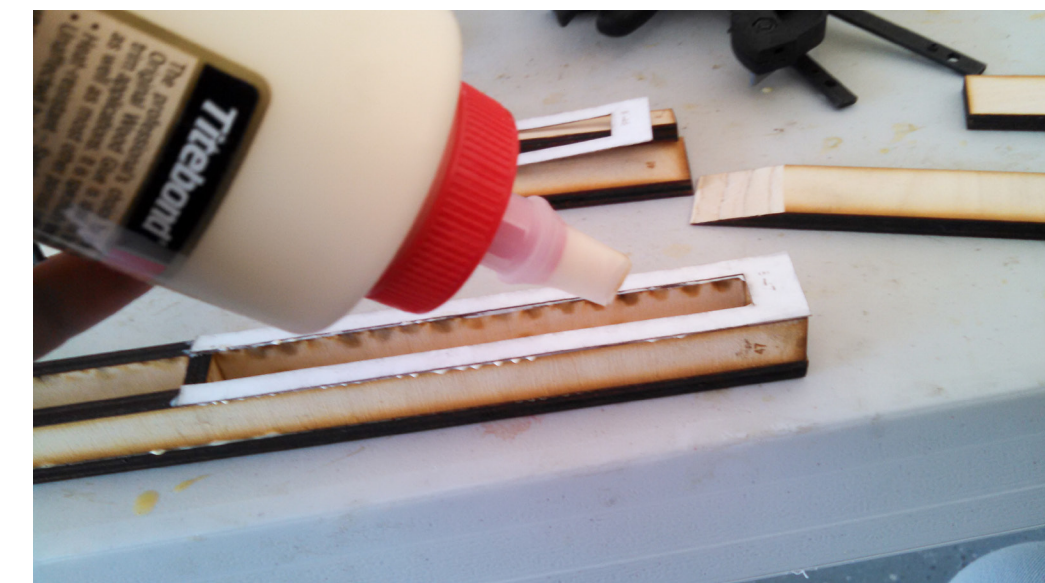
Look at that box we made! Now we need to make a gasket, so that there is a gap between the *languid* and the *cap*. The wind makes a thin sheet when forced out of this gap. We call the wind a *windsheet*, and the gap a *wind gap*.



We laser cut the gaskets to match the dimensions of each pipe. These are made from thick paper. We put glue on the gasket and carefully glue it in place.



Here is the gasket drying in place. It covers the *foot* and the *sides* that are covered by the *cap*. It doesn't cover the *languid*, and that space is what makes the *wind gap*.



After our gasket dries, we need to put the *cap* on. We put another layer of glue on top of the gasket.



Then we fit the *cap* on top of the gasket. Now we have a box where the wind comes in through the hole in the *foot*, and out through the *wind gap*. Where does it go next?



Here's what we get after this step is complete. See the wind gap?

4. Glue upper lip



Locate and check the measurement of the marks we made back in step 1. There should be two marks on one of the sides. One mark should line up with the *languid*. The other is called the *mouth height* mark.



The *upper lip* is the final piece to glue. It tapers down to an edge. This tapered edge is placed along the *mouth height* mark.



Put a smooth layer of glue along the top of the *side* pieces. This is where the *upper lip* will go.



Place the *upper lip* so that the edge lines up with the *mouth height* mark we made. There will be a gap between the tapered end of the *upper lip* and the *languid*. This gap is called the *mouth height* of the pipe.



The pipe is thoroughly clamped and left to completely dry. Sometimes the pipe is made a bit long on purpose. The open end of the pipe can then be cut down to the exact length specified by the equations.

After the pipe is dry, things like tuning slides can be installed. Tuning slides are small moveable wall extensions that allow the length of the pipe to be slightly adjusted for fine tuning of the note.

Each pipe has several possible mouth heights that produce different combinations of harmonics. Many different adjustments to the type and shape of the languid, cap, and foot can be made that all affect the sound.