

Construction of a Banjolele



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Project:

For my project I decided to create a banjo ukelele from scratch. The idea mainly came from my girlfriend owning one, and I was looking for something to do for a project. It is a simple enough instrument to play and also one that is not too complex to construct, but on the other hand has a really pretty sound that you can have some fun with. It took me probably 5 separate days to build this, on those days I probably spent anywhere between 3 and 5 hours working on it. There was of course a lot of trial and error which is why it took me so long I feel. If I were to do it again I could probably cut that time in half, if not even more.

The idea behind it was rather simple in construction. I started off w/ a 1x2 that was roughly 8 ft long and cut it into halves. To do this I used a band saw that my grandfather had. It was a tool that definitely took some learning on my part to be able to use properly, but in the end, it was an invaluable resource. One of the hardest parts of the project I found was physically finding the cookie tin that I have. It doesn't seem like a very hard thing to come across, but during this time of year it really is. Eventually I found one for not too much, and we moved on from there. I used the oak because it was a very hard wood, and I did not want to worry about it folding over on me. I layered the area of the wood that would be inside of the cookie tin with a second layer so it would be thick and sturdy, then cut a box out of one end of the tin to accommodate the size of the wood. I then used wood

glue to glue a second layer on to the bottom of the head of the neck. Then by again using the band saw, I was able to make an angled cut that allowed the strings to stretch over a curve, this helps keep the tension on the strings and to keep them in place over the nut. Once I did this I had to cut the head down several times. The tuning pegs I purchased were much shorter than I thought they would be, so thinning it was necessary. In the end I was able to get it thin enough it held fine, and I didn't have any issues with it breaking obviously. Once I had all these separate pieces it was time to put it together. Turns out oak is incredibly hard and drilling into both it and the metal tin was quite troublesome, but I managed in the end. I have two screws in the end that are flush and solid in both the wood (which I made the end semicircular) and the tin to hold it to the back tight. The only probably I came up with this in the end is that The wood rests solidly against the face of the banjo in this manner. This I'm sure stops a lot of the vibrations that it might otherwise have. I'm highly curious as to how the sound would be without that, so personally I think I very well might try and carve the wood there more into a semicircle so that it still has the support on the front and back, but doesn't touch the metal face, but it all depends on the time I have this summer. I then created a small nut that at first was supposed to just be a quick prototype that we planned from. It worked fantastically so we glued it in and kept it. Just to see if we could get it to play, we next built the floating bridge. On a banjo, the bridge is stops the string

from vibrating behind it, like a normal instrument, but it is also adjustable. This is largely for the simplistic nature of a banjo, but also because it allows you to quickly tune each string in a certain direction if required. Once we had all these pieces assembled, the next tricky part was finding proper strings for it. Classic ukelele strings were far too short to be able to utilize on my banjo, so I went into Samuel's Music for some assistance. We at first just tried to purchase classic banjo strings from them and tune them for a ukelele. Unfortunately, the 440A note was far too high to be hit and held by any classic banjo string. The G, C, and E required were not that hard to find, but I went back in a couple days after we broke our original strings and spent about an hour with a lovely young lady who took an interest in my instrument and we went through a bunch of random strings in a box in an attempt to find one that could hit the proper note. Alas, no string could manage properly. When I got home though, I ordered .007 gauge strings off of eBay and set to work seeing if I could make them work. If I had the floating bridge in it's proper place closer to the rear of the face, it would snap before o right at 440A, but I found if I pushed the bridge up closer to the front, I could just manage to comfortably hit the note I needed to. Was a HUGE accomplishment, as much work was put into this, I did not want to have to tune it down to a tenor uke. Once I found that the tuning that I wanted was feasible, it was time to develop a method to attach frets to my ukelele. At first I thought I had a fantastic plan. Use the metal

edges of old school rulers, remove them from the rulers, and attack them into grooves onto my banjo. No matter how hard I tried, I could not manage to get them to both be in place, and stay in place. Again, it was a back to the drawing board type of thing. My grandfather came up with the idea of trying to use wire to accomplish the same thing. We took an old power cord from an appliance he had lying around and I spent a good long time stripping, cutting, and straightening the wire. To straighten it, I placed it in a vice and tightened then turned it over and over again, overall, it was an effective way to straighten them. I Used the reference from the notes we had in class to find the proper measurements for the first octave of frets. I then used a smallish hand saw to put small grooves into the fret board where I need them to be and used crazy glue to glue them on. Personally I did not think the crazy glue would hold them well, but I've been messing around with it for a good long time now and they are still holding to this day. Once everything was adjusted and tuned, I moved around the floating bridge and re-tuned so that the frets were as close to perfect as I could get them and attempted to play my new instrument. The sound was different then my girlfriend's ukelele's sound, but not necessarily in a bad way. I enjoy the sound it makes, and while I have to re-tune it often, it works great and is something I'm very proud to have said I can make. As I said I'm planning on making some minor adjustments to it at a later time, but all in all I think it went over swimmingly.

From here, I needed some numbers to find out what exactly I had made. I compared the my banjo to my girlfriends ukelele through using a piezoelectric transducer. The pictures will help explain the placement on each, but there were copious results and I found that my instrument produced a very different quality of noise, which you could hear of course, but now we had graphical evidence to show how in fact that it did. My banjo had a lot more activity overall in it then the ukelele. There was only a single peak in complex over pressure in which the ukelele clearly beat my banjo and that was at a particularly low frequency. Once you reached the higher notes, had much higher peaks and much more often. These results I found were similar to what you would come to expect from a resonator guitar. An instrument made so that it could be heard over other instruments like percussion. This was before the advent of electrical guitars, so the need was obvious. Overall, this is probably where the loud twang that is so different from the ukelele comes from, and as I've mentioned before, I was very happy with my project overall. In the following pages there will be pictures of construction and of results gathered.

Some of the pictures of construction



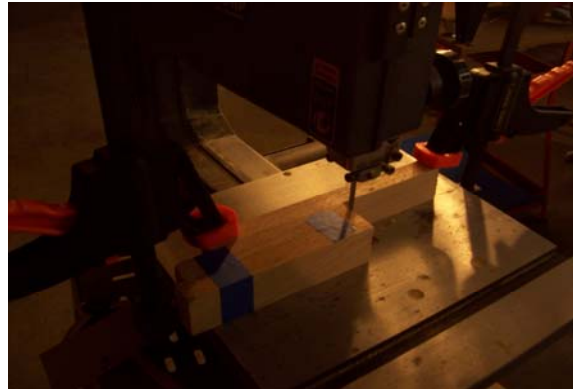
Gluing pieces together



Preparing to attach



Cutting the entrance into tin

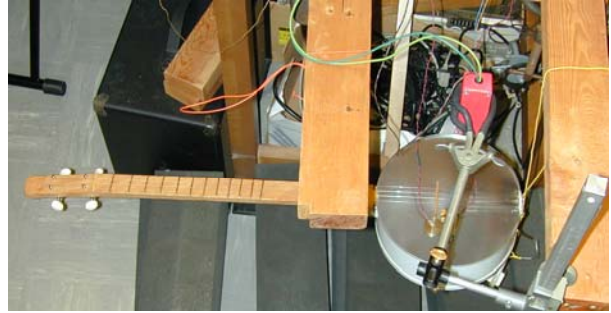


Cutting the head into proper shape

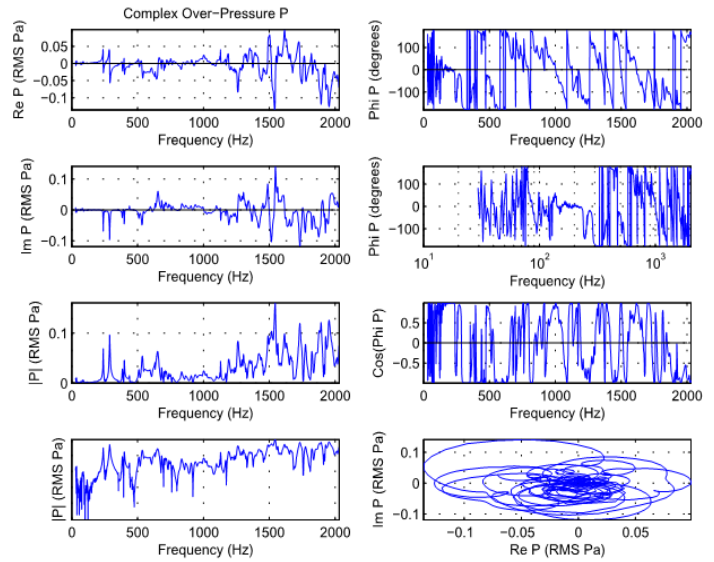


Tuning the instrument

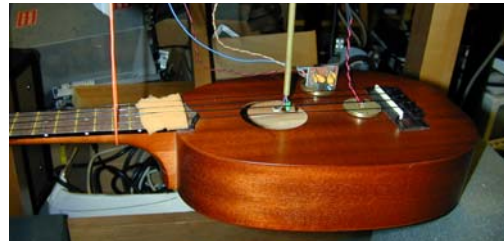
One set up for the banjo



Small example of results



One set up for Ukelele



Small example of results

