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Project: Arch Bridge

Overview: This bridge is a completely self-supporting bridge that holds together without any use of screws or fasteners. This concept dates back to the 1400's and is a great way to teach history with engineering in mind. The more weight added to the bridge the stronger it becomes, but take away the weight and pull out just one piece and the entire bridge will crumble.

Materials: 3/4" plywood

Minimum Cutting Area: 48" x 48"

Bit Size: 1/4"

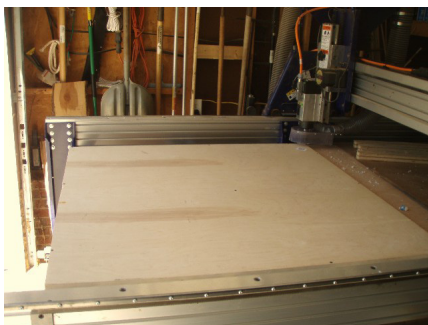
Finishing: Either a clear coat or a painted surface makes this project look great.



Always read the entire project details before starting to cut the file yourself

Account for the thickness of the physical material on hand and the material thickness in the file

This file is zeroed to the tables surface; Zero your bit to the tables surface



1. Included with the cut file is a hold down toolpath that shows where it is safe to put screws. Run this file separately from the cut file so you can screw down the work piece, or if you have a different size board or different type of hold down, disregard the file.



2. As the file starts cutting the profile of the parts, make sure the cut is going all the way through the work piece and into the table surface. If you need to adjust any part of the file make sure you do not remove the hold down or you will lose position.



3. Tabs are used to hold all the pieces to the scrap wood attached to them. Use a utility knife to score these edges. Never try to push a piece out without cutting the tab; it will tear the grain on your project. Sand remaining tab flat.



4. 1/4" x 1 1/4" dowels are needed for this project. Make sure the dowels are no longer than 1 1/4" or they will break through. One can sand them down or buy a shorter length.



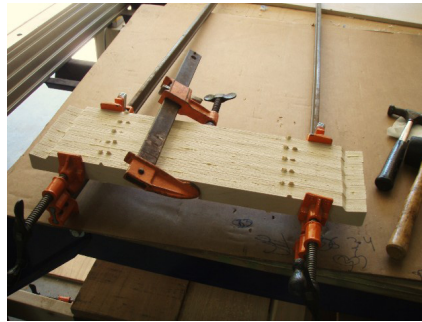
5. A glue roller is ideal for this project; it saves a lot of time. Glue up 5 sets of pieces at a time.



6. Lightly tap the dowel pins into place. They are here to help line things up.



7. Push the pieces together so they line up. Make sure the ends are matched up and you haven't flipped the pieces around wrong.



8. Glue, clamp and wait. If weight is going to be applied to this project at a later time one does not want to rush through these steps.



9. Putting a 1/4" roundover on each piece not only removes the tab remnants, but also makes the project look nicer and easier to handle.



10. Sand each piece with a power sander and touch up with hand sandpaper. Each piece will be handled several times and slivers are not fun to get.



11. Either a clear coat polyurethane works great or a spray paint to the individual pieces.



12. Follow the next 12 pictures in order to properly assemble this bridge. Once together and weight is applied to it, it will become stronger. Don't most structures become weaker with stress??



Note the above two pictures. By simply pulling one piece out of the bridge the entire thing collapsed.

Explain how this system works. Try adding weight to see how much it will hold. Make more pieces; what would happen if two bridges were cut and assembled as one? Expand on the design, history and other concepts involved with this bridge.