

# MDF Japanese Woodworking Toolbox

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## Intro: MDF Japanese Woodworking Toolbox

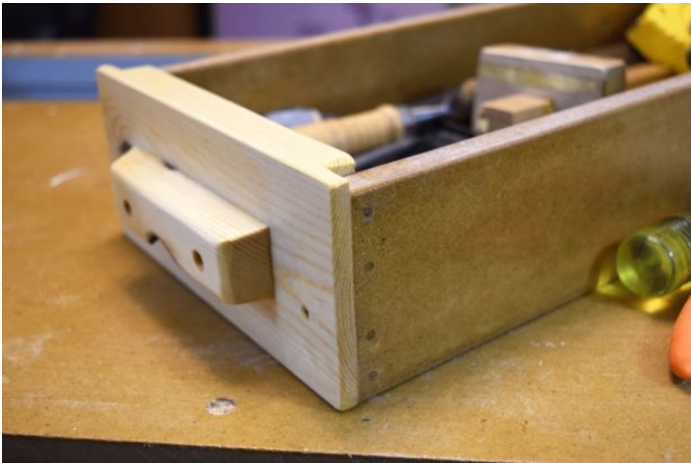
In 2003 I began seriously expanding my medium into wood. However much I looked, I could not find a project that I liked at my skill level. So my first projects were mortised and tenon joinery with crossed deep cross locking lap joints, not something a beginner should tackle.

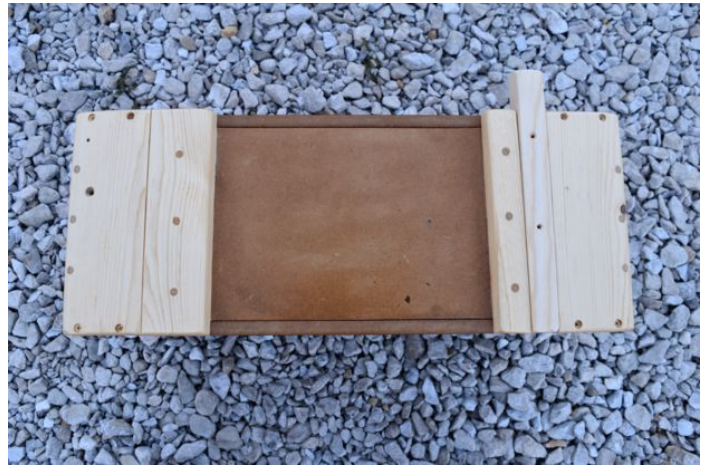
Fast forward 13 years, I decided to build a project for the-me-of-2003, and any beginner looking to be challenged rather than patronized.

The project has to be "good looking," as an artist I find too many projects so ugly that they metaphorically pierce my eyes. The project has to be challenging, too many projects insult our intelligence and abilities.

The project has to be inexpensive, woodworking seems to have become a competition of collecting tools to be used as decoration for man-caves and she-sheds; this materialism drives people away from woodworking, but with very few basic material and tools plus some ingenuity and determination we can fall in love with woodworking again. This toolbox is a good place to start.

Be sure to accept the inherent risk of any project and take the proper safety precautions.





### Step 1: Material

- ~0.5 sheet (4'x4') of 0.5" MDF
- 1x8x72" piece of nominal pine board (the actual measurement of this board is 0.75" x 7.25" x 72")
- 1/8" dowel, about 8' is needed.
- 1/4" dowel, ~20" is needed
- About twenty 1" long solid brass #6 screws

### Step 2: The Carcass

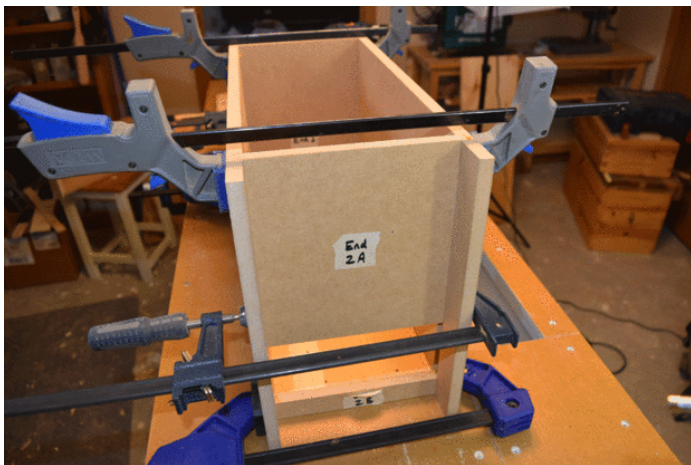
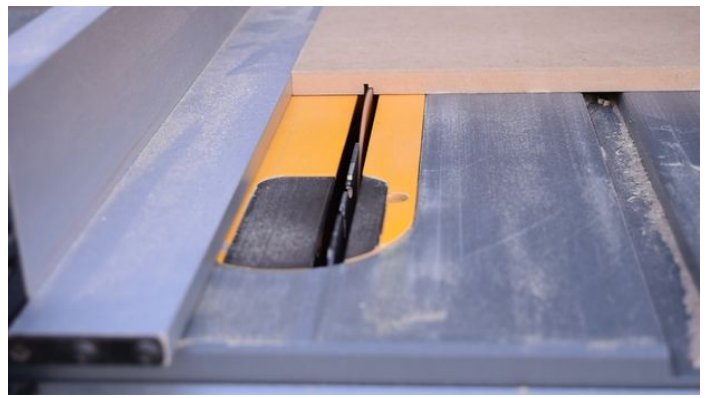
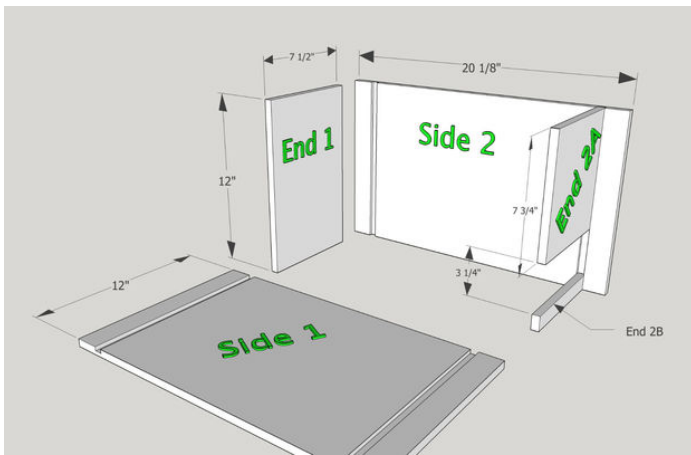
Cut the pieces to the dimensions shown. All the End pieces are 7.25" wide. Side 1 and Side 2 are identical. The housing dado (groove/trench) starts 1.5" from the edge. The dado is ~0.5" wide and ~0.25" deep. The dado run the entire height of the box. The depth does not need to be exactly 0.25", but it does need to the same depth for all the pieces.

The most efficient method to cut this dado is with table say. Set the fence to 1.5" and the blade to ~0.25" high. Run the edge of the MDF against the fence. Move the fence 1/8" with each pass, until a 3/8" dado is formed. The last pass needs to be <1/8", adjust slowly until you get the pieces to fit snug. The End pieces should require a little pressure to fit into the dado and stand square on it's own. If you need a hammer to get the Ends into the dado then the dado is too tight. See video for details.

Alternatively, the dado can be made using a track saw, a circular saw + a fence, a router + a fence, or a hand saw and a chisel.

Glue the carcass piece as shown in the picture (or better yet the watch the video). Clamp the carcass together. Check that the carcass is square by measuring corner to diagonally opposite corner. If the dado are cut just right carcass will easily align into square.

Once the glue is dried the carcass is still structurally weak it is time to pin in the dado as well as the bottom and middle-divider pieces.



### Step 3: "nailing" the Bottom, Middle, and Dado

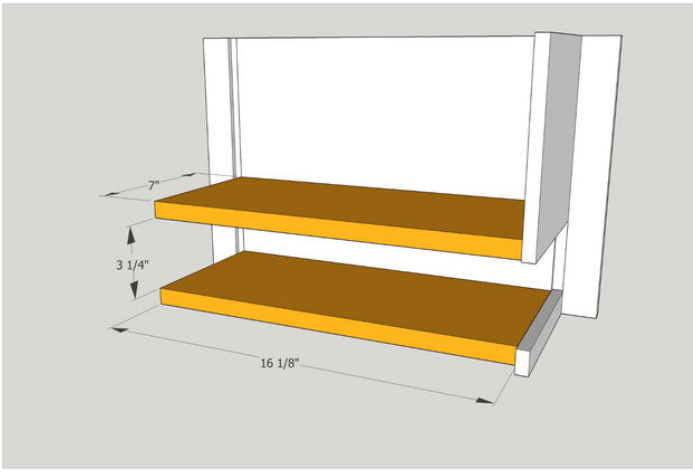
The Bottom and Middle pieces are cut from pine boards. In my case I recycled a piece of old board that was once part of my bench. They are 0.75" thick, ~7" wide, and ~16.125" long. The exact dimension may vary depending how the dados were cut.

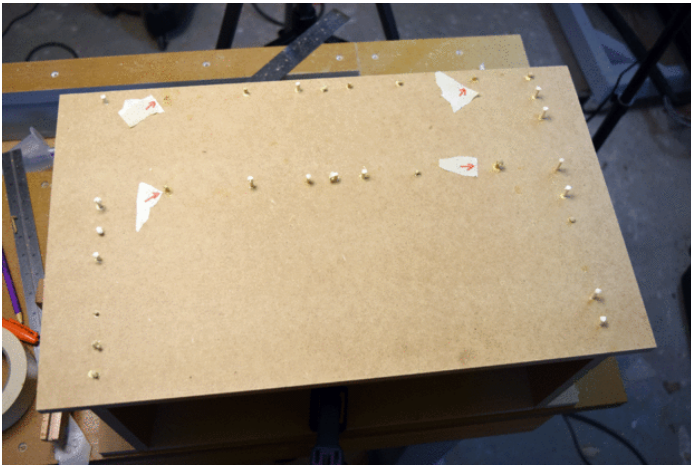
The Bottom and Middle piece are positioned flush with the drawer opening. So the Bottom is 1/4" away from the bottom edge of the carcass. A piece of 1/4" thick scrap can be used to help you position the bottom. The Middle piece is more difficult to position since the carcass is already glued together. Align the Middle with the bottom of End 2A on one side, measure the distance from the top of the Middle to the top edge of the carcass, use this measurement to set the depth of the end that you cannot see.

Once the Bottom and Middle are positioned drill a 1/8" hole ~1" deep from the MDF carcass into the pine boards. Do 4 holes and pin it with glue and 1/8" dowel. I used poplar dowel through out the entire project, they are inexpensive, light weight, strong, and the 1/8" thick dowel can be easily cut with pliers.

Check the alignment has not shifted after these 4 holes/pins. Continue to drill as many holes and glue and "nail" in the dowel as you like until you are comfortable with it's strength; I suggest a geometric progression. Use at least 9 pins along the long face and 5 pin along the short end, the pins should be spaced 2X the thickness of the MDF you decide to use. Once the pins are dried, cut them off with a saw, and use a chisel to flush the top of the pin with the box. See video for more details.

Now is a good time to glue in a piece that covers up the dado gap left between End 2A and End 2B, this piece should be ~0.25" thick.



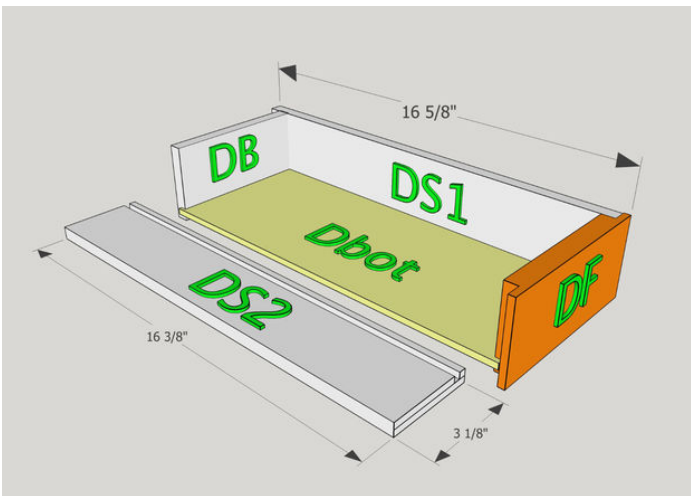


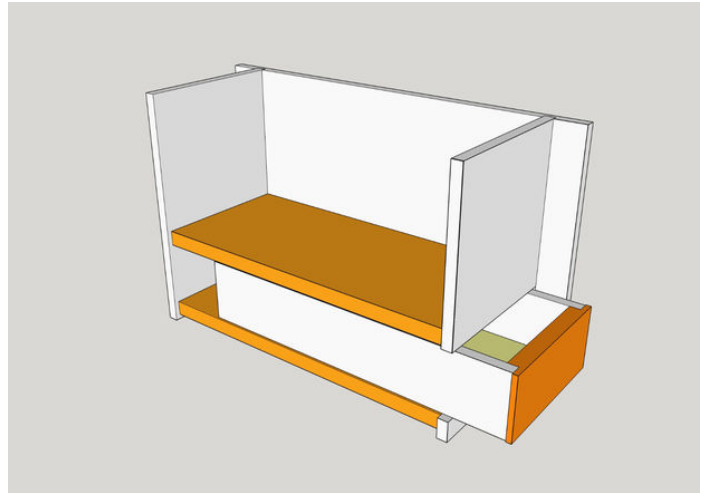
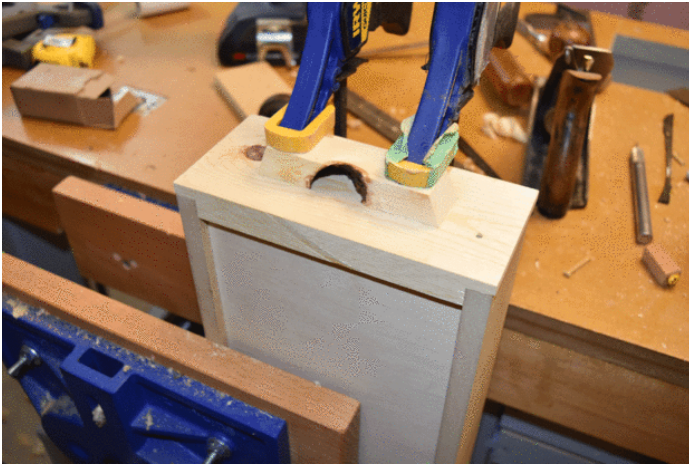
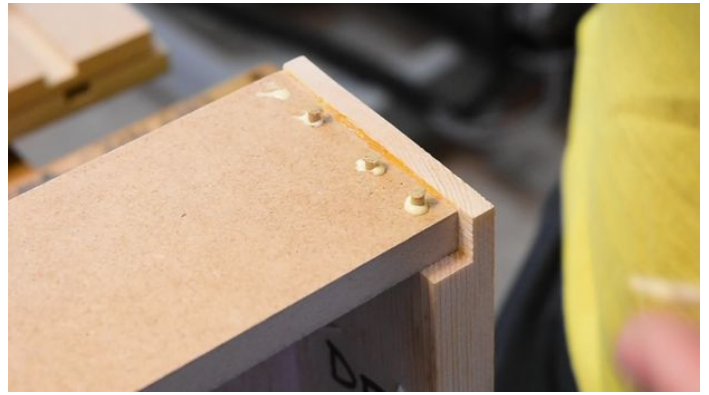
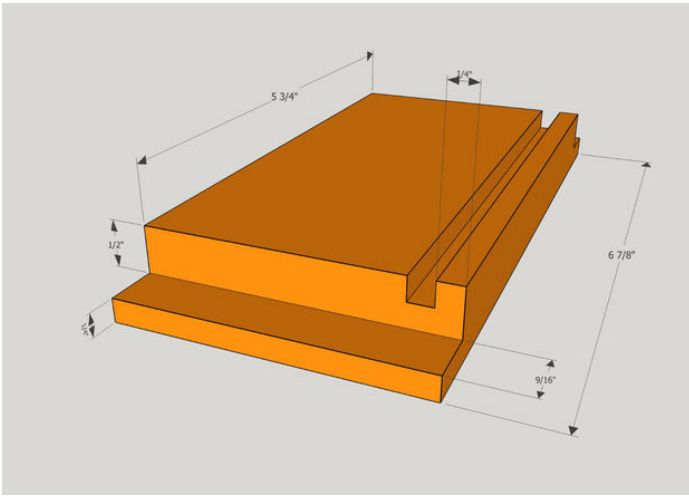
#### Step 4: The Drawer

A 1/4" wide and 1/4" deep dado is cut 1/4" away from the bottom of the MDF and pine pieces. A piece of 1/4" birch plywood is used for the drawer bottom. Use the Bot plywood piece to align all other pieces, there is a rebate cut into the drawer front (DF) see drawing for measurements. Use the same technique for cutting dados on a table saw to cut this rebate; use the miter gauge to ensure a cut that is close to 90 degrees.

Put glue on on the MDF and pine faces that will meet, put several drops of glue into the dado at places where the bottom plywood will slip in. Clamp everything together, check that it is square, let the glue dry, then pin the pieces. The plywood bottom is pinned to the side only at the center. This is not an ideal drawer construction, but it is easy, and should last a long time with minimal care.

Ignore the area in the photo where the side is shorter than the front, I was experimenting with different sizes. Cut a handle and glue and screw it to the drawer; choose a dimension that fits your hand. At this point the drawer should slide nicely into the carcass. If the drawer is a little short you can add screws to the back so that the drawer front is placed where you want it to be.

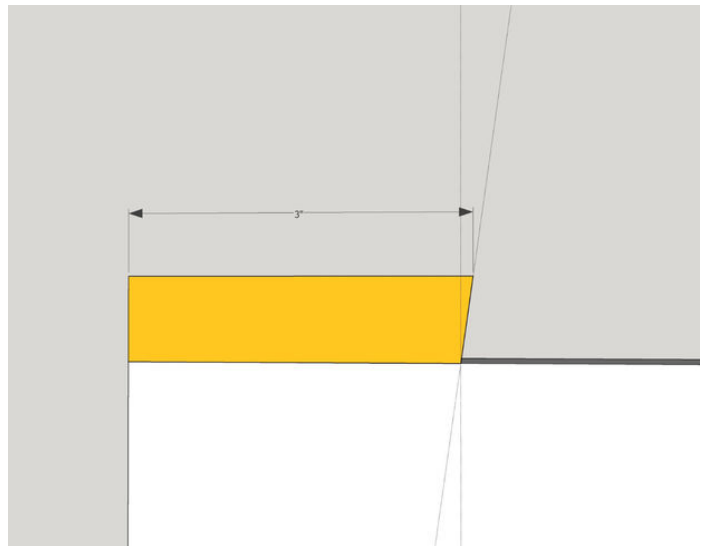
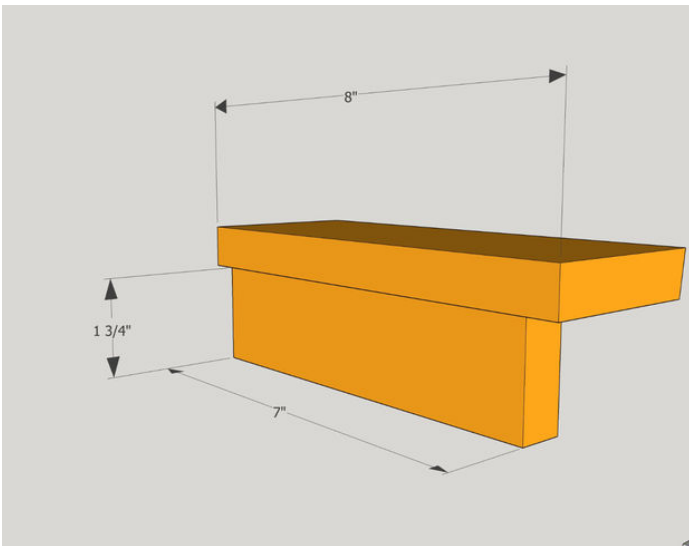


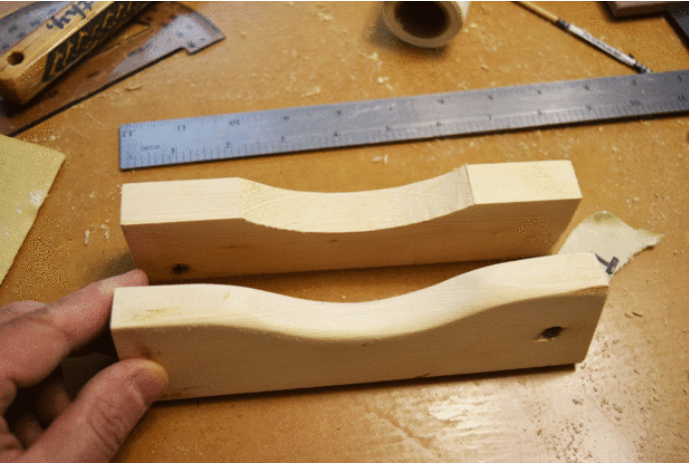


## Step 5: The handles

The handles are made from pine. There are two pieces. The top piece is cut with an 8 degree angle for the lid and locking mechanism. I suggest reshaping the smaller handle piece to fit your hand. Use the brass screws to secure the handle to the carcass. Be careful when screwing into the MDF, the space between the faces splits easily (see video for more detail). Pin the two handle pieces together with 1/4" poplar dowel.

Now moving onto the most complex part. But if you've been following along so far this next part should be pretty easy. Remember the 8 degree angle.





### Step 6: The Lid and Locking Mechanism

The lid pieces are all cut at an 8 degree angle (this is important). LA1 and LB1 are part of the handle from the previous step. The rest are used to make the lid and locking mechanism. The lid is ~15" long and 7" wide, if you have been cutting very close to the dimension in the drawing there these measurements will work.

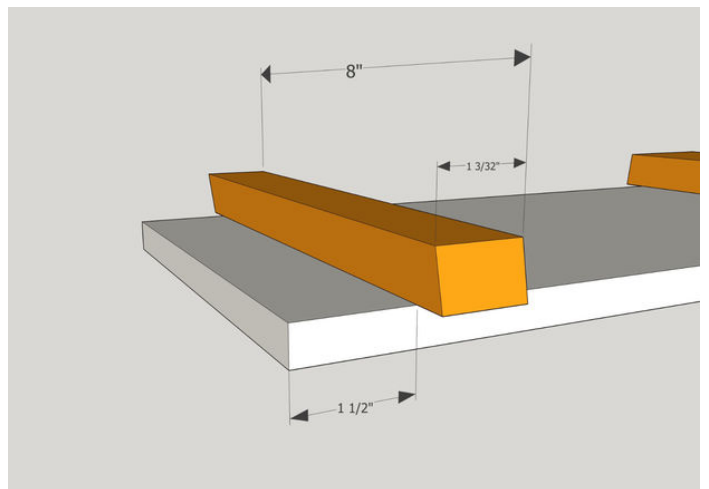
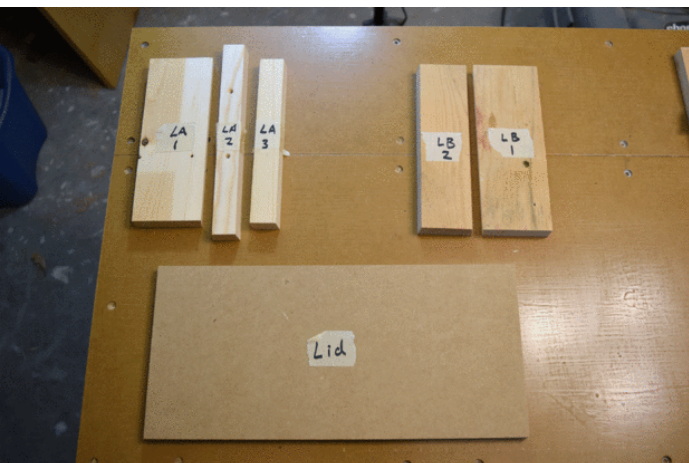
Do not be over concerned with the exact dimension of the LA2 (the key), LA3 (key-side wedge), and LB2 (wide wedge), they should be little longer than 8" because we are going to trim them flush later. They should be 8 degrees.

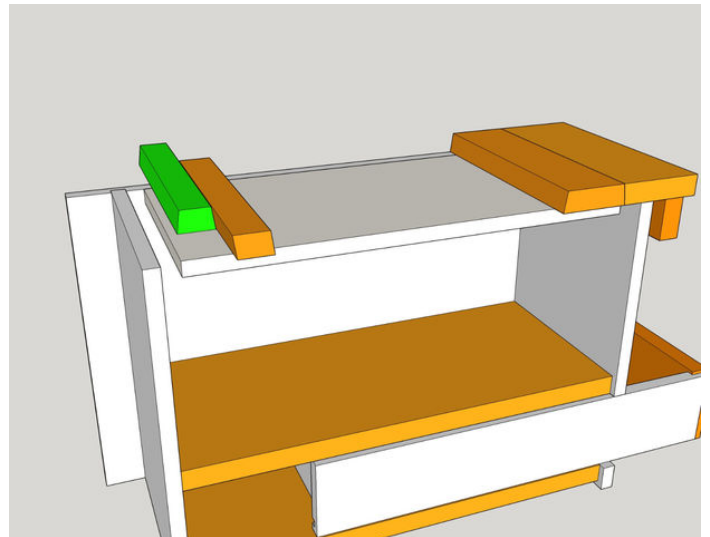
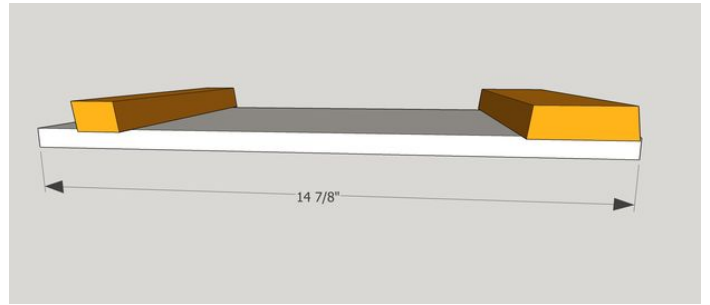
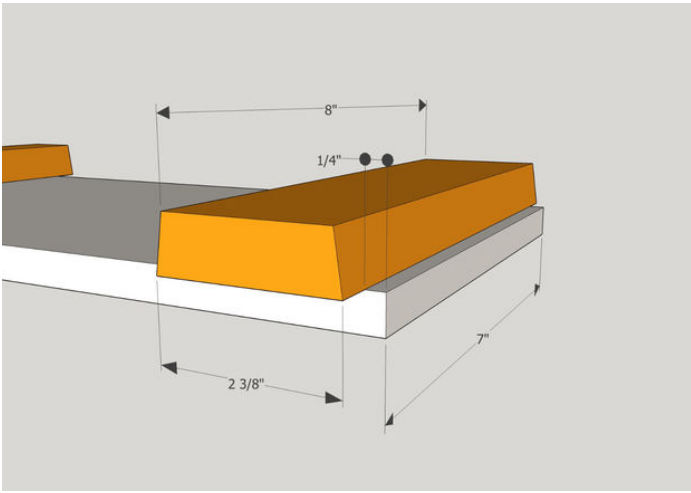
Install, the wide wedge ~0.25" from one end of the Lid; be careful to align the center of the wide wedge with the Lid and that the two pieces are square. Clamp a scrap behind the positioned wide wedge, this will help with alignment during gluing.

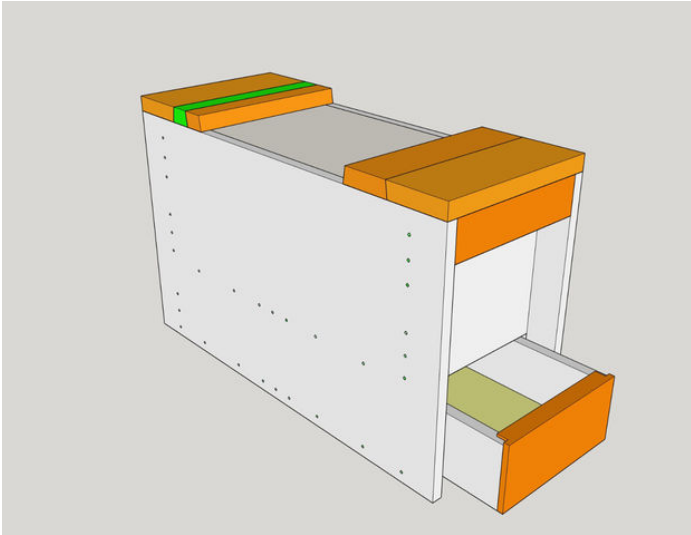
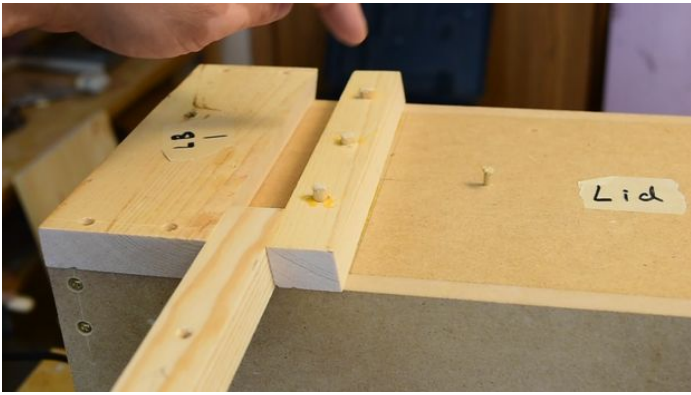
Once the wide wedge is dried, clean up the glue run out and put the lid into the box. Place the key, and place the key-side wedge behind the key, mark the position of the key-side wedge. Take the lid out of the box. Move the key-side wedge 1/16" away from one end of the mark; move the other end 1/8" away from the mark. The key-side wedge is now at a slight angle; mark this position. See video for more detailed and fluid explanation.

Glue and pin the key-side wedge along the slight angle. The key is now too big to fit all the way down, so use a plane to shave layer of the key until it forms a compound wedge that can slide into the angled key-side wedge.

The construction is now completed.







### Step 7: Refinement and Finish

Refine the shape by removing all the sharp edges with files and sand paper, until nothing catches your hand. Any protruding faces should now be trimmed/planed/or sanded flush with the box. Sand to 320 grit. Apply a coat of linseed oil, this is going to darken and enhance the look of the MDF.

Apply a light coat of polyurethane ("light coat" means polyurethane should not "run" even at a vertical), let dry, and sand to 220 grit. Repeat the light coat and sand to 320 grit. Finally, apply a SUPER light coat of polyurethane and let it dry for 2 days and sand with 600 grit. You're going to love the finish.

Don't forget into glue and screw the feet before this step (like I did in the video). It's going to make applying the polyurethane a lot easier.



