A Few Remarks about the Toy Box

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A WARNING – PLEASE READ

Woodworking can be dangerous! It's up to you to determine if you can safely use the tools and perform the tasks needed to complete this and any other woodworking project. If you are unsure, STOP! Get advice from someone knowledgeable or do some careful studying on your own. Be safe!

Always wear at least an appropriate N95 dust mask or respirator when sanding or spraying paint. For advice about dust masks and respirators, visit this link:
https://woodworkingtoolkit.com/best-dust-masks-respirators/

READ, UNDERSTAND, AND FOLLOW ALL OF THE INSTRUCTIONS AND WARNINGS THAT CAME WITH YOUR TOOLS. BE CAREFUL!

This Is Not Standard Documentation – Fill In the Blanks

I generated the original material in this ZIP package just for me, not for a general audience. This gave me the freedom to create a minimal amount of written design documentation. And it allowed the documentation to be technically incomplete. I simply carried some ideas around in my head.

So I suggest that if you want to build the Toy Box, carefully look things over and determine ahead of time if you have enough information to go forward.

It might be sufficient to simply guess at any needed information if you can't find it in the included files.

Please be aware that there might be mistakes in the documentation that I accounted for during the build but failed to note in the documentation.

Non-standard Dimensioning

My attitude toward dimensioning is to make it "good enough." Professional mechanical designers follow certain conventions regarding dimensioning. I'm not that careful. So understand this ahead of time when you find any dimensioning that is unconventional.

The Toy Box

The Toy Box was made for a 4 year old great-grandson. Because it was for family, it was built strong with no attempt to economize on materials. Therefore, all panels were made from 1/2" Baltic birch plywood, not 1/4" standard plywood. The seat was made from 3/4" Baltic birch plywood, plus a strip of solid wood edging along the front edge. With the exception of a few components (the Seat Frame Back Brace and both Soft Close Anchors), all joinery is mortise and tenon. All side and bottom panels are captured in dados/grooves. With luck, the Toy Box will be tough enough to survive intact so that his younger siblings, and possibly other children, will be able get some good use out of it.

The box features a soft-close mechanism to help protect little fingers.

Some of the Toy Box's features:

- Footprint: 36" x 17"
- Height to the Top/Seat: 18"
- Height of the Back: 8" above the seat
- Height of the Arm Rests: 6" above the seat
- Large Framework Pieces: 2 1/2" x 2 1/2" cross-section (3 x 3 x 36 poplar square posts available from Lowe's)
- Structural Pieces (to complement the Large Frame Pieces): 2 x 4 kiln dried Douglas fir cut to width to remove the rounded edges and the width reduced to 2 1/2" to match the larger pi
- Lid: 3/4" x 24 3/4" x 12 5/8" plywood with a 1" wide solid wood edging applied along the front edge
- Lid Hinges: 4 mortised butt hinges suitable for 3/4" thick material
- Soft Close Mechanism: "Sugatsune Lid Stay 105 Degree Open With Soft Close", purchased from Amazon.com
- Cove Molding (1/2 in x 8 ft molding available from Lowe's)

- Name Stencil: purchased from Stencilease.com; a custom stencil was ordered with a particular text in Whimsical style, 4" high
- Plywood: 1/2" Baltic birch front and side panels; 3/4" Baltic birch top
- Glue: Tite Bond II or equivalent
- Screws: As needed
- Finish: Gloss Paint (no paint on bottoms of feet or bottoms of bottom rails)

Figure 1. The Toy Box with the seat closed

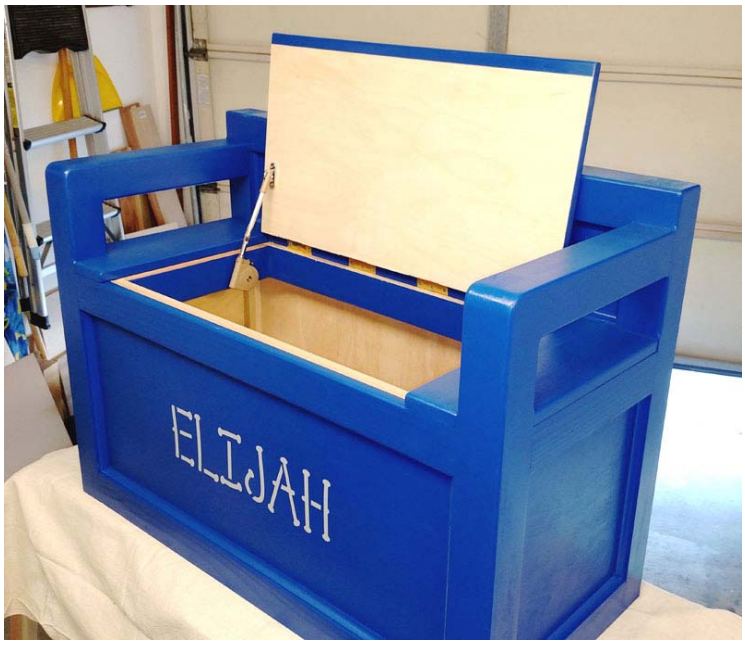

Figure 2. The Toy Box with the seat open

The soft-close mechanism is visible in Figure 2. It can be seen in action in these two videos:

https://www.youtube.com/watch?v=z0ycPJA57Lo
https://www.youtube.com/watch?v=FahaO1IoIRk

Each of the videos shows two mechanisms being used. One seemed to be sufficient for my build. You might want to use two. Use the documentation provided with the soft-cloase mechanisms to determine how to mount them.

A SketchUp File and an Equivalent PDF File

File *Toy_Box_12.skp* is the SketchUp design for the Toy Box. This file is useful since I think all of the necessary details are incorporated here. So, for example, if you find a dimension or other detail missing, it can be determined by examining this file. And, you can orbit and move the model around for a better look at everything.

File *Toy_Box_12.pdf* contains all of the images and dimensions from the SketchUp file. Use this if you're not familiar with SketchUp.

Certain Details are Deliberately Missing

For example, cove molding was used along all of the inside edges of the front and side panels as well as the panel that forms the backrest, but those molding are not part of the design files.

A second example is hardware such as screws and hinges. None of those are shown in the design drawing. So you will have to refer to the photographs and these instructions for guidance in using hinges and screws.

A third example is that many edges are rounded over with a 1/4" radius round-over bit. This was done for the sake of aesthetics as well as to help reduce injuries or bumped heads. The round-overs are not shown in the design drawings so, again, you'll have to examine the photographs for guidance.

Finally, 1/8" round-overs were used along all of the edges on the seat and seat opening. Just look at the photographs to see how the details of the original Toy Box were implemented.

The Details

The information that follows will help to make clear the details of some of the components and construction so that possible misunderstandings might be avoided. Use the included SketchUp or PDF file to follow along with these descriptions.

3/4 View

Look at the 3/4 View page to see the overall configuration of the Toy Box. It's configured like a bench that doubles as a storage box.

The top of the box, both the Top (the door portion of the seat) and the two panels (Seat Left and Seat Right) on either side of the Top, are 3/4" material. That is, the Top is 3/4" Baltic birch plywood and the Seat Left and Seat Right are 3/4" solid wood. All of the plywood in the panels is 1/2". All of the top edges of the three top components and the bottom edges of the Top are softened with a 1/8" round-over bit.

Exploded View

This is a partially exploded view so that it isn't too busy. That is, everything is exploded with the exception of the side assemblies and the front and back assemblies. This is a good reference for identifying the positions of some of the components.

Skeleton

This view shows all of the structural pieces of the Toy Box. Notice that the arms and posts at each of the corners are constructed using material with a 2 1/2" x 2 1/2" cross section. The rest of the structural items are formed using 2x4s cut down to remove their rounded corners and set their widths to 2 1/2"; thus, from the outside of the completed box, all structural pieces have the *appearance* of having the same 2 1/2" x 2 1/2" cross section.

With three exceptions, every structural piece is joined to its mating piece using mortise and tenon joinery.

Two of the exceptions are the Soft Close Anchors. These pieces can be identified in the Skeleton page as the pieces that are spaced 2 1/4" from the front posts.

Unlike all of the other joinery, the Soft Close Anchors are attached using glue and pocket screws. The pocket screws are not shown in the drawing but they are visible in Figure 3.

Also clearly seen in Figure 3 is the third exception to the mortise-and-tenon joinery used in the box: the Seat Frame Back Brace is glued and screwed into place using countersunk crews. Countersinking of screws here is important to avoid scratches or other injuries to little hands.

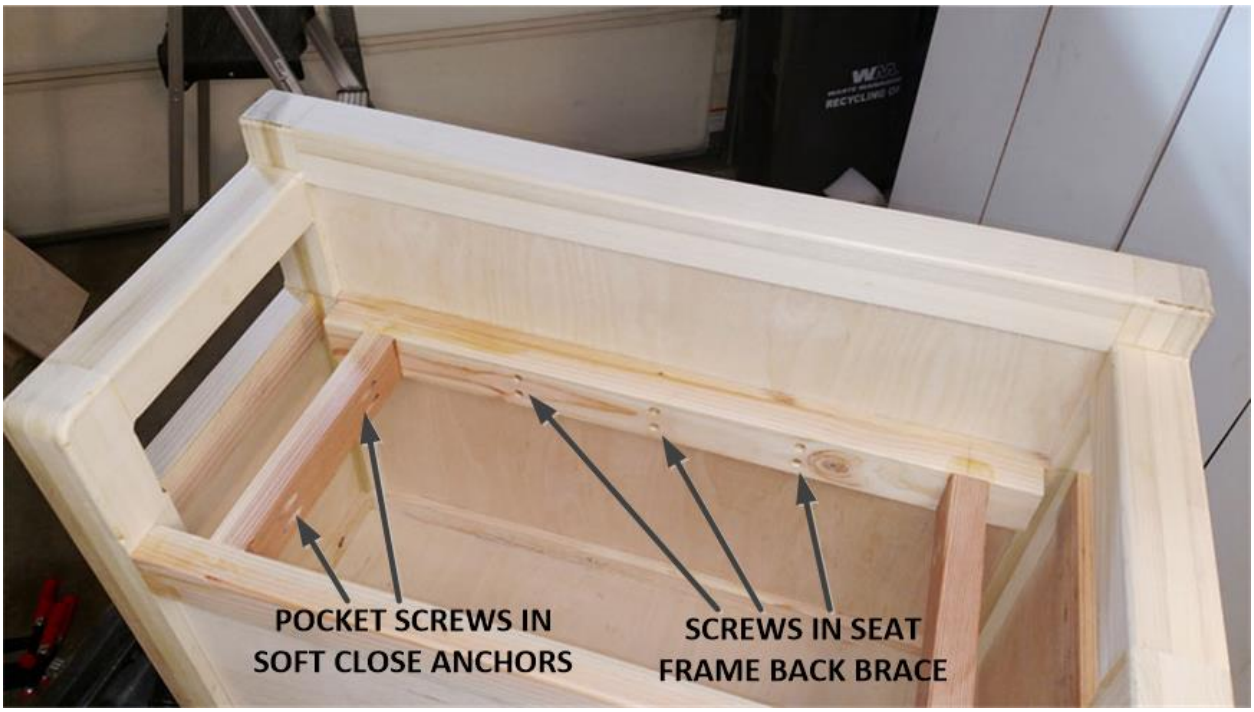

Figure 3. Details of Non-mortised Components

Notice that the Soft Close Anchors make a snug fit with the Seat Frame Back Brace and the Seat Frame Front. It's important to have a good, snug fit here. So custom fit each Soft Close Anchor before gluing and screwing it into position.

Skeleton Exploded

This drawing identifies all of the structural components.

Front Post Left

The Front Post Left is the front post at the left of the Toy Box when facing the front of the box. The drawing details all of the mortises and all of the grooves in this post.

Front Post Left Detail

This drawing shows all of the detail at the bottom of the post.

Front Post Right

The Front Post Right is the front post at the right of the Toy Box when facing the front of the box. The drawing details all of the mortises and all of the grooves in this post. These are a mirror image of the information on the Front Post Left and Front Post Left Detail pages. Figure 4 shows the entire Right Side Assembly, including the Front Post Right.

Notice the mortises in Figure 4. Some of the mortises have round corners while others have square corners. The mortises with square corners were cut by hand. Those with round corners were cut with a router.

There is a total of 22 mortises in the Toy Box. I simply got tired of cutting so many mortises by hand and turned to the router to speed up the build.

Figure 4. View of Right Side Assembly Details

Arm Rest

The two arm rests are simple to cut. Note that their edges are square in the drawing but the edges should be given a 1/4" round-over *after* the side assemblies have been constructed.

Recommendation: Assemble and glue both side assemblies before doing any other assembly. (An example of a side assembly can be seen in Figure 4.) The fully constructed side assemblies will facilitate the assembly of the rest of the Toy Box.

Components that are Given No Comment

All of the pages for the components from the Back Seat Frame through the Seat Frame Back Brace are unremarkable. The drawing for each provides sufficient information to construct each component.

Seat Left Right

The two Seat Left Right components are located under the Arms. They are made from solid wood, not plywood, and are mirror images of each other; that is, make them identical in all ways but turn one upside down. Their locations and orientations are identified in Figure 5.

Note that all of the top edges receive a 1/8" round-over except the edges that abut the posts and back panel. Add the round-overs before assembly.

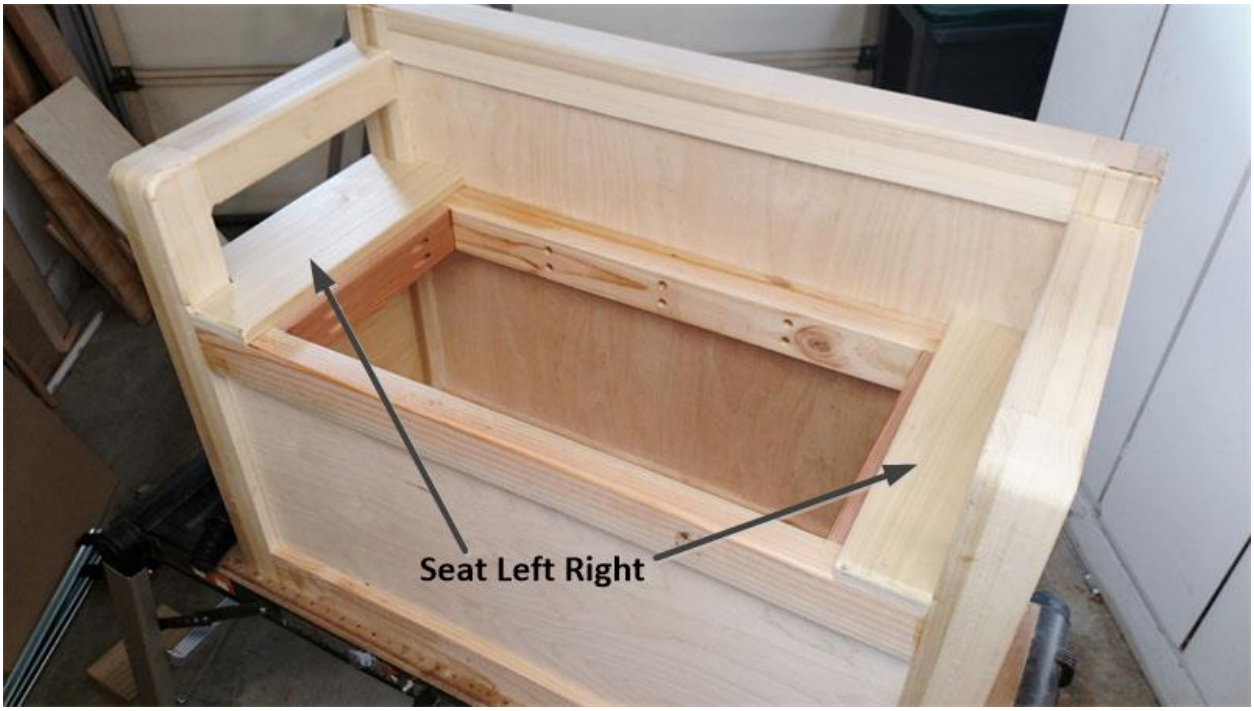

Figure 5. Seat Left Right Locations

Seat Back Rail

The Seat Back Rail is a simple component that would appear to need no description. But this is an important part of the Toy Box. The Seat Back Rail is glued and screwed on top of the Seat Frame Back and the Seat Frame Back Brace using sufficient glue and countersunk screws. This piece must be secured to the frame of the box because the top hinges will be attached to it as shown in Figure 6.

It must be noted that the hinges are mortised into the Seat Back Rail.

Figure 6. Seat Back Rail Location

Top Plywood

The Top Plywood serves two purposes: it's the main part of the seat and it's the hinged door that provides access to the inside of the box.

The drawing shows two pieces, the Top Plywood and the Solid Wood Edging. The edging serves two purposes: 1) It cleans up the front edge of the Top Plywood so that the plywood plies are not visible; 2) It toughens the front edge of the seat to enable it to take a lot of abuse from the sorts of handling that the top will receive. I made the Solid Wood Edging from maple.

I attached the Solid Wood Edging to the front edge of the Top Plywood using glue and four #10 biscuits.

The top and bottom edges of the front of the Solid Wood Edging each receive a 1/8" round-over. Also, the top and bottom edges of the sides of the entire top assembly, i.e., the edges of the sides of the glued assembly, each receive a 1/8" round-over. Apply the round-over after the Solid Wood Edging and Top Plywood are attached.

The back edge of the Top Plywood is mortised to receive the hinges.

Soft Close Anchors

The Soft Close Anchors are simple pieces of 2x4 cut down to remove the rounded edges and to reduce the width to 2 1/2". The length of the pieces must be custom cut to provide a snug fit between the Seat Frame Front and the Seat Frame Back Brace. Glue and pocket screws are used to secure the Soft Close Anchors as shown in Figure 3.

The Soft Close Anchors serve two purposes: 1) They provide places to mount the soft-close mechanisms; 2) They provide mechanical support for the sides of the seat.

More Components that are Given No Comment

All of the components from the Backrest Panel Plywood through the Bottom Panel Plywood are unremarkable. The drawing for each provides sufficient information to construct each component.

Additional Considerations

Cove Molding

Cove molding was used to clean up the joints between the front and side plywood panels and the adjoining structural pieces as can be seen in Figure 7.

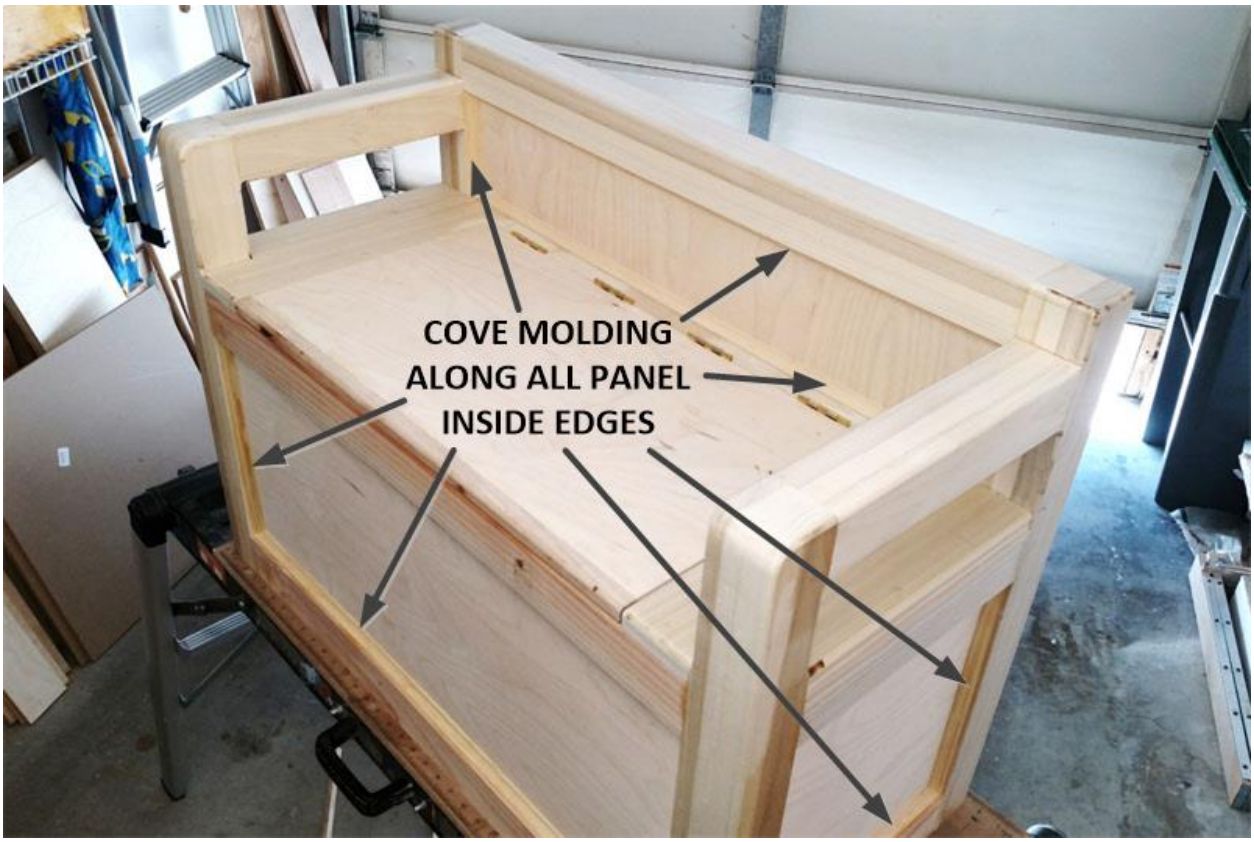

Figure 7. Cove Molding Along All Panel Inside Edges

Fill the Holes

The pocket holes and countersunk screw holes should be filled to enhance the box's appearance and to limit the possibility that little fingers might get caught on sharp edges. Use a suitable wood filler. Spackle such as *Ready Patch* is also very suitable for this purpose.

Round-overs

All of the outside edges of the structural pieces were given a 1/4" round-over. Most of this was done after the box was assembled. The round-over gives the box a much more pleasant and professional appearance. And, it helps to limit injuries if a child should bump against one of the edges.

Paint

I painted the outside of the box a gloss deep blue because that color is one that the great-grandson likes.

You can see in Figure 2 that only selected parts of the inside were painted. Specifically, the inside walls of the opening into the box were painted, as was the bottom edge of the Solid Wood Edging, the sides of the top assembly, and about 1" of the Seat Frame Front below the top. The rest of the inside was left unpainted.

Limited areas between the top assembly and the areas that the top assembly rests upon were painted. The selected areas where paint was applied helps to prevent a "bare" spot from being seen along an edge when the top assembly is closed. The other areas around the seat were left unpainted to limit the possibility that tacky painted surfaces pressing against each other might cause the top to stick closed.

The bottoms of all posts and the bottom edges of all bottom rails were left unpainted in order to prevent paint from rubbing off on the floor or carpeting.

Stencil

I added a stencil of the child's name using a winter gray paint, which seemed to provide a pleasant contrast with the gloss deep blue body of the box. If you would like to use a similar stencil, go to stencilease.com and select *Custom Stencils*. The stencil that you see in Figure 1 and Figure 2 was chosen with Whimsical font 4" high and, I think, 15" wide. The stencil came with a nice feature in that it had a mild adhesive on the back so that it would lay flat on the surface while the gray paint was applied.