How to build a basic Vault Box

Materials and process for completing a simple trapezoid vault box

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### TOOLS:
- Safety Glasses (1)
- Earplugs (1)
- Dust Masks (1)
- Tape Measurer (1)
- Drill/Driver (1)
- Circular saw / chop saw / jigsaw (1)

### PARTS:
- 3/4" Plywood (1)
- 2x4s or 2x6s for framing (1)
- Outdoor decking screws 2" + 3" or nails (1)
- Liquid Nails (optional) (1)
- Primer/paint (1)
- Playground silica sand (Home Depot has this) (1)
Step 1 — How to build a basic Vault Box

- Size is up to you and your design constraints. Our new medium boxes are 36" tall, 32" deep on the bottom, 12" deep on the top, and 48" wide so that they fit through doorways and make efficient use of plywood sheeting. If you don't need to fit through doorways, 36x36x16x48 is a good size as well.

- Weight and base width relative to height are the defining factors for tippiness. Our new boxes are a little narrow, so we built them heavy (about 120lbs) and cut a big hole near the bottom for bracing or weighing them down.

Step 2

- Once you have chosen your size, sketch out each face's dimensions on paper so you'll know how to cut your plywood and lay out your frame pieces. Take your time to plan and think about how to make the best use of your time and materials.

- The sizes you choose for the faces of your box will determine how you build your frame. DO NOT just cut the sheeting and attempt to fit it together with a crappy frame.
Step 3

- We build our frames like we build walls - framed in 2x4s with studs every 16". This is important so that you have enough attachment points for the faces and an internal framing structure to distribute force. You can also use 2x6s on the top and bottom to add strength and weight.

- We used a mitering chop saw to cut the angles, which helps a huge amount.

- Use at least two 3" screws or nails per attachment when framing
Step 4

- Your framing will probably have some irregularities. We've found that the best way to make sure the pieces fit together tightly is to trace the frame onto a sheet of plywood, then cut. If your cuts are accurate, you will have very few gaps in your vault boxes.

- Cut and square up the ends first, then the faces, and then the top so that the sheeting overlaps at the edges. Extra points for angled cuts on the faces for a perfect fit.

- We used spare OSB plywood for the sides once, but it breaks down too easily. If painting, you can get away with CDX, but use BCX or ACX if finishing clear or for the greatest strength.

- Use 3/4" plywood throughout.
Step 5

- Use quality fasteners when assembling your vault boxes. The plywood sheathing provides excellent shear strength (to keep the box in a box shape) and the framing prevents the plywood from buckling in--but if they aren't tied together well, neither will be very effective.

- We sink star head 2" decking screws in at least every 8" into every framing member at PKV. If you're using nails, be sure to caulk down a line of liquid nails on every connection as well for a long-lasting box.

- We round over all exposed edges with a router and 1/2" roundover bit. You can also attack them with a belt sander.
Step 6

- We cut in handles either in the middle or the bottom end of boxes for easy moving and weighing down. A hole saw drill attachment and jigsaw will make neat small handles for carrying.

- Most of our new boxes have larger holes in the sides for putting plate weights and sandbags in.

- If you make large holes for weight you can also put shelves in.

- Save wear and tear on the box bottoms by adding feet. A simple 2x4 cut into a square works. Our new feet are made of metal and rubber and have wheels built in for moving.
Step 7

- Finish your boxes either by painting or clear coating
- For painting, just use any latex primer/sealer, then paint over with any porch/floor paint. You can mix playground sand in with the paint to add some texture for better grip.
  - Two coats of primer will keep the paint on longer.
- Clear coating is a lot harder. Our last process involved staining, epoxying edges and the tops, and using several coats of clear marine varnish with walnut shells added in for grip.
  - See the finishing guide for more details

Step 8

- Enjoy! Tell us how your build goes :)

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