

## **Building an Emergency and/or Composting Toilet**

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I came to build a composting toilet through an interesting evolution of circumstances. Along our road to self-sufficiency, which I expected wouldn't be reached until many years in the future, I also wanted to be sure we were prepared for short term emergencies such as power outages. A friend of mine and I are trying to support each other on this path. She mentioned another friend of hers who lost power for over a week on her farm during an ice storm. She said the thing they had the most issues with was going to bathroom, and that the first thing they did come Spring was build themselves an outhouse. This first hand experience made an impression on me.

In the meantime, all the books I'd been reading about emergency preparedness emphasized the fact that the more prepared you are, the less stressed you will be during an emergency, and the more likely you'll be to survive. Some of the books suggested running emergency drills, such as spending a weekend as if the electricity was off. I wanted to try this, so that we could find out what we really missed when we couldn't use the electricity and to see if we needed additional emergency supplies as a consequence. Also, the books emphasized that if you ran drills, you would be less nervous if the real thing happened, since you'd been through it before and knew how you'd handle it. My husband agreed to run an emergency drill. I actually had to ask plumber friend of mine if we would have running water during a power outage. We were on municipal water system, and I had been able to turn on the water during a brief power outage we had in the past. He told me that we would have water pressure in the water lines and thus running water in our house while the village's water tower was still full enough to pressurize the lines through gravity. Electricity comes into the picture to pump the water up into the tower to fill it, so running water would only be available for a limited time once the electricity goes out.

Our Summer was so busy that it got away from us before we could run our emergency drill, so we were faced with doing it in Winter time. This of course would be much harder. Specifically, we couldn't just take water from our rain barrel and pour it directly into the toilet bowl to flush after we went the bathroom. I wasn't sure what to do instead. I knew that you could take heavy duty garbage bags and put them in your empty toilet bowl, going to the bathroom like usual and removing the garbage bags when filled for later disposal when the water came back on. I did also have a 5 gallon bucket in my supplies to use as an emergency toilet, and I knew that emergency supply companies sold toilet seats that would fit on top of them, but I didn't know how sturdy these seats really were. I did actually sit on top of a five gallon bucket, and found it surprisingly comfortable. However, I wasn't sure it would stand up to our weight if we had to sit on it often for several days. I also imagined that the bucket wouldn't be comfortable when you were on the toilet for a long time having a bowel movement, or during an emergency if you got diarrhea from eating whatever food was available. So I tried to come up with an alternative solution while I kept putting off our emergency drill.

My friend who told me about the power outage on the farm had also sent me the link to a Mother Earth News on-line article about a couple who built a composting toilet for use in their off the grid cabin. It was essentially a sturdy box with a regular toilet seat, which I was sure would stand up to repeated use, built around a 5 gallon bucket. Thus I conceived my idea to build such a toilet for use during our emergency drill, and then went on to explore its other uses. We were able to build our emergency toilet almost entirely from supplies we had around the house. Here's a description of how we made our box, along with the mistakes I made so that you can avoid them.

Supplies Needed:

- scrap wood: 1x8s and 2x2s

- scrap plywood for the toilet seat top
- 1 5/8" screws and possibly nails
- a commercially made toilet seat
- a 5 gallon bucket with a handle
- equipment: drills, saw, jigsaw, sander, measuring tape, carpenter's square for 90 degree angles, hammer, pencil
- stain or paint

I wanted to make the toilet as small as possible because we have a very small bathroom. The final size of our toilet was 15" wide by 18" long by 15" tall. I chose 15" height because I had 1x8 scrap lumber (which is really 1 x7 1/2"), so that two pieces stacked on top of each other would be 15" and take the least cutting. We had several 5 gallon buckets and they all seemed to be 14 1/2" tall, so 15" would be just above the bucket, cutting down on splashes. The 15" width was the smallest I could use and still accommodate the bucket handle (the bucket itself is 12" in diameter). The 18" length gave us enough room to reach in and pull up the bucket handle, as well as having enough room to attach the toilet seat lid.

### Cutting Wood

- Begin by cutting the 1x8 wood for the sides of the box and the 2x2s for the inside corners.
- Cut four pieces of 1x8 to 13 1/2" long (two to each short side of the box), and another four pieces 18" long (for the longer sides).
- Cut four pieces of 2x2 15" long. Other toilet designs don't use the 2x2s, but I wanted them for extra support, and as something to which the sides could be easily attached.
- If you are new to carpentry, here's a tip. When cutting multiple pieces the same length, measure your first one twice, then cut it. Use it as a template to measure the other pieces of the same length, instead of using a measuring tape. Then all the pieces should be the same length, even if they are slightly off the desired measurement. In this project, it is more important that the sides be of equal length so that the box is square, rather than conform to exact measurements, as long as the bucket still fits inside the box.
- Sand rough parts of the wood as much as desired.

### Build the Sides of the Box:

- I started by assembling one of the short sides of the box. Screw two 1x8x13 1/2" pieces of wood to two 2x2x15" supports. You'll want to begin by placing the 2x2s down on your table, put the 1x8s on top of them, and then screw through the 1x8s down into the 2x2s. If you have two drills, use a bit in one to drill pilot holes for the screws, and a bit in the other to drive in the screws.
- I used two screws per side to attach the 1x8s. When deciding where to place the screws, remember to leave room to drive in the screws to attach the perpendicular wall, as well as screws into the bottom of the 2x2 to attach the bottom of the box (we forgot the later, so used nails instead).



Photo 1- assembled side wall of the box turned over for better view

If you were to do this the other way around, screwing through the 2x2s (laid out like the finished version shown in Photo #1), you would need longer screws that would go all the way through the 2x2 and into the 1x8s. I tried this first, but it was such a large screw that it split the 2x2. Alternately, you could also use nails instead of screws.



Photo #2- The second side being assembled.

- Continue assembling the other sides. See Photo #2. You can stack the next side and the next 2x2 without them being assembled and make sure everything fits. Then attach with screws.
- Continue with the third side (Photo #3). Now you can place your bucket inside to make sure your box is the right dimensions.



Photo #3: Testing bucket inside three assembled sides to see if it fits and if the handle can be used.

- Make sure you have the corners assembled correctly. The shorter sides go inside the longer sides when attaching the sides to the 2x2 supports. See Photo #4 for how they are assembled. I did this wrong, and when I got three sides assembled, I noticed that one end of the box was 18" like it was supposed to be, but the other end was 19". An obvious mistake in retrospect.



Photo #4: Box laid on it side to show how the corners are assembled, with the shorter sides inside the longer sides.

- When I had three sides assembled, I noticed that one of the corners was not sitting at a 90% angle. To fix this, I made a 16 1/2" long jig from extra 1x8 and pushed it between the two sides to which I would attach the fourth side. (See Photo #5). This held the box square as I attached the final side.



Photo #5: Using a temporary jig to hold the three assembled sides in place so the fourth side can be attached in such a way that the box ends up square. The piece sticking out the top of the box is the jig.

- To make a bottom, we used two more pieces of 1x8 since we had them and measured them to fit. We nailed them into the 2x2s. They did not cover the entire bottom, but left a slight reveal on the two sides, which was not a problem.

- We used plywood for the toilet lid. We cut a piece that was one inch wider than the box on all sides. This overlap would serve as a way to lift the lid off the toilet. We attached  $\frac{3}{4}$ " trim around the bottom edges of the top, so that it would keep the top from sliding too far to one side. If you are better carpenters than us, you could use 1" trim that would not leave any slippage room, if your box is perfectly square. Photo #6 shows the bottom of the lid.



Photo #6: Bottom of toilet lid with trim attached around edges.

- Next , you need to figure out where to cut the hole in the toilet lid. In my design, we pushed the bucket as far forward as possible in the box, and we pushed the lid as far back as possible. I tested this with the toilet seat on top (but not the lid we just made), to make sure this would leave appropriate room for attaching the toilet seat.
- To figure out where to cut the hole, I measured the width of the front wall ( $\frac{3}{4}$ " ) and the distance to the inside rim of the bucket. Then I added  $\frac{3}{4}$ " to this measurement to account for the overhand of the lid (which was the width of the trim when pushed all the way back. I measured this distance in from the edge of the lid (2" in). I also measured the center of the width of the lid, which was at  $8 \frac{1}{2}$ " from an edge (half of 17"). Where these two lines intersected is where I wanted the edge of my hole.
- Since the bucket was  $11 \frac{1}{4}$ " on the inside rim, I wanted my hole slightly smaller in diameter, 11". Half of 11 is 5.5, so I marked center of the circle point at  $5 \frac{1}{2}$ " up from where I marked the edge. I used a compass like the ones we used to have in geometry class to draw the circle, setting the compass at a width equal to the radius of the circle ( $5 \frac{1}{2}$ " ).
- To cut the hole, you'll need a jigsaw. Drill a hole on the edge of the circle that is wider than the blade on your jigsaw, insert the blade, and cut around the circle. Either my measuring or drilling was a little off, because my circle ended up being slightly wider than the rim of the bucket.
- To attach the toilet seat, you'll need 2 bolts, 2 washers, and 2 nuts. It's best to use either plastic and/or wing nuts for easiest removal when you need to replace the seat. Assemble everything and put the toilet seat in place. Lift its lid and make sure the hole in the seat is over the bucket. Mark

where the bolts go and drill the appropriately sized holes. Attach the seat, with the washer and top of the bolt on top, and the nut on the bottom.

- We also attached handles on the sides of the box so we could pick it up and move it more easily and added some shims inside the box to mark where the bucket should sit (and to be sure it didn't move.)



Photo 7- Toilet assembled except for attaching toilet seat.