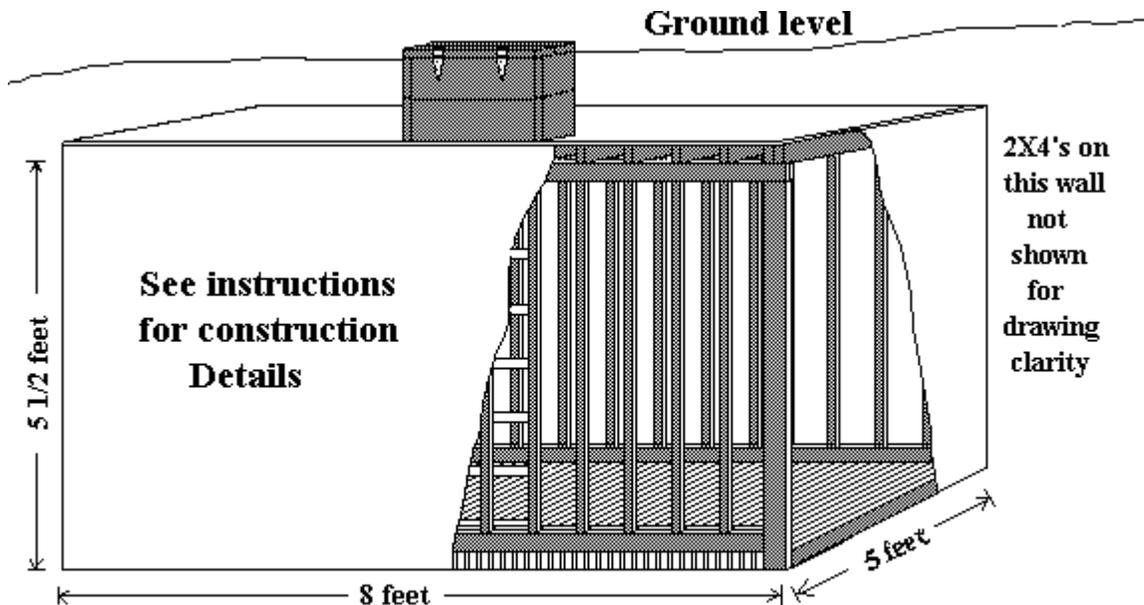


A Modern Underground Storage Cellar

This is a great example of what can be done as just about anyone who owns even a small piece of ground can make and use it.



Underground Storage Room, Cutaway View

Things went well as he dug the hole by hand until he unexpectedly struck bedrock at seven feet down. He would have liked to go deeper. In actuality, (unlike the drawing) his floor has a step in it, following the uneven bedrock. The level of the bedrock also forced him to make his roof 6 inches lower than he planned. The entrance way is a box 2 feet square and centered on one of the long walls. It is made from 2X10 lumber with the hatch made of the same material and hinged to the entrance boards. A ladder descends to the floor of his cellar for easy entry and exit.

Construction: The floor consists of pressure treated 2x4s using the bedrock as a foundation. The 2x4s are spaced with gaps, to allow any spills to flow down into the bedrock. The walls are made of 3/4 inch plywood supported by 2X4's spaced on 9" centers. The bottom support beams (to the bedrock) are pressure treated 4x4s. The ceiling is supported again by 2X4s on 9 inch centers. The top is made from two layers of 1/2 inch plywood.

It was finished by waterproofing it with two layers of heavy duty landscaping plastic, staggered to overlap significantly. It was first wrapped around the sides, then draped over the top and down the sides. Finally, tarpaper was layered over the

top and down the sides to protect the plastic from any rocks during the backfilling operation which just about completed this little project except for relandscaping the area. Only a foot of dirt covers the roof. Initially two feet was planned for, but again, the unexpected bedrock altered these plans.

Before the roof went on, two 55 gallon water barrels were set in one end of the shelter. After construction was complete, buckets of preserved foods were stacked on the other side. Between the barrels of water and the buckets, a set of deep shelves was made opposite the ladder for other goods. Note that none of these items are shown in the drawing.

A final note: Even with only 1 foot of dirt, the builder is getting a maximum temperature of 70 degrees in his shelter on 95+ degree F days with the cellar area in the full sun. As this only lasts for four months out of the year, it will be cooler during the other seasons.

PLYWOOD SHELTER - 2

Ideally, one or a few of those Sea Box type-shipping containers would be great shelter design, but at US\$4,000+ each, that's not within a lot of peoples grasp. Wood frames can withstand a great amount of wind, but they also have their limits.

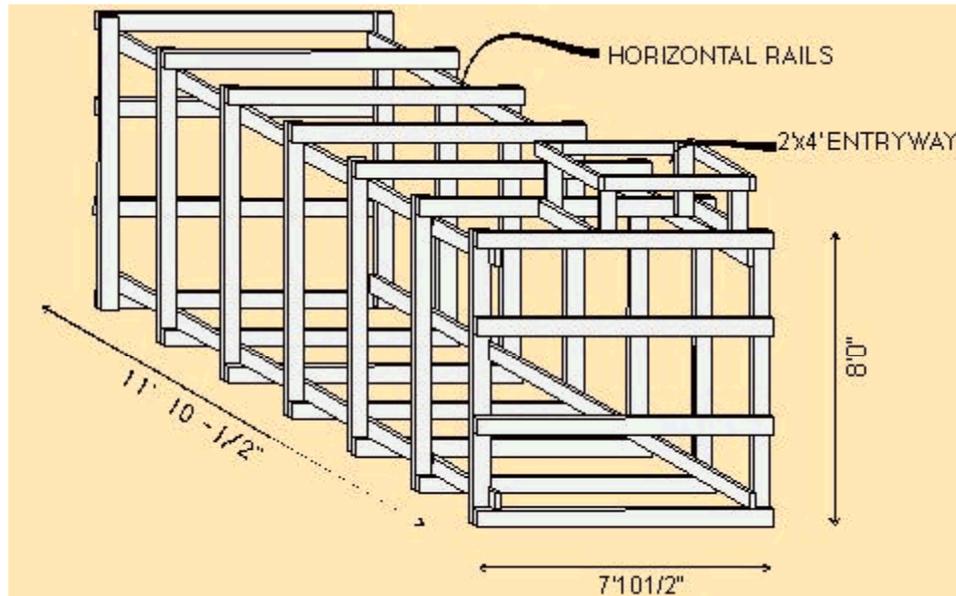
Here are plans for a simple box, that can be put, or more likely built in a hole. Properly covered, it will withstand a great deal of adverse conditions. Since money is by no means plentiful in our lives today, this is planned as simply as possible. Once decent shelter is achieved, comforts can be added as the materials are acquired.

UNDERGROUND, WATERPROOF? WINDPROOF? EARTHQUAKE RESISTANT? SHELTER

Most of us are physically able to dig a hole by hand with a shovel, pick and pry bar. The hole has to be about twelve feet wide, by sixteen feet long. Depth is up to you. The deeper, obviously, the better. Save what dirt that comes out of the hole, as it can be used to cover your box. Based upon experience, in packed soil, with six-inch rock, a four feet deep hole took me four days of unforgettable hard labor. Many hands make for light work. GET HELP!!

The simplest waterproofing would be by using landscape plastic. Six mil would be the best. But if that's not available, the heaviest you can get is better than none. You are going to wrap the entire box in plastic, then fill in the hole around the box and cover it also. This is why deeper is better. Before you begin putting your frame together, line the hole with the plastic. You will be assembling the frame over the plastic, so be careful not to puncture it.

The box, as shown in Figure 1, is made up of five ribs, and two ends.



The box will be seven feet, ten and one half inches wide, eight feet tall, and eleven feet, ten and one half inches long. The shaft for the entryway is two feet wide by four feet long by two feet high.

MATERIALS

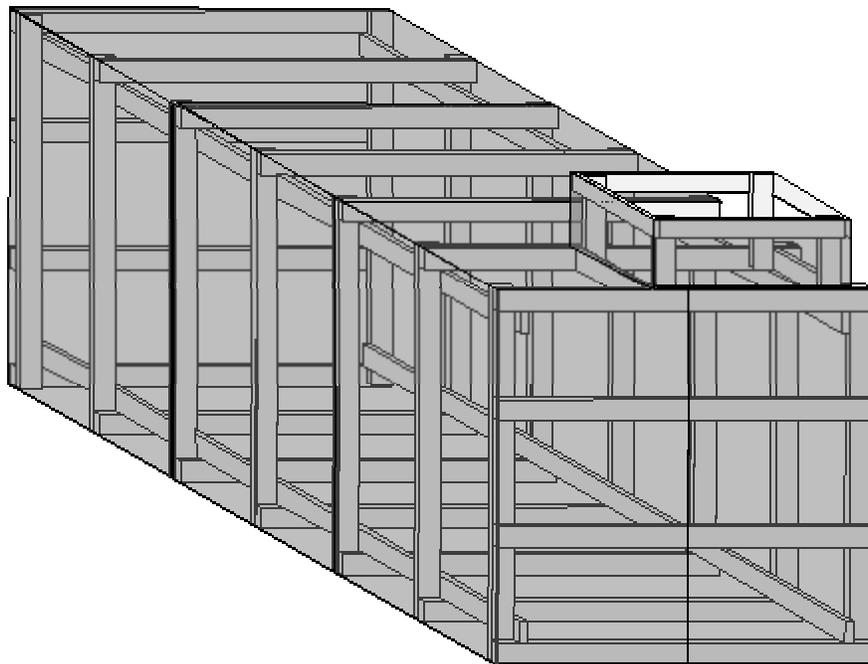
- 40 -- 2 x 6 - 8'
- 17 -- 4' x 8' x ?" Wafer Board (this is like particleboard, but with larger chunks of wood. It's cheap!!)

Materials should be around \$500.00 for this project. This does not include the hardware to fasten this thing together. A roll of black, 6 mil plastic, 20 feet wide by one hundred feet long is \$50.00. If plastic is not available, no reason why a lot of paint and caulk won't work just as good. Worse case scenario, and if nothing is available, don't cover it.

As far as fastening this thing together, if I have power available, I plan to use 3" deck screws to fasten the 2x6's together and 2" deck screws to attach the wafer board to the frame. If there is no power, then a good old hammer and nails will have to do. 10d cement coat box nails if possible, for everything. The problem with hammer and nails is that things tend to vibrate and loosen with such a frame. Have a good heavy brace on the other side of what you're nailing, like an eight-pound sledgehammer.

The horizontal members of the ribs and end pieces should be cut to seven feet, ten and one half inches long. All vertical members are to be eight feet. This allows for the overlap of the top panels over the side panels. See Figure 2 below.

Construct the ribs and ends, and using the horizontal rails, fasten the frame together. Everything must work in two foot increments, so the panels will match the frame. Be as meticulous as you can in making the frame square. Everything will fit better, if you do. Remember that your panels are four feet wide, and must butt together in the center of the rib.



Once the frame is complete, your panels can be fastened to the frame. Do one end first, then the sides, working from one end to the other.

Before you do the remaining end and the top, cut your floor panels to six feet, ten inches long, place them inside, and fasten them down. Finish the remaining end.

You can now put the two whole top panels in place, and then cut the last panel to fit around the entryway. The last panel you have will be used to cover the access way chimney. I did this to help keep debris from falling inside. Make the hatch cover three inches bigger than the outside of the chimney, and frame it with the last 2x6. It will cover the hatch, and fastened down with hook and eyes, will provide some security.

The dimensions for the chimney are left out. Just measure and cut to fit.

When you have reached this point, and have a ladder inside for access, finish wrapping the plastic around everything. Back fill your dirt around the box and cover it about a foot and a half on top. Pack it down as best you can so it won't blow away.

The inside can be finished with wood frame bunks for sleeping and storage. The exposed interior studs are easy to work with. Whatever framework you may add inside, fasten it as much as possible, to the sides, top and/or bottom. This will serve to reinforce the entire structure.

Since the entire box is covered in plastic, it won't breath very well. A lot of bodies generate moisture. With nowhere to evaporate, this will eventually become a problem in moister climates. The hatch ventilation may or may not be sufficient.