**How to build a sturdy shed enclosure 14' x 14'
NOTICE: these plans are for a shed like structure that sits on unsecured deck blocks which may not be suitable for all locations especially in areas where tornadoes or extreme high winds are prevalent or on unstable ground. Consult your local contractor or architect before building in these areas please.
TOOLS NEEDED: I used power tools but hand tools would work just fine. You'll need a saw, hammer, screw driver, drill, bubble level, tape measure, square, 6' step ladder and extension ladder.
TIME REQUIRED: I built my shed enclosure in from start to finish in two weeks by myself working 4 hours on weekdays and about 8 hours on weekends so I figured about 80-100 hours total time. This could have been greatly reduced with two or more people working together!
APPROXIMATE COST: I built this enclosure from all new materials at a cost of less than $2200 (excluding windows, doors, and deck). You can use recycled materials to save money or better materials if you desire. The windows are double pane low e-glass and the doors are steel insulated which I got for nothing from a trailer that was being demolished. Use the best doors and windows you can find as they are real heat robbers if done cheaply! There is a materials list at the end of the plans.
SKILL REQUIRED: if you have used power tools and built a shed or a dog house yo. Can probably handle this project. If you are not sure of your ability then please get help from someone with building experience.
STEP 1: pick a location
Before you start building I would like to offer this advice. The prettiest place by the river or high on a hill may not be your best place to build. Pick a spot protected from wind and flooding but gives you good southern exposure so to take full advantage of the sun to help with heating cost.
For your foundation you need 50 deck blocks that accept a 4x4 post available from your lumber yard store or any place that sells lumber for decks. If you want a permanent foundation then use pier tubes and concrete poured below the frost line and a 4x4 deck post pier. For these plans we will use the deck blocks.
Place the deck blocks on firm ground. If necessary, tamp the earth down with a big heavy log. You will need (5) 2"x6"x14' boards and (4) 2"x6" corner braces for the frame. Screw the frame together with the mounting braces and place the frame on the deck blocks.
Now square your frame by taking a piece of string and a tack and place the string from one corner to the other cross corner. Mark where the sting come to the corner. Then do the same thing on the opposite corners. You will have to move the corners in or out until you get a perfectly squared frame also adjust the deck blocks so they are directly under the corners ready for the 4"x4"s. If you skip squaring the frame your wall and roof panels will not fit without lots of trimming and waste so take the time to do this step correctly.
STEP #2: Put in your 4"x4"corner post and floor joists
Now if your frame is square you can drop your 4"x4"x10' I to the deck blocks and attach the frame to the post using 3 inch deck screws and 2corner braces and (4) 20 penny spikes. I put my floor at 18 inches from ground level to allow access under the shed if necessary and I suggest you leave some crawl space. Use you bubble level to level the post both directions but don't be concerned if it's a little out of level at the top as this will be fixed when you attach the beams and sidewalls.
Using floor joist hangers (ask your hardware person) place your floor joist on 16" centers. You shouldn't need to cut anything if you run the floor joist the same way your frame runs. One of the directions of the frame will be exactly 14 feet if you put you frame together as stated.
TIP: rough cut lumber can be purchased directly from a lumber mill of find an old house or building being demolished and salvage the lumber for your enclosure. Make sure recycled lumber does not contain live insects like termites or carpenter ants. Borax is a natural safe pesticide when applied to wood. Cement blocks, pavers, and old bricks are discarded by the truckload when old commercial buildings and houses are demolished. Ask around and you can probably get theses for free for the taking. This will save you a lot of money on the deck blocks. You will want to place the remainder of the deck blocks to support the weight of the substrate under the floor joist.
STEP #3: put in your floor braces and insulation
Because you will use 4'x8' sub flooring I recommend a floor brace (2"x4") placed every 2 feet making sure that when you lay the sub floor that you have something to attach your sub floor to. This way you will only have to trim one side of the sub floor panels.
I used R19 insulation in my floor. You may not need insulation but I highly recommend it if you don't want cold floors. Time to start the insulation. I placed the the insulation batts right on top of the floor joist and stapled them down. Some people say do it from the other side but because my floor will be completely enclosed there is no need and my way is much easier. I suggest laying down a heavy black plastic under the entire floor to act as a vapor barrier and to help prevent radon gas build up.
TIP: fiberglass batt insulation is one type of insulation or you can use styrofoam, or cellulose (shredded paper).
STEP #4: Put on your sub flooring
I used 3/4 inch tongue and groove wafer board sub flooring. It's heavy and solid and won't sag under heavy substrate. Use a block of wood and a hammer to tap stubborn sheets in place until the grooves match neatly. Use 1 1/2 inch deck screws every 12 inches to secure the flooring. You will need to trim out a 4 inch opening in each corner to fit the posts. Save the trimmed pieces and fit them back around the post for a finished look. Trim off the flooring to fit smoothly on the frame. Save these scrap pieces as they make great shelves for the inside the enclosure.
TIP: a sub floor can be made of any good solid wood of equal thickness.
STEP #5: install beams, sill plate, and wall studs
I used (2) 2"x4"s screwed together to make each of the cross beams. Measure the distance between the corner post at the base and cut to that length for a tight fit. Attach beams to corner post at 8 feet from floor using metal L braces (see hardware person). Level the corner post with your bubble level and you may need to push or pull them to get them level. Sill plates are 2"x4"s screwed to the sub floor and floor frame. Wall studs go on 16 inch centers between beMs and sill plate. Toe nail or screw in place. Decide where your door and windows will be before putting in your wall studs!
TIP: most glass and door installers give or sell salvaged windows and doors. My recycled doors are steel insulated and were free from a glass shop. Try to get insulated solid core doors. Windows should be double pane with wood or vinyl frames if possible. Avoid single pane windows and cheap metal framed windows that leak.
STEP #6: frame your door and windows
When deciding where door and windows go here's a little advice. Put most windows on the south side to catch the sun in winter and a few if any on the north side to avoid heat loss in winter. Because all windows and doors are different you should measure yours and make openings to fit. Most exterior doors are 36"x6'6" but you may build your own any size. Frame the openings with 2"x4"s screwed to your wall studs.
STEP #7: Put on wall sheeting
I used exterior grade T1-11 plywood for my wall sheeting but clapboard or other material should work just fine. The walls are 8 feet high so just lean the panels up and screw them to the studs. I cut my door and window openings out after I attached the sheets using a power jig saw. Now is a good time to install door and windows if you have them. A little advice- hinge your door to swing out wards to save room in the interior of the enclosure.
NOTE: you may choose to install a vapor barrier such as tyvec or roofing felt under your wall sheeting. This is recommended in high wind, rain, and humidity locations but is not necessary in all locations and is not included in the costs in these plans.
STEP #8: building your loft
I designed this to have a loft for storage as it doubles your interior space but you could leave it out or do a half loft as you want. I used 2"x6"x14's for the loft joists attached directly to the wall studs at 7 feet from the floor with a second 2"x4" brace under each end for added support. I used 5/8" wafer board for the flooring screwed every 12 inches for strength. Putting your loft floor at 7 feet high will give you 7 feet head room up and downstairs at the peak in your loft. Decide where your lift access door will be. I suggest putting in the center near an end wall so you don't pump your head climbing into the loft. A good size access door is at least 36" x 36". You can build a simple ladder out of 2"x4"s and several 2"x4" braces spaced about 2 feet apart and attached to the rails using 3 inch screws.
TIP: Attic space is usually wasted space but with a loft will almost double your space and is a great place to snake cages since lofts usually stay warmer in the winter as warm air rises.
STEP #9: Building your roof rafters
I used 2" x 6" x 10's for my rafters because that give me 5 inches of overhang and 7 foot headroom at the peak. To make your rafters cut 4 1/2 inches angled to the corner of the rafter which is slightly more than a 45 degree angle. Toe nail or screw two rafter sides together to form a big V. Attach your rafter brace using screws (see hardware person). Rafter braces should accept a 2" x 6" or 2" x 8" girder. I also made a small gusset of scrap wood that I screw to each rafter for extra support while u put them in place. Add a 2" x 4" collar tie to each set of rafters for added support also on each side attach each rafter to the wall with a hurricane tie.
STEP #10: put in the roof girder and install rafters
Use a 2" x 6" x 14' for your center roof girder. Screw it in to the first rafter brace and place a 2" x 4" scrap brace under the other end so it is level (use your bubble level to level the rafter and the girder). Attach a collar brace to each rafter. A collar brace is just a 2" x 4" that lays under the girder and is screwed or nail to both side of the rafter for extra support. Slide your rafters over the girder and lick them in place with screws through the girder brace. Rafters go on 16 inch centers. Attach the bottom ends of the rafters to the beams using metal rafter braces (see hardware person).
TIP: Installing the rafter is really a two person job. I highly recommend getting help for this step of the construction.
TIP: If you build you loft first you can stand on this floor to install your rafters much easier and safer. If you are working from a ladder be VERY careful as rafters are heavy and unwieldy. Get some help for this step please!
STEP #10: Putting on your roof sheeting
I used 5/8" wafer board but you can use 1/2". It is easier to slide the panels onto the roof from the ground and tack them in place then go back up to the loft to screw them at 12 inch spacing.
NOTE: There needs to be 1 foot of overhang on the ends. You shouldn't have to cut much if any if you use 4' x 8' sheets.
TIP: If you put windows upstairs one on each end this will give you light and in the summer help with a breeze if it gets to hot. I used 30 pound Tamco roofing felt and felt nails under my shingles. You can also use this under metal roofing if you decide to go that way. Put on a metal drip edge over the felt and under the shingles to prevent rain and ice from dripping under your eves. You can attach a 2" x 4" to the front and rear of the overhang edge for a nice finished look and I cut a sheet metal triangle to cover the small gap at the peak and gave it a unique finish.
TIP: I used asphalt shingles which are fairly cheap and widely available but if you want to catch rain water (saves on your water bill) I would suggest a metal roof instead. The cheapest is the shiny corrugated metal doors used on barns and it reflects sunlight to reduce heat in the summer.
STEP #12: Install your shingles
I used Tamco 30 year shingles because I was doing this all by myself and they are easier to handle, but a metal roof would be great, if you have never installed shingles read the back of the package and follow the directions and you will do fine. Use some of your scrap lumber to enclose the rafter ends. I used a piece of T1-11 left over from cutting out the doors. Just screw them to the end of the rafter and bottom to enclose the roof.
STEP #13: Insulating walls and roof
I used R19 batt insulation but blown in would works great. Go with the highest R value in you roof as that is where you will lose the most heat in the winter and gain it in the summer. If you never installed insulation read the package and ALWAYS wear gloves, mask, and eye protection.
STEP #14: putting up the interior wall material
I chose 3/4" plywood since the substrate will be pushing against it and you don't want the plywood to fail. Just cut each piece to 7 foot long and stand up on end the using 1 1/2" deck screws attach to the walls and repeat until all walls are covered saving all the scrapes to use for selves or what ever.
TIP: you will want to underpin the shed to keep cold air out. You can use left over wood for this or get fancy with it and rock the foundation with river rock use your imagination also you can add add a deck to the front of it for you to enjoy the nice weather.
Material list
FOUNDATION:
(50) deck blocks
FLOOR:
(14) 2x4x14s
(6) 4x8 t&g sheets
(3) rolls if R19 insulation
WALLS:
(4) 4x4x10s corner post
(65) 2x4x8s
(8) R19 insulation
(14) 4x8 sheets T1-11 siding
(14) 4x8 sheets of plywood
LOFT/CEILING
(10) 2x6x14s
(8) 4x8x5/8 plywood
(8) 4x8x1/2 plywood
ROOF:
(24) 2x6x10s rafters
(10) 4x8 sheets wafer board
(2) rolls roofing felt
(6) squares of shingles
(4) rolls of R19 insulation
NOTE: you can save a bunch of money by getting as much of these materials from remodels and demo jobs old barns that need to come down are a great source for lumber.**