

How to Build an Earthbag Roundhouse

by [Owen Geiger](#) on January 28, 2011

Table of Contents

License: Attribution Non-commercial Share Alike (by-nc-sa)	2
Intro: How to Build an Earthbag Roundhouse	2
step 1: Earthbag Foundation	2
step 2: Door Thresholds and Door Bucks	3
step 3: Stacking Soil-filled Bags	3
step 4: Measuring the Radius	4
step 5: Tamping and Leveling	4
step 6: Metal or Wood Anchors	5
step 7: Anchors for Electrical Boxes	5
step 8: Window Bucks	6
step 9: Bond Beam	6
step 10: Build the Roof	7
step 11: Install Doors and Windows	8
step 12: Cement Plaster on Exterior Walls	8
step 13: Earthen Plaster on Interior Walls	9
step 14: Finishing Details	9
step 15: Interior View	10
step 16: Exterior View	10
step 17: Conclusion	10
step 18: Final Earthbag Roundhouse Video	11
Related Instructables	11
Comments	12

Intro: How to Build an Earthbag Roundhouse

Note: If you're new to earthbag building, please read the introductory [Step-by-Step Earthbag Building](#) Instructable first.

We built this earthbag roundhouse in 2010 as part of an earthbag workshop in Thailand, and finished it later that summer. Roundhouses are perhaps the simplest, fastest, easiest earthbag structure to build. We're extremely pleased with the results, especially in terms of strength and cost. This is one of the strongest structures I've ever worked on in my 30-plus year construction career. The main impression is one of incredible fortresslike strength - massive walls with no sway. I'm sure it could easily withstand a direct hit by a speeding vehicle. This is no exaggeration. There's been at least one incident where a drunk driver hit an earthbag wall and only chipped the plaster. (The vehicle was totaled.) Earthbags also excel at withstanding floods, hurricanes, tornadoes and earthquakes. Engineered plans are now available for whatever conditions you face. Earthbags are even bullet resistant, as explained in our highly popular blog post where compressed earth withstood 50 cal "BMG" 661 grain Full Metal Jacket rounds. [Bullet Resistance of Compressed Earth](#)

The other key advantage of earthbag is cost. For our roundhouse, we wanted things to look nice, of course, but we didn't want to spend a fortune. The final cost came out to \$11.50/square foot. Most stick-built houses are \$100/sq. ft. and up, so this roundhouse demonstrates how anyone can build their own home even on a very tight budget. We used a few basic, low cost methods to class up the roundhouse: rounded window and door openings (free), nice colors (no extra cost), curved bathroom wall and buttress (no extra cost to create curves), exposed wood and thatch roof (dirt cheap), earthen plaster on the interior (really dirt cheap), and lots of beautiful old windows for views, ventilation and to add a sense of spaciousness. In summary, build small -- just what you need, use simple shapes, pay with cash, and add on later if needed.

Basic project information:

18' exterior diameter; 15' interior diameter; 177 sq. ft. interior floor space; total cost of materials: \$2,045, which is about \$11.50/square foot

This Instructable is not an exhaustive how-to article. It would take an ebook to cover everything, which is what I'm finishing up at the moment. My new earthbag building book will be available soon -- probably near the end of February 2011. Watch for the announcement and stay up-to-date on all the latest earthbag news by following our [Earthbag Building Blog](#).

The following instructions assume you have cleared and leveled the site, removed topsoil, positioned fill soil around the building site to minimize work, dug a trench to stable subsoil, buried any utilities, put about 12" of gravel in the trench, and added a center pole with stringline to measure the radius. Bags or tubes can be used. We demonstrate bags, because they're often available recycled for very low cost. My [YouTube Channel](#) has short video clips that show each step of construction.



Image Notes

1. Finished Earthbag Roundhouse

step 1: Earthbag Foundation

Earthbag foundations -- gravel-filled bags or stabilized bags -- offer many advantages over reinforced concrete foundations and work well with many types of sustainable buildings. In particular, they are low-cost, fast and easy to build, require no cement (a major expense and cause of global climate change), and require no forms or expensive equipment. In cold climates you can use lava rock or pumice to create an insulated foundation. This one simple step can save you thousands of dollars over building with concrete, and cut your energy costs.

Typical earthbag foundations are made with poly bags (double-bagged for strength) filled with gravel. Aggregates are preferred for foundations because they will readily drain away any moisture and prevent wicking into the wall system. Some prefer to use stabilized soil in earthbag foundations, seeing it as a longer lasting solution. The jury is still out, but it appears poly bags kept out of sunlight can last hundreds of years, so gravel-filled bags should last at least a lifetime.

Simply fill the bags in place with gravel. Stitch the ends closed or fold the bag end over. Butt each bag tight against the previous bag. Tamp the bags flat after each course is complete. Add two strands of 4-point barbed wire between each course. Add courses of gravel-filled bags until you're at least 6" above the risk of moisture damage.



Image Notes

1. Last Course of Gravel Bags



Image Notes

1. Completed Gravel Bag Foundation

step 2: Door Thresholds and Door Bucks

You'll want durable thresholds at entry doors. I recommend concrete or stone for this purpose. In this method, finished floor height (F.F.) is the same height as the threshold. In other words, the threshold and floor will be exactly the same height. To build the threshold this way, pour a 2"-3" concrete threshold, sloped slightly for drainage, on top of the earthbags at each entry door location,. You can add concrete pigment to make it any color you want. Allow adequate time for drying (about one week, depending on the temperature), and then set the door buck on the threshold and brace securely in position.



Image Notes

1. Door Threshold

step 3: Stacking Soil-filled Bags

At this point you can continue stacking courses of bags for the remainder of the walls, but now the bags are filled with soil. (Although there are numerous alternative fill materials. See our **Earthbag Building Blog** for full details.) Most subsoil is suitable for earthbag construction. Subsoil is the clay/aggregate soil that's below the topsoil. You could dig your own, but you can buy it very inexpensively and save many days of hard work. You can also buy an engineered mix called road base, which contains the ideal ratio of clay to aggregates, no mixing required.



Image Notes

1. Stacking Earthbags

step 4: Measuring the Radius

Measure the radius of each course of bags to maintain an accurate circle. Tie a piece of rope to the center pole and use it to check the radius to every bag. Always keep the rope level for accurate results.



step 5: Tamping and Leveling

Tamp earthbags solid and level after each course is complete. Tamp the high points first. Then evenly tamp the entire wall several times as you continually move the tamper. This last step avoids creating low spots. And if you use the same number of buckets of soil in each bag, and are careful placing the bags, the courses are almost self-leveling. Consistency is the key. Use the same process for each bag. Remember to place two strands of 4-point barbed wire between every course.



step 6: Metal or Wood Anchors

Add metal or wood anchors every few courses to secure door and window bucks to the earthbags. Most people use wood anchors. But in areas with termites, it's best to use anchors made of galvanized sheet metal. They're inexpensive, strong, easy to make from scrap metal, resistant to decay and, because they're thin, they don't take up space between bags like wood anchors do. In most cases, sheet metal anchors are preferred over wood anchors. Simply nail into the earthbags with galvanized nails and screw into the backside of the bucks.



Image Notes

1. Metal Anchors

step 7: Anchors for Electrical Boxes

Most earthbag builders use some type of improvised wood or plywood anchor to attach electrical boxes. I've found the simplest solution to be 3" wood poles. A rot resistant variety is best. Embed the poles between courses wherever you want an outlet or switch. If you forget or want to add extra boxes, sharpen the end of the pole and drive it into the wall with a small sledgehammer before the soil gets too hard. Use an electrical box as a depth gauge. You want the front of the box to protrude about 1-1/4" beyond the earthbags to match the plaster. After the walls are built, screw boxes to the stakes with two screws and staple or nail the wiring in the recesses between bags. Complete all the rough electrical work before plastering.



Image Notes

1. Anchors for Electrical Boxes

step 8: Window Bucks

Set window bucks on the wall when you reach windowsill height. You can pre-build the bucks while your threshold is drying. Use standard carpentry techniques to brace the bucks square, and to keep the buck plumb and level. We use double 2x4 bucks instead of wide lumber, and we use poles for braces instead of milled lumber to cut costs. It's often a good idea to pound $\frac{1}{2}$ " rebar down through the bags on either side of door and window openings if you have lots of openings like we do.



Image Notes

1. Window Bucks

step 9: Bond Beam

It's easiest to build a bond beam immediately above windows and doors so you don't have to build lintels. This method saves hundreds of dollars and one whole step. Reinforced concrete or wood bond beams are both acceptable. You'll want to read up on these building steps since the subject is too involved to summarize in a few sentences. We used concrete due to the prevalence of termites in our area. We used two layers of $\frac{1}{4}$ " plywood as forms, $\frac{1}{2}$ " rebar pins pounded in the tops of walls, and $\frac{1}{2}$ " horizontal rebar. Pour the concrete nonstop so you don't have any joints. Embed hurricane ties in the concrete for securing roof poles. Allow to dry several days before stripping the forms and building the roof. Any voids in the concrete can be patched when you plaster.



Image Notes
1. Bond Beam

step 10: Build the Roof

Build the roof after the bond beam is finished. Any type of roof is possible, and space doesn't allow a lengthy discussion. We used a metal compression ring with radiating wood poles covered in thatch. Create large roof overhangs of approximately 30"-36" to protect walls from moisture damage. The exact size will depend on your climate.

The roundhouse has a super strong feeling due to the concrete bond beam, thick walls, sturdy poles and round shape. You could probably have a dozen workers on the roof with no visible effect. The roof frame went together almost like clockwork. The compression ring worked perfectly. The roof was all bolted together in about 4 hours, in part because the poles were pre-cut and prefinished in advance.

Thatching is usually very slow and laborious, but we thatched our roundhouse in just one day and for only \$100 using pre-made thatch panels. That's why I love thatch panels - they're very inexpensive and all the tedious work has already been done. And they work great on round (conical) and organic shaped roofs because they're flexible. Just bend them into position and nail in place. We installed the panels using 8" spacing. Plan on rethatching every 3-5 years or so, depending on the quality of your thatch. Some thatch will last 10 years or even longer.

In cold climates you'll want a thick roof with lots of insulation. This can be achieved with trusses or TJIs (engineered truss joists). Wide dimension lumber could also be used, however, this requires cutting old growth forest.



Image Notes
1. Inside View of Roof Showing Compression Ring and Roof Poles

step 11: Install Doors and Windows

Use standard carpentry techniques to install doors and windows. This boils down to simply screwing the door and window frames to the bucks so they are plumb and level. Add shims as necessary. Remove the doors after they are fitted to prevent damage. Mask off windows with plastic to reduce cleanup later.



Image Notes

1. Recycled Wood Windows (after plaster)

step 12: Cement Plaster on Exterior Walls

Here's a brief summary of the cement plastering process we used on the exterior of our earthbag roundhouse:

Step 1: Put cement between the bags in the recesses.

Step 2: Add thin coat of cement over bags.

Step 3: Add more cement.

Step 4: Add more cement.

Step 5: Trowel the plaster smooth and use a sponge float to smooth out the finish.

As you can see, the process is quite simple, although labor intensive. It boils down to adding a little plaster at a time. Leave each coat rough so the next coat will better adhere. No plaster mesh is needed - the plaster sticks to the earthbags, no problem. Resist the temptation to overwork the plaster or you'll lose adhesion to the bags. The total process took about five days of work for two workers spread out over a little more than week. A third worker helped the last day. Use best practices in your area. Always prevent plaster from freezing. Keep plaster moist and allow to dry slowly for best results.



Image Notes

1. Final Cement Plaster

step 13: Earthen Plaster on Interior Walls

Earthen plaster is lowest cost, easiest type of plaster to work with. Many people find earthen plaster very enjoyable work. They're often pleasantly surprised at how incredibly simple it is. After all, the main process is basically smearing mud on the walls. Follow one of the free recipes on the Internet. Experiment with small patches to help determine the optimum mix for your materials. Add more sand or less water if the plaster cracks. Add more clay if the plaster doesn't stick to the walls.

The first step is to fill the recesses between bags and apply plaster around doors and windows. Plaster mesh is recommended around all windows and doors to help prevent cracking. You can apply earthen plaster with your hands or with a hawk and trowel. Allow each coat to thoroughly dry before adding additional coats. Leave each coat rough so the next one will more readily bond. Add more coats of plaster until your walls are finished. Smooth the final coat until you're satisfied with the results.

2nd photo: Here you can see the natural beauty of earthen plaster that's been sculpted to gracefully curve around window and door openings. This not only looks good, but also lets in more light and improves the view. I want to emphasize how this simple concept totally transformed our roundhouse from a bunch of bags into a thing of beauty. Click [here](#) for more details about rounded corners.



Image Notes

1. First Coat Earthen Plaster



Image Notes

1. Finished Earthen Plaster

step 14: Finishing Details

At this point you can finish your electrical and install plumbing fixtures. You can also install doors, trim, shelving and cabinets, and then stain and varnish any woodwork, and paint your home. But plastered earthbag walls don't require painting or trim. Many builders plaster right up to windows, doors and floors. This is another major time and cost saving advantage of building with bags.



Image Notes

1. Bathroom Wall with Glass Block

step 15: Interior View

Finishing details turn a house into a home. It's what people really notice. If you want a really nice home, be sure to plan accordingly and give this some extra thought. Finishing work does require extra time and effort, but the results are definitely worthwhile.

Interior view showing natural color of earthen plaster, recycled windows and yellow concrete floor. For the floor, we troweled natural iron oxide pigment on the surface before the concrete set up. The pigment is sprinkled by hand and troweled into the top ¼" as the concrete sets up. A little more color was added later during final troweling to even out the color. We were careful to moisten the sand and gravel under the floor to slow drying and prevent cracking.



Image Notes

1. Finished Interior View

step 16: Exterior View



Image Notes

1. Earthbag Bench

step 17: Conclusion

It boggles the mind how flimsy stick-built houses meet code and yet some people have doubts about earthbag building. (And even more hilarious is how trailer houses are somehow considered safe and adequate.) Let's briefly compare stick frame and earthbag houses: A strong person could readily kick their way through pressed board siding and sheetrock in about one or two minutes. The same person would probably be struggling an hour later trying to penetrate an earthbag wall, even with a sledge hammer, pick, shovel and crow bar.

What type of house would you rather live in? One that is thick, quiet, energy efficient, non-flammable, non-toxic and dirt cheap? Or one made of sticks and toxic materials that burn like crazy, offgass toxic fumes, leak energy and cost a small fortune. Earthbag is inexpensive enough that you don't need a mortgage. Instead of spending 30 years paying off a mortgage, build super inexpensively and have far more time to spend with your family and friends, and help build community. This also lessens the influence of big banks, which are wrecking society with their greed.

Remember, over 70% of Americans can't afford a contractor built home built to code, and that was before the current housing crisis. And since earthbag building is far faster and less labor intensive than adobe, cob and rammed earth, it's one of the best of all possible sustainable housing options.

And as a final word, I want to say anyone can do this. It's as basic as filling and tamping bags of dirt and covering with plaster. Just take some time to do the necessary <http://www.instructables.com/id/How-to-Build-an-Earthbag-Roundhouse/>

background research and maybe start out by building a small storage shed to refine your techniques. Almost everything you need to know is free on our websites.



step 18: Final Earthbag Roundhouse Video



Image Notes

1. Finished Earthbag Roundhouse

Related Instructables



How to Build an Earthbag Dome
by Owen Geiger



Step-by-Step Earthbag Building
by Owen Geiger



How to Build Dirt Cheap Houses
by Owen Geiger



Biohazard/Radiation - Halloween Costume
(Photos) by mada



How to Plan for Building Your Country Home
(video) by Progressive Farmer




How to Piggyback an Xbox360 controller on a Universal PCB
by Toodles


Comments


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 **Krotas** says: Feb 1, 2011. 11:29 AM [REPLY](#)
Unbelievable.
Thank you for this breathtaking instructable. I'm not an adult, so building a house on my own doesn't concern me yet, still, I couldn't take my mind off it until I had read the whole instructable. These are really fascinating building techniques.
Thank you!

 **Owen Geiger** says: Feb 1, 2011. 5:09 PM [REPLY](#)
Thank you. Glad you enjoyed it.


 **Momojuju** says: Feb 1, 2011. 8:49 AM [REPLY](#)
Thanks for a great article, Owen. Is the buttress wall by the front door needed for stability? Or is it just an architectural flourish?


 **Owen Geiger** says: Feb 1, 2011. 4:57 PM [REPLY](#)
The door is the weakest area and so I wanted to be sure there was no movement. And I added a bench on the other side for the same reason. Buttressing is not needed on such a small structure, especially a roundhouse. But it does look good, add visual interest and block blowing rain at the doorway.

 **jj.inc** says: Jan 31, 2011. 8:40 PM [REPLY](#)
These are really cool, you should start a larger family sized project, maybe connect multiple huts. I especially liked your dome with the growing things on it.


 **Owen Geiger** says: Jan 31, 2011. 9:44 PM [REPLY](#)
I have several designs that join roundhouses, domes and hexagonal pods. Plus, many clients combine my basic shapes to create unique designs to meet their needs.


[Roundhouse Cluster](#)
[Roundhouse/Dome Cluster](#)
[Pod Houses](#)

 **sev17** says: Jan 31, 2011. 7:43 AM [REPLY](#)
I noticed in the last picture of the last step there is a dirt house in the background. Did you make that? If so, can we have an instructable? :D Thanks!
Awesome Ible btw!

 **Owen Geiger** says: Jan 31, 2011. 6:44 PM [REPLY](#)
That's our earthbag dome. I just published the Instructable yesterday. It got over 11,000 views or hits overnight.
<http://www.instructables.com/id/How-to-Build-an-Earthbag-Dome/>

 **warty24** says: Jan 31, 2011. 5:05 PM [REPLY](#)
what was the total cost for this beautiful home?

 **Owen Geiger** says: Jan 31, 2011. 6:09 PM [REPLY](#)
The cost is shown in the Intro: \$2,045 for materials. I'm not sure how much we paid the plasterer's and thatchers. Labor here is dirt cheap.

 **Galt** says: Jan 30, 2011. 11:49 AM [REPLY](#)
Kudos on the instructable but pooh pooh on the pee poor science commentary. Your repeat of someone elses scare 'em to help fund me baloney is like building on mud. Cement making uses a lot of electricity, true, but you assume too much. Where's the electricity made for example? Typical out there Kool Aid drinkin' IMO. Google is not God and global warming assumptions just detract from an otherwise great idea. Nuf 'a dat.

There's a footing liner made of poly called Fastfoot, <http://www.fab-form.com/products/fastfoot/fastfoot.html> that allows you to use concrete in a wide variety of conditions very simply and would probably adapt well to a circular wall footing. That said concrete is expensive by comparison and any sort of smooth, somewhat rounded gravel will provide nearly 100% compaction just by dumping it into a hole. The makers of some pre-cast concrete wall panels use gravel alone as a footing under their own products. http://www.superiorwalls.com/green_approved.php

Another great advantage to this type of building is sound proofing and air leakage elimination. The thermal battery that you are constructing also lends itself particularly well to passive solar zero input design protocols (assuming an adequate roof of course).

<http://earthshelters.com/uncategorized/passive-solar-design-improving-the-passive-solar-house-2/>

<http://www.wbdg.org/resources/psheating.php>

http://en.wikipedia.org/wiki/Passive_solar_building_design

The German / Scandinavian protocols are also very constructive resources.

By adding things like trombe walls, radiant hydronic heat, earth tube ventilation and light tubes a near zero energy input structure of extremely low maintenance can be constructed. There are some other variants that share similarities and can help create hybrids of your approach. One other would be Dry Stacked block for example. While the block are more costly the water proof surface bonding cement used in that method would provide another means

of finishing the earth bag structure.
<http://www.quikrete.com/ProductLines/QuickwallSurfaceBondingCement.asp>
Check out the earth filled tire and straw bale wall construction methods also.

The barbed wire is ingenious. A kind of Durawall lateral reinforcement at a budget price. How about just laying direct bury rated Romex down the center line of your wall well between the two rows of barbed wire. No conduit necessary and unless you hang pictures with 10" spikes you couldn't possibly disturb it once complete. Even the vertical runs for wall switches and overhead where needed could be ganged together and somewhat isolated so that the area that they're in could be well remembered and avoided later. Another solution might be to run the majority of it through the floor.

While it may not be "Green" enough for ya (and most of that "Green" jazz is a scam anyway) check out the DIY spray foam kits if your thinking of using a dome lid. Flat roofs can be up engineered to be covered with EPDM and earth for example or a more traditional style can be outfitted with a radiant barrier and some recycled foam board for an energy efficient space on the cheap. The recycled foam board insulation is often LEED certified and about half the cost of new from the home centers.

All in all love the ideas in spite of the global warming reference. If people are that worried about carbon foot prints they better figure out what their gonna do with all of that cow flatulence and Third World industrialization that we continue to underwrite. Too bad the scam was revealed...Al Gore was gonna make a killin' brokering carbon credits. Always ignore the dogma and follow da money.



Owen Geiger says:

This is not the place for climate change debate. I have better things to do.

Jan 31, 2011. 5:21 PM [REPLY](#)



marki_marku says:

With this round house I noticed that the floor is up a couple of steps from ground level outside. On the inside did you fill the hut with rocks and gravel to get it close to the level of the steps before finishing or did you build a timber structure and cement over that, or did you use some other process. Thanks for your awesome instructable. I have been interested in alternative building methods for years.

Jan 31, 2011. 4:49 PM [REPLY](#)



Owen Geiger says:

We live in a rainy climate, so we raised the building site with road base. We spread out truck loads and had the trucks drive back and forth in different directions. Then let it sit through a rainy season. We also used road base and then sand and gravel to raise the level inside.

Jan 31, 2011. 5:17 PM [REPLY](#)



soundmotor says:

This is a gorgeous building and your instructable is very informative. I am most interested in the foundation you used and wonder how it will perform in areas with deep frostlines? In the northeast USA that is 4-feet.

Jan 30, 2011. 2:38 PM [REPLY](#)

Also, how do you estimate the number of bags needed for a project?



Owen Geiger says:

Fill the lower courses with an insulating material that doesn't rot. Scoria and pumice (lava rock) are excellent choices. That will give you a frost-protected insulated foundation. That one step alone will save you thousands of dollars in excavation and foundation costs.

Jan 30, 2011. 4:06 PM [REPLY](#)

You can download a free frost-protected insulated foundation guide from the Internet. Search for it with Google. Then replace the concrete they recommend with insulated earthbags.

Every topic on earthbags is covered in detail on our blog or other websites, including calculating number of bags. Search our blog at Earthbag Building Blog for how many bags: <http://earthbagbuilding.wordpress.com/>



soundmotor says:

Thank you Owen, I appreciate this information.

Jan 31, 2011. 8:27 AM [REPLY](#)



buteomont says:

This is just awesome, plain and simple. Thanks so much for taking the time to share it with us.

Jan 31, 2011. 8:05 AM [REPLY](#)



realanthillkit says:

Brilliant. Beautiful. Solid.
Nice commentary in your summary too.
Where is this located?
I'm guessing it's either
a) rural
b) NOT in the U.S. (obviously, not being a drywall/stick home this is unacceptable according to code)
c) both

Jan 30, 2011. 7:25 AM [REPLY](#)



integrator says:

Code doesn't require drywall/stick home construction. It's just the cheaper in some ways, and most common. Houses in the US are built from cinder blocks, poured concrete, and solid log construction. I'm sure you would have to educate the planning department, and would have some resistance, as it's not common.

Jan 30, 2011. 5:18 PM [REPLY](#)



Owen Geiger says:

Jan 30, 2011. 8:42 PM [REPLY](#)

That's right. People tend to do things like everybody else -- herd mentality. But yes, building codes accept Alternative Materials. (It's actually in the code.) It just takes more knowledge and perseverance to use unconventional methods. In urban areas it's probably best to hire an architect or engineer who specializes in these things to guide you through the process. Otherwise, you might experience lengthy, frustrating delays. It's far easier to gain approval in rural areas.



realanthillkit says:

Jan 31, 2011. 6:59 AM [REPLY](#)

Ah, so it's not the codes that are rigid, it's the enforcers/interpreters.



urwatuis says:

Jan 30, 2011. 5:11 PM [REPLY](#)

why can't we build 1000's of these for the homeless Haitian's victims of the earthquake???????



Owen Geiger says:

Jan 30, 2011. 8:33 PM [REPLY](#)

That's what we're aiming for. There's about a dozen projects now in Haiti: <http://earthbagbuilding.wordpress.com/2010/09/21/earthbag-projects-in-haiti/>

But we have to start out one step at a time. Three schools have already been built. A clinic is under construction now. Housing for medical staff is almost ready to start. I lost track of how many small houses have been built. More schools are planned. One group was happy enough with their house that they're planning a small development of dormitories, etc. Other projects are in the pipeline and we'll update that list as time goes by.



rocyahsoul says:

Jan 31, 2011. 6:03 AM [REPLY](#)

If you have some contacts in Haiti, you might pass on to them this info. There's a website that provides a microfinance facility. It's called Kiva.Org. People who need loans make a contact to a local loan facilitator and they place the loan request on Kiva. People, mostly Americans, who wish to share their prosperity can fund loans, which are then paid back to them in their Kiva account, that they might lend again, or could cash out whenever they see fit. I've made about 6 loans through Kiva so far. I was paid back the loans each time.

Usually the loans are for business expenses, but I've seen people apply for loans that they needed home repair. So certainly people in Haiti who need building materials, could apply for loans through Kiva.



telvis23 says:

Jan 31, 2011. 4:44 AM [REPLY](#)

My english is terrible, but I mean that your work is very cool, and I know a group that develops such technology in Brazil, follow the link <http://www.ecocentro.org/en/>



Owen Geiger says:

Jan 31, 2011. 6:02 AM [REPLY](#)

Yes, we know of them. We've been writing numerous blog posts about their hyperadobe method that uses mesh bags. We have a very high opinion of hyperadobe and believe the concept will catch on.

Search our blog for hyperadobe if you're interested: <http://earthbagbuilding.wordpress.com/>



Nemesis201077 says:

Jan 31, 2011. 4:58 AM [REPLY](#)

Another excellent instructable. I've been looking at strawbale construction techniques for about 10 years now as a potential method to create small, unique buildings.

This looks like a rival to my previous ideas and I may well have to spend some time reading up on the subject.

I'm planning to build some chalet style accommodation in central France on a small campsite, this method would make my plans achievable and offer a unique prospect to tourists wanting a eco-chalet/glamping holiday.

Do you know of any UK based earthbag groups, perhaps I could do some volunteering to learn the basics and give a little back?



Owen Geiger says:

Jan 31, 2011. 5:59 AM [REPLY](#)

The main person there is Paulina Wojciechowska. She wrote a book about 10 years, so is a pioneer in the field. Now she teaches workshops. <http://earthbagbuilding.wordpress.com/2010/11/27/earth-hands-and-houses-dome-in-sussex-england/>

And someone recently built a children's playground in London, I believe.



ArtieTech says:

Jan 28, 2011. 11:58 AM [REPLY](#)

Why couldn't you start the walls on the cement?

Is the gravel base that important for this structure?

Also shouldn't the cement 'beam' have expansion joints?

I really like the finished look of the plaster. How did you add privacy for the bathroom area?



Owen Geiger says:

Jan 28, 2011. 5:08 PM [REPLY](#)

You could use a concrete foundation, but that adds greatly to the cost and requires difficult form work (extra difficult due to the round shape).

Gravel is the cheapest, easiest way to create a strong base for the massive, heavy walls. Rubble trenches are a proven, time tested building technique.

The bond beam must be continuous -- all one piece -- because it's like a ring that holds the top of the walls together. Expansion joints are for large expanses of flat work. Totally different.

There is a bathroom wall. I chose not to show it because the article was getting very long. We used low-fired clay brick, a very sustainable building technique.

My Picasa web album shows a pic of the bathroom wall, plus a few extra:

<http://picasaweb.google.com/112134999496127815400/EarthbagRoundhouse#>

<http://www.instructables.com/id/How-to-Build-an-Earthbag-Roundhouse/>



ArtieTech says:

Yea, i realized this weekend the load of the earth wall would be a lot for concrete to support. Thats for the link to the other pics!

Jan 31, 2011. 4:53 AM [REPLY](#)



koroliiov says:

Awesome! I just wonder how earthquake resistant this stucture is?

Jan 31, 2011. 2:48 AM [REPLY](#)



Owen Geiger says:

We didn't build this one to resist quakes. This isn't a seismic area.

Precision Structural Engineering Inc. at Structure1.com has a code approved earthbag design for seismic areas.

Jan 31, 2011. 3:38 AM [REPLY](#)



dukic says:

Thank you, this is great...

Jan 31, 2011. 2:54 AM [REPLY](#)



mudlover says:

This is all great. I hope to undertake a building project in Thailand also. Maybe strawbale on a gravel earthbag foundation, though I'm also considering ricehull bags for the walls. I'm also contemplating a treated bamboo "post & beam" setup to support the roof.

Thanks very much for all your excellent material!

Jan 31, 2011. 1:12 AM [REPLY](#)



Owen Geiger says:

I know someone building a rice hull bag privacy wall in Thailand. Watch our blog for the news.

I think strawbale is too risky in rainy climates like Thailand. That's just my opinion. Sooner or later you'll get a roof leak and there will be no way to dry out the wall.

Rice hulls can also rot, they at least they're moisture resistant.

Bamboo can be good if you learn the best techniques. Some people are claiming preservation methods that last for a very long time, sometimes hundreds of years. They may be exaggerating the lifespan.

Ferrocement is another good roof option.

Jan 31, 2011. 2:33 AM [REPLY](#)



Rozarius says:

Hello, I really like this idea and would like to someday try something similar.. However, I live in Vancouver, BC and it's pretty wet around these parts. Do you think something like this would last as long in a really humid environment? I'm not sure what Thailand is like compared to Canada humidity-wise, but here we get lots of rain throughout the year and in the winter it usually hovers around freezing temperatures, but doesn't always go too far below that. We also don't get too much snow in this part of Canada, but I imagine I would need a more heavy duty roof, at the least.

Jan 30, 2011. 11:15 PM [REPLY](#)



Owen Geiger says:

Earthbag will work fine, but I highly recommend a roof with lots of insulation. Domes are more vulnerable to the weather. Example: moisture will get into every little crack and burst the plaster when it freezes.

There is an earthbag dome in BC. I saw it for sale on a real estate site last year. It was an eco-dome.

Phangan Earthworks has a dome in southern Thailand where it rains almost constantly for months. They had exceptionally plasterer's do their plastering. It's almost too good to believe. Very few people could achieve this degree of craftsmanship. Their dome is not leaking, but again, it's a risk unless you're really skilled at plastering (and use a lot of it).

Phangan Earthworks Photo Gallery <http://www.phanganeearthworks.com/galleries.html>

Today's blog post announces that their photo will be on my new earthbag book: <http://earthbagbuilding.wordpress.com/2011/01/31/cover-shot-chosen-for-new-earthbag-book/>

Jan 31, 2011. 12:13 AM [REPLY](#)



berky93 says:

This is very interesting. Would it be possible to build structures with multiple floors or basements using this method?

Jan 30, 2011. 5:54 PM [REPLY](#)



Owen Geiger says:

So use lighter weight materials for the 2nd story and you'll come out ahead.

Jan 30, 2011. 8:37 PM [REPLY](#)



Owen Geiger says:

One story is the most efficient. It takes a lot of time and energy to move heavy soil to upper floors. But sure, you could do it.

There are two basement designs explained on our blog:

<http://earthbagbuilding.wordpress.com/2009/11/12/earthbag-basements/>

<http://earthbagbuilding.wordpress.com/2010/10/04/insulated-earthbaggeotextile-basement-walls/>

Jan 30, 2011. 8:37 PM [REPLY](#)



berky93 says:

Interesting. This seems like a really efficient and environmental method of building.

Jan 30, 2011. 9:40 PM [REPLY](#)



miko2413 says:

I visited your blog, and I noticed one thing as I was scrolling through your eco village plan - all the structures are round. I figured there was a reason for it, before contemplating a square one for myself. With a round shape, I feel more like a round pizza in a square box, that I don't have as much space as I'm used to.

Jan 30, 2011. 7:24 PM [REPLY](#)



Owen Geiger says:

The eco-village is by Dr. Sunny Chai in Beijing. At least one building is rectangular.

"Round is sound" is the saying. Roundhouses, domes and curved walls are naturally stronger.

But if you look at my [Earthbag House Plans website](#), you'll see many rectilinear designs. That's because most people (over 99%) live this way. That's what they want. And that's fine with me. I like many different designs and styles.

Jan 30, 2011. 8:20 PM [REPLY](#)



zanne101 says:

This looks terrific. If an area allows straw bale building, then would you think it's more likely to allow this? I would want to build the larger size - I think you said 33' could be done without extra support.

If someone was new to this building technique, could a form be made where you could put the filled bag before stitching, to see if the volume was ideal? That way the bags would be more consistent. Or maybe they could be weighed before stitching - as you can tell I don't trust myself on estimating weight and volume :-)

I've been looking at cob building too, but this seems a little simpler. On a YouTube video on cob building, there was a bathtub that was plastered right into the structure, kind of soft and rounded - very unique and lovely. Would love to do something like that.

Something like this should be doable in the high desert. Only one month or so of heavy rain but dry most of the year.

I've saved some of your instructions on other pages and bookmarked your site. Are there building groups doing these buildings in the US? It would be nice to have a group of people helping each other build their huts/houses/etc. Each one would go faster and someone in the group would always have more experience, which would be good.

Someone asked "In the exterior picture there is a dark brown ring around the base of the structure and I am curious as to what that is." Could you please tell us, I'm curious also.

Jan 30, 2011. 10:06 AM [REPLY](#)



Owen Geiger says:

The brown ring is just paint.

No need for the form you describe. Just count the number of buckets that go in each bag. I stack 4 buckets next to me before starting. That way I don't lose count.

Earthbag is way faster than cob... maybe 10 times faster?

It works great in the desert, that's for sure. Lots of this sort of thing in the western and south western US.

There's a group in Utah doing this. You can come and help for free I believe. It's called Safe Haven Village.
http://peswiki.com/index.php/OS:Utah_Safe_Haven_Village_Project

Jan 30, 2011. 5:27 PM [REPLY](#)



zanne101 says:

Thanks so much for the info. I'm not back out west yet - trying to get there. I wish I had known years ago about all these alternative methods of building. Between this and solar power, I would have gone in a totally different direction career-wise.

I will definitely check out the Utah group for future reference.

Jan 30, 2011. 6:53 PM [REPLY](#)



sitearm says:

@Owen; This is the first I've heard of earthbag building. Your instructions were clear and precise. I read every step, including the benefits summary at the end. This has intrigued me so much I've blogged it, including your channel and blog links. One issue: I am having a hard time imagining building this in the suburbs ;) Is this method suited only to low-density population areas, low rain, other? Cheers! Site

<http://sitearm.wordpress.com/2011/01/30/earthbag-building/>

Jan 30, 2011. 10:29 AM [REPLY](#)



Owen Geiger says:

With engineering support from Precision Structural Engineering, Inc. you can get code approval anywhere in the world. This is a recent breakthrough. Search our blog for details: <http://earthbagbuilding.wordpress.com/2010/12/04/reinforced-earthbag-specifications/>

So you can build in the cities, etc. If a licensed engineer stamps your plans, then it's extremely hard for the city or anyone else to stop you.

Jan 30, 2011. 5:32 PM [REPLY](#)

[view all 119 comments](#)