

Let Me Tell You Something About Shipping Container Homes

2016 By Mike Container

Cover Photo: Saipan Harbor, Saipan (Aug. 12, 2015) - Crane operators work to clear a pile of damaged containers on the pier in front of the amphibious dock landing ship USS Ashland (LSD 48) during disaster relief efforts in Saipan after Typhoon Soudelor. (U.S. Navy photo by Mass Communication Specialist 3rd Class David A. Cox/Released) Photo Used Under Creative Commons License Attribution-ShareAlike 2.0 Generic www.creativecommons.org/licenses/by-sa/2.0/

Contents

1. Preface
2. Treated Floors
3. Cannibalized Sidewalls
4. Insulation
5. Toilets & Plumbing
6. Summary

1. Preface

What is a home? Some say home is where the heart is, or wherever you hang your hat. To others home is a house, dormitory or apartment. Many people today live a nomadic RV lifestyle. To them home is a party on wheels. Yes homes are all around us but what can we use to make a home? Traditional building materials and techniques assembled under the governance of local codes has been the standard up to this point, but mankind is a curious creature always striving to create new uses for existing objects.

Once such object is the amiable shipping container. It is pleasing to the eye with its sturdy build and simple rectangular shape, and who doesn't enjoy a box full of factory-new stuff in a consumer driven culture such as ours. This is all well and good for the average person on the street but the student of architecture and the do-it-yourself improvised builder see something more in these units: inhabitable dimensions, affordability, stackable design, and a unique modernist look.

Shipping container home projects are good for the student of architecture. They are easy to conceptualize and build. Often a seasoned architecture firm planning container homes are only experimenting because they are low cost and the finished structures receive a lot of free advertisement for the firm. Architecture firms and builders are paid by clients to do most of what they do, and sometimes they design shipping container homes for upscale clientele who want to impress their friends. Trends in architecture come and go. Today's shipping container home could be tomorrow's object of ridicule, similar to fashion, and unlike clothes and footwear, a house will likely be around for quite a while longer.

So why not build something timeless?

Shipping containers remain an excellent choice for utility structures upon the grounds of a main house. Outbuildings, vehicle and motor sport storage, workshops, equipment housing, machinery shops, "man-cave"... you name it, the list goes on.

This is where the shipping container structure really shines... or on it's own in a rural camp like environment, but to try and make shipping containers the centerpiece of a residential structure in an established city is going to anger a lot of neighbors. Most traditional homeowners are fiercely protective of their property value because to them their home is an investment. You would probably have better luck building in an area that suffers from urban decay.

The Internet is a fertile ground for websites and little pamphlets proclaiming the benefits of shipping container homes. Many enterprising individuals have created lesson plans and courses designed to teach the fine art of shipping container home planning.

Most of these materials are created by the low-information brigade, and simply thrown together to make money, souring the experience on the whole for the interested new comer. The publication you are reading now, this ebook, is superior to the aforementioned pieces of toilet paper for the simple reason that it contains actual usable information (and its priced as close to free as possible).

Beware of "shipping container home" websites asking for membership fee's, or ebooks with long titles and nothing inside, and keep an eye out for fake reviews being posted for these publications and programs online. Above all else, do not take any building advice from these idiots.

Youtube has a lot of excellent videos on shipping container buildings if you have the patience to sift through the increasing amount of spam. I recommend making "shipping container homes" the last thing you use as a search phrase. As of 2015 the phrase "shipping container homes" has been almost completely commandeered by a handful of internet marketing cretins who possess zero actual knowledge on the topic.

I also noticed most of the Facebook shipping container pages are really bad, but hey... what do you expect, it's Facebook.

With that being said, there are plenty of good sources for gaining knowledge on the topic...

The Residential Shipping Container Primer (RSCP) website is an excellent source of information and it's free:

www.residentialshippingcontainerprimer.com

Zack Smith's Firmitas.org is an great website with one of the oldest and best free shipping container architecture info webpages online:

www.firmitas.org

Ebay is a great place to browse for shipping containers and get an idea for current prices. Most shipping container brokers require you to call them for a price quote, but with Ebay the prices are listed right there on the page. If the seller tries to list contact info to make a direct sale outside of ebay it is called "avoiding ebay fee's" and is against the rules. This means you will see an actual purchase price listed, pay that price, and not have to deal with a sales person. What a concept.

Books recommended by the Wikipedia Shipping Container Architecture page:

Kotnik, Jure (2008). Container Architecture. p. 240. ISBN 978-8496969223

Sawyers, Paul (2005, 2008). Intermodal Shipping Container Small Steel Buildings. p. 116. ISBN 978-1438240329

Bergmann, Buchmeier, Slawik, Tinney (2010). Container Atlas: A Practical Guide to Container Architecture. p. 256. ISBN 978-3899552867

Minguet, Josep Maria (2013). Sustainable Architecture: Containers2. p. 111. ISBN 978-8415829317

Kramer, Sibylle (2014). The Box Architectural Solutions with Containers. p. 182. ISBN 978-3037681732

Broto, Carles (2015). Radical Container Architecture. p. 240. ISBN 978-8490540558

Now that we have the preamble out of the way... lets take an in depth look at the main problems associated with shipping container homes and tiny houses built from shipping containers.

2. Treated Floors

You hear a lot of people complain about the treated plywood flooring in containers. They say its dangerous and toxic but because almost every deck in north america is built from pressure treated lumber containing the same agents, I say "so what".

We interact with treated lumber all the time. It's everywhere and no one is dying from it.

Many shipping container home "experts" insist that you must remove all original plywood and replace it with something safe like untreated plywood. Fact: the plywood in shipping containers is extremely heavy duty 28mm thick 19-ply hardwood plywood.

Do they realize how much a sheet of this material is worth?

Assuming a sheet of 4x8 foot 18mm (3/4in) thick plywood is \$50, then this product would be \$100+ (if you could even find it for sale).

Removing the plywood floor is a waste of money and lot of hard work for not much benefit. Furthermore, if you use standard dry steel shipping containers with treated floors for utility structures as I recommend, you wont have to worry about wood boring insects destroying the floor from below.

This existing floor should be considered a sub-floor and can be covered with addition flooring if desired.

- > Hardwood
- > Untreated Plywood
- > Tile
- > Linoleum / Sheet Vinyl
- > Carpeting

Why not nail down a 16in on-center row of 2x2's over the existing plywood floor, and install rigid foam insulation between the 2x2's covered by new plywood flooring.

This solves two problems 1) covers the old floor, and 2) insulates the bottom of the container.

3. Cannibalized Sidewalls

Social media based shipping container home experts are always showing you images they copied from google of high end container homes suitable for print in Dwell magazine with huge areas of sidewall removed. These look good but nobody ever goes into any detail about how the structural integrity of the home was maintained. Perhaps this remains the secret of the architect, as well it should.

Runkle Consulting, a structural engineering firm, published a web based report several years ago which remains the best of the few free resources regarding shipping container structural engineering and the effects of sidewall removal.

See: www.runkleconsulting.com/shipping-container-engineering/

I advise you read it.

Thinking of making a unit with sidewalls removed the bottom floor of a multi-level stacked design? I advise you think again. In this case, if not reinforced correctly, we are talking about possible catastrophic failure.

The fact is, when significant sidewall removal is undertaken, the result is a considerable loss of strength to the point of noticeable flex under the weight and movement of occupants. I feel like its really dumb to take a structurally intact box and cannibalize it.

Why? Because you are wasting money in two ways 1) wasting perfectly good material in the unmodified shipping container, and 2) creating structural weakness that will require at the very least considerable amounts of welded-on structural steel beams to rectify, if not the all-out hiring of a structural engineer. Structural steel is not cheap, and not something you can easily pick-up at the local Home Depot.

Small openings for standard size residential doors and windows do not seem to create as much of a problem if any at all, but I would steer-clear of any double-wide french style doors or large picture type windows in the sidewall.

What about removing full sidewalls on the inside when you are joining two container together? I hate to tell you, but this will also reduce the buildings structural integrity. Again, reinforcement will be called for in any double wide configuration.

4. Insulation

There are really only a handful of common methods used to insulate site built homes today, and when it comes to shipping container structures the options are even less.

These are our options:

Spray-on closed cell or open cell foam

Fiberglass batts

Rigid foam insulation

Foam panel sandwich

A light 24in on center stud spacing framework of 2x2's, 2x4's, or 2x6's is usually installed on interior walls prior to insulating with fiberglass batts or spray-on foam, and you can put studs 16in oc if you want.

Light duty insulation: 2x2's and spray-on or rigid foam panel insulation

Medium duty insulation: 2x4's and R-13 fiberglass batting

Heavy duty insulation: 2x6's and R-19 fiberglass batting

Spray-on foam insulation application is outside the scope of the normal do-it-yourselfer and requires hiring a professional with the proper equipment and materials. This adds up to more money out of pocket, but the product is quite nice.

Using fiberglass batt insulation is easy, they come pre-cut into 4ft or 8ft lengths, and standard widths of 16in or 24in.

Keep in mind the finished ceiling of a shipping container will be lower than 8ft if you use a drop ceiling, but the size of this space will be up to you. You know, the area above the drop ceiling where you will lay insulation, mount light fixtures, and run wiring.

Speaking of which, a standard drop ceiling is an excellent way to create a clean interior and insulate the top side.

Traditional drywall or paneling can be used to finish over whatever method of insulation you choose.

Regardless of what method you choose, it is naive to think that a steel box in the direct sun in summertime will be anything less than an oven. This is why all the big shipping container shelter makers like Seabox install AC units through the sidewall.

In cold weather some form of electric or fossil fuel burning heater will also be necessary. Sorry... you can't heat a building in subzero temperatures with just solar panels. Abundant public electricity has been available for over a hundred years folks... it's ok to utilize it. Wood burning stoves are also nice. Do you like propane? I don't, but you might.

5. Toilets & Plumbing

Lots of model shipping container homes have a toilet shower, sink, all the regular kind of plumbing a house has. Unfortunately these are not usually connected to any discharge point, rather, they are just props. Dreams of what could be if you contact your local building department and open a can of worms. Any one can buy a toilet at home depot and bolt it to the floor, but the real hassling starts when you attempt to connect sewage pipes in a municipality. Rural uses on a septic system will fare much better.

The granola crowd likes to put forth the notion that you can shit in an old coffee can while you text on your iphone, then sprinkle a little cedar sawdust on your refuse, no problem. Hey, if you gotta go you gotta go *rolls eyes*. Do you really want to live like this, or would you, at the very least like a functioning toilet with actual water in it? I predict most people want a toilet. Allow me to go further out on a limb and make the wreckless assumption that most people would also like a sink, a shower, and a laundry hookup.

So it's simple. If you are going to call it "a home" it better at least have the normal basic amenities of a home

6. Summary

Ok, so what have we learned?

- 1) Avoid taking 'shipping container home' construction advice from questionable sources, or at the very least take it under a skeptical eye
- 2) You can reduce the loss of structural integrity to almost zero when you utilize intact dry steel shipping containers and keep any sidewall openings for windows and passageways as small as possible.
- 3) The floors that come with your shipping container are a valuable part of what you paid for, and do not need to be removed simply because some internet nerds claim they are toxic.
- 4) Insulation? Sure, why not. Basic method: copy the way they insulate office trailers and have done so for years. Its not rocket science people.
- 5) Insurance? No way Jose ... but lets face it, now-a-days the insurance industry fights to pay out even on conforming structures, so why bother.
- 6) Hooking up toilets to the floor is easy enough, but connecting that sewage pipe (black ABS) to the main sewer line is going to be a problem. The word 'problem' can be defined many ways and I guess that's up to you. A privately owned septic system will not be a problem.

You can create something awesome with intermodal shipping containers, something to live or work in, but take the time to do your homework beforehand.

Ok, so we did not learn volumes here, but we did cover the basics, and we had a great pep-talk. At the very least this information is real, and I hope you found it useful and worth the price you paid. Have a good day.

All The Best, Mike Container