Your Guide to Shipping Container Basics

A GUIDE FOR ORGANIZATIONS CONSIDERING A MODIFIED CONEX

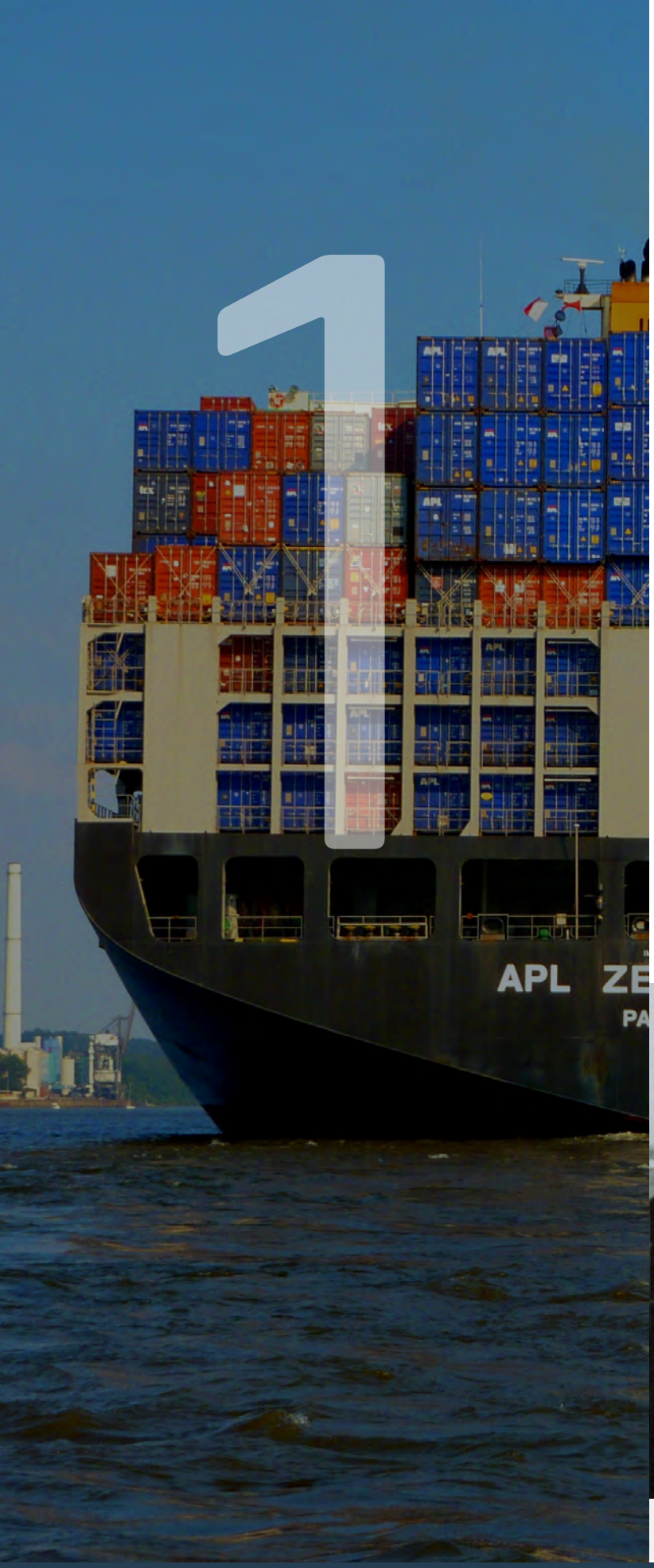
WHAT YOU MUST KNOW BEFORE BUYING A SHIPPING CONTAINER

This guide will share valuable insight and help those investigating container structures:

- Determine if a shipping container is a good fit for their application.
- Understand how containers compare to other modular structures.
- Get a clear picture of the benefits and costs of container structures.
- Complete due diligence prior to purchase to avoid costly mistakes.

If you have any questions or need assistance along the way, we're here to help. Just give us a call at

877-704-0177



A BRIEF HISTORY OF CONTAINERS

Shipping containers have evolved considerably over time. This evolution – also known as containerization – is marked by three distinct eras.

Era No. 1: Shipping containers revolutionize the shipping industry

In the 1950s, American entrepreneur Malcom McLean pushed steel shipping containers into wide commercial use.

In the 20 years after containerization, global trade grew 790%, revolutionizing the world's economy. According to U.S. Customs and Border Protection, more than 11 million maritime containers arrive at U.S. seaports each year. Another 11 million arrive by truck and 2.7 million by rail at land borders.

Above: Malcom McLean looks over containers in port. 1957. Wikipedia CC BY-SA 2.0

Era No. 2: Containers resolve a theft problem on industrial job sites.

In the early 80s, theft of tools and materials on job sites was a common problem. ISO shipping containers prevailed as the ideal storage solution for job sites and other applications. Today, the container storage industry boasts $2 billion in annual revenue.

Era No. 3: Containers are widely accepted as building materials

From the early 2000s on, the shipping container industry has seen a huge proliferation of containers being used as structures for a wide variety of applications.

Popular uses:

- Storage and office spaces
- Industrial enclosures
- Living spaces
- Break rooms and locker rooms
- Mobile restrooms
- Pop-up retail
- Security checkpoints
- Mobile medical clinics
- Training facilities
- And more

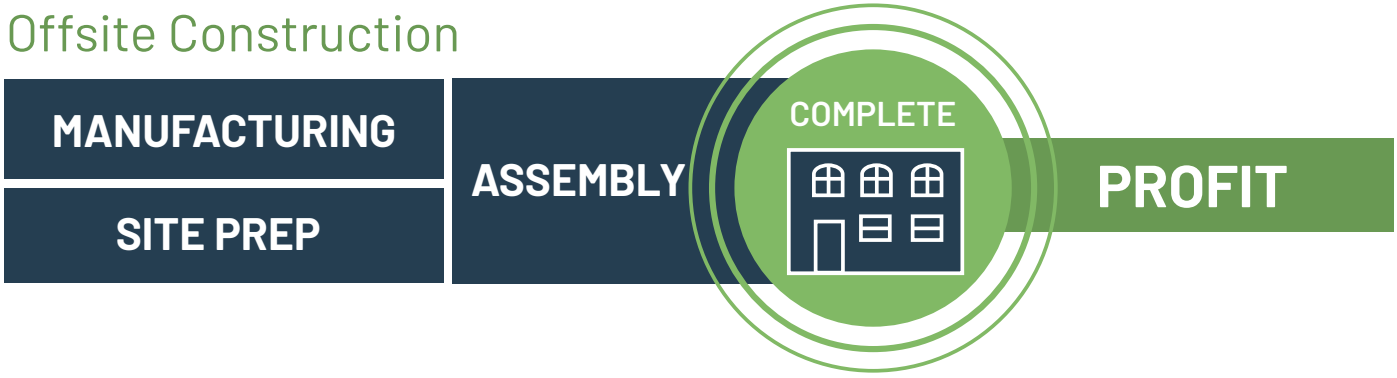
MODULAR MANUFACTURING VS. ONSITE CONSTRUCTION

Fast Deployment

Since container structures can be built offsite, most of the setup is complete before shipping and installation. The site can be prepped while the structure is being built and finished out. Upon completion, the container is delivered to the site, where the plug-and-play installation takes place.

Building in a factory environment also eliminates the risk of weather delays, which often occur with onsite construction.

Offsite Construction



Traditional Construction

Stackable

ISO containers are rated to stack nine high. If you stack containers nine high, filled to capacity, the bottom container would be supporting nearly 500,000 lbs.

Portable

Easy to relocate – shipping containers are inherently portable. Designed to be transported, containers come with handling points for forklifts and cranes.

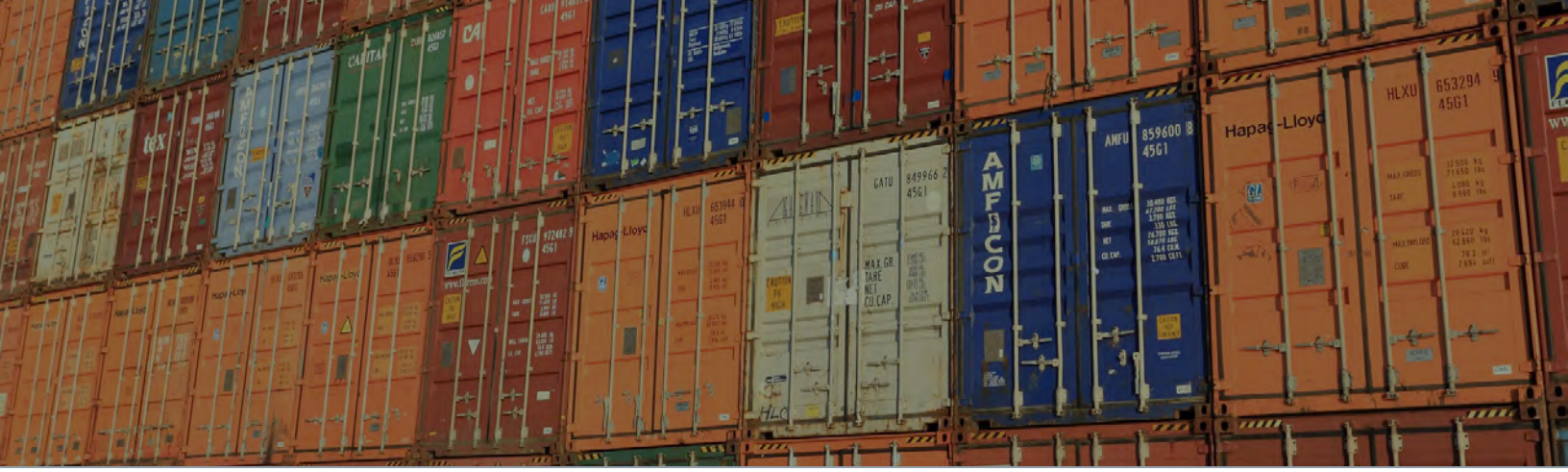
Durable

Shipping containers last a long time, with lifespans of 20 to 25 years. Containers offer substantial salvage values too. In fact, our accountants typically allow us one percent depreciation annually.

One Stop Shop

With site-built structures, you need to coordinate the project with multiple vendors – electrician, plumber, installation crew, etc. With container structures, everything can be built and finished out off site by one vendor, which simplifies life from a project management standpoint.

> Shipping containers can be stacked nine high, loaded to maximum capacity.



BUDGETING FOR CONTAINER STRUCTURES

One of the biggest misconceptions about containers is that they are inexpensive. Sure, an old, used container may run about $2,000 or so, but that $2,000 doesn't cover the costs of modifying the container and everything that goes inside.

Upfront Costs

Off-site container construction can usually save 5-10% in hard costs compared to traditional construction. Further, there are significant soft cost savings related to carrying costs, time to revenue, etc.

Additional Costs Include:

- Cutting openings for doors and windows
- Framing openings
- Insulation
- Climate control
- Access points
- Plumbing
- Electrical
- Walls
- Flooring
- Other modifications

> The container itself typically comprises just 15-20% of the cost of the structure.

Evaluate the Total Cost of Ownership

As we noted earlier, container structures last a long time. If you plan to own your modular structure for many years to come, investing in a modified shipping container can offer considerable savings over the long-term.

In addition, most single unit container structure applications don't require a special foundation or skirting – just a flat, level piece of ground. If you're comparing costs to other modular buildings, consider the costs associated with tying the structure down and site prep time.

Also, if your container structure or environment is a complicated build, getting all of the components to fit together properly could get expensive.

For example, you may need to rent cranes and hire extra labor for installation. Fortunately, once your container structure is in place, the total cost of ownership will be lower due to the long lifespan of containers.

> Shipping containers are low maintenance and retain their value for 25 years.

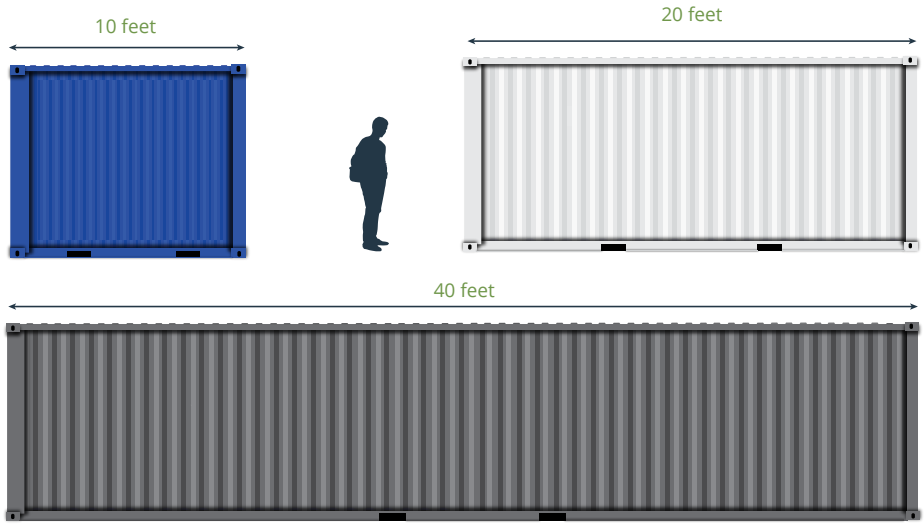
TECHNICAL CONSIDERATIONS

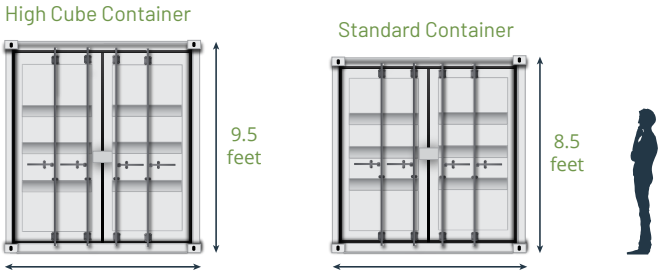
Selecting a Container Size

The most common sizes are 20-foot containers and 40-foot containers. 10-foot containers are also available, but less common. 53-foot containers are used in railways, but they are difficult to come by for second hand buyers.

Shipping container cost is largely determined by supply and demand, and not size. Depending on what's readily available, it may be most cost-effective to size up. For instance, 10-foot shipping containers usually cost more than 20-foot containers because of scarcity.

While typical containers are about 8½ feet high, high cube containers offer an additional foot of height. They're ideal for creating living environments or bathrooms where ventilation is required.





> Custom sizes are possible but dramatically increase cost.

Blocking

Placing materials such as cinder blocks or rail road ties underneath the corners to level the container and create ground clearance is called blocking. This is a practical option for containers that are placed temporarily. Long term blocking is possible as long as you check the structure regularly for sinking. Blocking also has the added benefit of adding enough ground clearance to discourage animals from nesting beneath the container.

Gravel Pads

Gravel pads are good option for single unit containers that will remain at a site for many years. The even surface provided by a gravel pad drains well and costs substantially less than a concrete slab.

Foundation or No Foundation?

Not every shipping container application requires a foundation. It's highly recommended that you use a foundation for multi-container structures to maintain a leveled surface. Most permitted structures will require a permanent foundation.

> While most shipping container structures do not require a slab foundation, multi-container structures are an exception.

Weather Considerations

If you will be placing your modular structure in a cold climate, you will need premium insulation and a commercial climate control system to keep the container and its occupants warm. Likewise hot climates will call for air conditioning.

User Considerations

If you need to access the structure every day – say the container is a living or storage unit – you may want to install different doors. Cargo doors were designed for high security applications and may be difficult to open. Consider adding roll-up or personnel doors for easier access.

Location

It's important to consider the delivery channel when purchasing a modular structure. Containers are delivered on a semi-trailer, and if a semi-trailer can't reach your property – narrow roads, lots of trees – delivery could be a challenge.

Connecting to Utilities

Always hire an electrician to connect your container structure to power.
If your structure has plumbing, we recommend hiring a plumber to properly connect the sewage line.

Containers can arrive to your site pre-wired and pre-plumbed.

Utility Questions Checklist

- ☐ What type of electrical hook-ups will be onsite?
- ☐ Will you be using a generator? If so will it have enough to power?
- ☐ If your structure includes plumbing, can you connect the container to a sewer line?
- ☐ Will you have access to city water?
- ☐ Will you have to use black water and grey water tanks?

CODES AND PERMITS

Steady progress is being made to incorporate shipping containers into code. In 2021, the International Building Code (IBC) will include specifications for container-based structures. From there, governments will have to vote to adopt the 2021 IBC, a process that will likely take many more years.

Until the 2021 IBC is widely adopted, your local authority having jurisdiction (AHJ) and the person who represents that jurisdiction will determine whether your modified shipping container is compliant or not.

You can bolster the credibility of your project in the eyes of your AHJ by communicating your plans early, and using AC462 compliant containers, which have been approved for use as building materials by the International Code Council.

We strongly recommend obtaining permits BEFORE spending a lot of time and resources on a container structure. If you don't secure the permits you need, your project could be shut down.

DESIGN LIMITATIONS

Your completed, modified shipping container will travel on a semi trailer from the manufacturer to your site. Trust us, riding inside of a container traveling down the freeway at 70 mph, feels similar to an earthquake. For that reason, we recommend:

- Finishing out the containers with high grade cabinet wood or plywood.
- Selecting laminate counter tops for bathroom vanities and kitchenettes.

If you are set on using drywall or granite counter tops for a permanent container structure, we recommend installing those features at the structure's final location.

Safety Considerations

Some believe that anyone with a welding torch can safely cut a hole in a shipping container. Not so. When steel is removed from a container, only a structural engineer or designer has the knowledge to create a solution to safely reinforce the structure.

It's vital to partner with a manufacturer that employs experienced structural engineers who understand the steps needed to ensure modified shipping containers are safe.

Have questions or need additional resources? Let's talk.

While the majority of our clients' container applications fall into one of our standard product categories, we regularly complete custom container modification requests too. If you're not finding the tools or insight you need here, contact us. We can walk you through the process and share additional resources to help transform your vision from concept into reality.

ABOUT FALCON STRUCTURES

When we repurpose steel shipping containers, we're not just leveraging a stronger, more readily available building material; we're creating long-lived business assets. Whether your business plans to quickly deploy a field camp or assemble a multi-story apartment complex, Falcon Structures can provide code-compliant modules for your project. Countless industries now rely on our modified containers to create modular container buildings with superior quality. Founded in 2003, Falcon Structures is based in Austin, Texas.

Contact Falcon Structures today for information on modified, steel shipping containers for your next project.

FALCON STRUCTURES

Call us at 877.704.0177
or send an e-mail to
sales@falconstructures.com