



Tiny House Blog

Entry #4... The Great Frame Up

02/12/2020

To frame or not to frame ... that is the question. Make no mistake, a lot of engineering and consideration has gone into the ThinHaus frame. It makes us what we are. It is light and stiff and strong and thermally isolating (great insulation). While others might make something that looks like our frame, you can be sure that it is unlike anything else in our industry. We haven't tested it, but it could probably withstand an EMP blast (Google "EMP blast" to see what this is).

Let's start with the material we use ... special order, industrial grade Clark Dietrich 16ga steel studs. Going with a even heavier gauge, surprisingly, does not get you much more strength and it does add a lot more weight. The primary design criteria is for 24" centers with balloon construction. However, when you add in the loft, window and door jacks, the spacing ends up being closer to 16" OC and that's why going with more steel is counterproductive. Headers made of steel are the gold standard of small house construction and a ThinHaus has this, too.



ThinHaus Frame with Roof Trusses and Sheathing

The special nature of our frame really starts down low. Around the edges of the trailer are "tracks" sitting on classic residential foam that replace the floor sills of a traditional wood frame. Instead of a piece of wood that uses nails to hold the studs in place (with poor lateral shear strength), the steel track is a "U" shaped beam, bolted to the trailer, that accepts the vertical studs in a tight fit with our patented tek screws and super blocking. There is no need to add external bracing for strength here. Once completed, the frame is insanely strong by itself.

But that's not all! Once you build the frame, we add the roof beams. With a single, solid steel truss every 18", the ultra thin, five-inch ThinHaus roof is connected to the frame with tracks and screws to make a steel box that simply is unlike anything else in the world. Now, remember the drop-axes that we discussed before? That wonderful extra four inches comes back to us at this point. The vertical studs are nearly 11' tall (and still fit under a 13' 6" bridge) giving our ThinHaus a huge main salon and plenty of head room in the bath, master and second lofts. It's the magic sauce that makes a ThinHaus bigger on the inside.

A troublesome property of steel is that it can transmit heat easily. So, a hot Arizona summer day could be uncomfortable if we didn't find a way to insulate the interior. In that same way, a cold Colorado morning would be really bad even though we insulated the floor. To solve this puzzle, ThinHaus created a "fiber sandwich" wall with steel, laminated sheathing and insulation. It's also used for the ceiling and roof and mimics IRC code R-Values.



Magic ThinHaus Green Interstitial Coating for Weatherproofing

Now, you have cellulose and rockwool and closed-cell foam and hi-tech sealants in multiple layers between you and the outside world.

But that's not all! To this, we add vapor barrier, moisture seal, roofing tar and special, water tight sealants and tape (at the joints) to make a dried-in ThinHaus ... and this is all before we add our triple coated, exterior steel sheets and shou sugo ban trim (we'll talk about this in a later blog, because it's incredible!).

Oh yea, there are windows and doors to deal with and weatherproofing that goes into that. It's really more of the same, but different. Without this special care, you would be fine in a ThinHaus as long as you stayed away from the windows, but since there are ten of them along with four doors, you can't. We use thermal windows and doors and seal them with different, but just as solid materials.



ThinHaus Team Building the Outside of a Model A2410

ThinHaus has an equation that we use for our frame construction:

$$T_R = H_u + E_q$$

TRAVEL EQUALS HURRICANE PLUS EARTHQUAKE

You have to build a structure that can take hurricane force winds (highway speeds) for days on end while still able to withstand an earthquake (there are pot holes out there). A conventional, stick-built structure does do that so well. A ThinHaus does.

For more data and building details concerning the ThinHaus Model A2410~Onyx, email to: [engineering@thinhaus.com](mailto:engineering@thinhaus.com) and we'll share the specifications and techniques that we use to build our industry leading ThinHaus.