

QUAD-LOCK® PROJECT PROFILE

A Journey to Net Zero



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Being an inventor, I wanted to build a prototype home; a home that is not only affordable and cool to live in, but also sustainable, and hopefully an industry trend setter. The home had to be passive solar oriented, partially earth sheltered on the North side, with a heavy emphasis on aesthetics and present a unique profile – nothing ordinary would do. Some of the unique features we wanted were radius walls, sculptable, lots of mass for thermal cooling and heating, relatively affordable and easy to construct. We loved the concept of building an Earthship like the ones you see in the southwest. You know, with used tires and recycled materials; very sculpted and aesthetic. The problem with these methods of construction in a northern climate such as New England is moisture and cold. Straw rots and tires don't insulate.

We didn't know anything about ICF at the time, but we were willing to investigate it as an option. We flew to Vegas for the World of Concrete to try to get educated on this concept. After 3 days of walking the aisles and talking to all the ICF guys, we were pretty much hooked on the concept. The little building out in the parking lot, made onsite for the show, really sold us on the qualities of ICF. ICF became my new choice for building. I remember how solid it felt and how easy it was to put together. I could envision building our dream home with it, except for one thing: it was linear – or so I thought.

I was first attracted to Quad-Lock because of the Plus Panels for the outside. Remember, we wanted to build a zero-energy home. I remember meeting Douglas Bennion (Quad-Lock's Manager of Training and Technical Services) for the first time. I told him that I thought his product was "Simply Elegant". Where have you been all my life? And then I asked him if you could make radius walls with Quad-Lock, he showed my wife and me a video, and in it were some examples of radius construction. BINGO – a done deal!

My head was spinning with possibilities. I was psyched! On the return flight, I drew a concept sketch of our dream home on a napkin. Two months later we broke ground.

Our whole house showed up one day in a large semi-trailer. It took almost an entire day to unload it and stack it on the driveway. We immediately began to assemble the ICF. Kevin Spaulding of Miles Supply, our supplier, volunteered to help out for a few days to make sure everything got off to a good start. We started on the straight back wall; no problem, easy and fast. But, when we got to the first radius, things went to hell, fast. The panels didn't bend well and, if bent too much, simply broke. We tried all day to master the radius, but gave up in despair and exhaustion. Kevin was very upset, because the entire house was mostly radius, some even tighter than the first one we took on. My wife and I were disillusioned. Our dream home was sitting



A JOURNEY TO NET ZERO...cont'd



in the driveway, in square bundles that didn't want to bend. Were we going to have to re-design our dream home – square, from the ground up? We had already poured the radius footings.

That evening we cooked dinner on the open campfire. This is how we entertained our guests, due to the fact that we were living in an RV during construction. After dinner, I figured it out. We were cutting the panels all wrong. I broke out my radial arm saw the next morning and I went back at it. This time it worked!

Building our first ICF house was very challenging, to say the least. Our #1 fear was blowouts. Many of our corners and wall junctions were very unconventional – meaning no metal reinforcing brackets. I substituted the brackets with 3M fiberglass strapping tape, criss-crossing it at every rise. One of the most anxiety ridden days of my life was pumping the first floor rise. The crew was as nervous as I was. After all, this was my first ICF project ever – and everyone knew it. I tried to comfort the troops that day with my motto – “go big or go home!” That didn't help much. Well, we pulled it off without a single incident. It was also one of the happiest days of my life!

The next scariest day of my life was pumping of the second floor rise; again, no problems and another very happy day. If I ever build a square ICF Quad-Lock house, I will be fearless!

Building with ICF is a whole new ball game: from working with contractors and inspectors, to not making any big mistakes that cost a lot of money. I ran into constant problems with my building inspectors – none of them had any ICF experience, either. In my county, in order to get a building permit, you must pass a very stringent energy audit. They actually failed my zero-energy home design on the audit because I wasn't using E-windows on my south side and they challenged the R-values of the ICF walls and open-cell Icynene foam in the roof. They were “pink” guys. They just didn't like foam – any version of it. My electrical inspector didn't like how my electrical conduit was terminated in the walls and scoffed at how we trenched the foam for the wire. When it came to finishing the interior walls, since many of our walls were curved, we had planned on plastering directly over the ICF – not allowed. The inspector made us apply ½” dry-wall on every curved inch of foam – fire code. This proved to be not only challenging, but costly as well.



I was able to get a little even when it came to the garage. The inspector showed up just after we had hung the ½” dry-wall in the garage – no easy task! He demanded that it be removed and replaced with 5/8” dry-wall – code in MA for garages fire rating. I simply reminded him that there was an 8-inch solid concrete wall between the garage and the rest of the house! 8” of concrete beats 5/8” dry-wall hands down. ICF saved the day!

A JOURNEY TO NET ZERO...cont'd

Our electrician had never done ICF either, but wasn't intimidated. We ran most of the conduit directly in the wall. This saved a lot of time and money; fewer holes to drill, more savings. The same thing with the plumbers – most of the water and sewer lines were cast into the concrete. Again, no holes equaled more savings!

I believe the biggest weakness of going ICF is the concrete pump operator – that is, finding the right guy! We had five pump days: one for the footings; one for the stem wall; one for the first floor rise; one for the second floor; and finally, one for the second floor rise. The first 2 pumps had terrible operators. They could barely do footings, let alone get it into an 8" opening in Styrofoam. I became very concerned. I needed someone for the first floor rise, and they had to be good – I mean darn good. After calling around and interviewing many companies, I found my man! Steve Capone saved the day. He is a true artist with the controls. We worshipped the ground he walked on. Also, it helps to keep the pump crew alive and well-fed. We always cooked cheeseburgers on pump day and had plenty of cold beer after the concrete was in place and the pump truck and tools cleaned up.

We saved a significant amount of money by replacing all of the horizontal rebar, except for headers, with Forta-Fiber – 5 lbs per yard. We added the fiber on site. We used fiber in the slabs as well, not metal – big savings! We chose an ICF draftsman to do the final drawing. She specializes in Quad-Lock, so that made it very easy. Our engineer was also very experienced with ICF, so that went well, too.

After building and living in an ICF house, I can say with 100% confidence that it was the right choice for our dream home. After 30 years in home construction, I will never go back to conventional built – EVER!

During the last summer in New England, it was very hot and humid. The inside temperature of the house never exceeded 70 degrees Fahrenheit, even on 100+ days. This winter has been very cold and snowy. To this day we have never had to use the radiant heat upstairs. It stays between 65 and 70 degrees, day or night. On solar days, the whole house stays very warm. We have had to burn very little gas for non-solar days for heating because of the thermal mass of the concrete.



We are in the process of installing a solar thermal and PV system. Because we can, we are also installing a micro-hydro system. I believe once these systems are complete, we will not only achieve the zero-net goal we started out to achieve, but far exceed it by producing a significantly greater amount of energy than we consume. Also, we will have enough energy to fully charge 2 electric hybrid plug-in cars.