

Feeling Strapped And Going Nowhere Part II

By George Porter

If you will remember from our article of last month, feeling strapped and going nowhere is exactly the way you want to feel if you happen to be a HUD code home with people in it. We discussed a little of the history of anchoring, as well as some of the criteria. It is necessary that anchors resist a lateral movement, as well as an upward force. We also talked about the importance of putting the anchor strap to the home in the place that the engineer who designed the home wanted it to be, as well as meeting all the criteria of the anchor manufacturer, such as putting the proper anchor in the proper kind of soil so it can achieve its rating of a working load of 3,150 lbs. and a momentary overload of 4,725 lbs. per anchor strap. Two straps on one anchor means that the anchor itself must be capable of resisting a sustained load of 6,300 lbs. Many people install anchors in the footing the home sits on. In order to resist the load of that magnitude the footing would probably have to be a mass of at least 1.5 cubic yards of concrete and it would be necessary there be a vertical strap as well as a diagonal strap to the opposite side.

This month we'll be talking about flood hazard areas, buoyancy, other kinds of anchors, and does a home really need anchors anyway. F.E.M.A. (Federal Emergency Management Agency) has criteria concerning the anchoring of manufactured housing. It basically falls into two types of flood hazard areas. One is a flood hazard area which could involve the scouring of footings and the movement of water so as to carry a home downstream. It's a type of flooding you would find when a river overflows its banks and washes everything away. The manual shows an impressive array of engineering, but only part of the solution lies in the anchoring. A major part of it lies in the footings, which can be undermined by the rushing water and cause the home to collapse, even though the anchors did not fail. While there are criteria for anchoring in an area such as this, it is probably only suitable in a mild flood. There are two factors which cause all efforts you could generate to be useless. The force of water on the side of a home is probably a hundred times stronger than wind moving at the same speed. Couple that with debris such as a large tree trunk washing downstream, and you have created your basic irresistible force.

If that isn't enough, there's another factor called buoyancy. Buoyancy can be the problem in flood areas such as this, but it is the major problem in tidal flooding areas. The only true resistance to tidal flooding is to keep the entire structure out of the water. When the water level on the outside of the home becomes approximately 12" higher than the floor inside, you have created more than 50,000 lbs. of buoyancy. When the water rises faster than the water can seep into the home, the home becomes like a boat and that amount of force is enough to rip the entire structure from its frame. Even if it could survive, I would hate to think what the home would look like after it had been under water. I personally never inspected a home that's been through a flood, but I've seen what a leaking hot water heater can do, and that's nothing compared to putting the whole house under water.

Anchoring to resist flooding, even though F.E.M.A. addresses the problem and has established criteria, seems to be an exercise in wishful thinking. However, who could say you shouldn't do it? It may help save some of your property and it may also save somebody else's property downstream.

The major reason for anchoring is wind, and wind is something we have to deal with all over the country. One time I had occasion to talk to the chief engineers from HUD and NCS/BCS both at the same time. They explained to me that in a mathematical model, not the real world, by calculating the coefficient of friction of the frame on the blocks, it's possible to demonstrate that a 45 mph wind can move a home off its foundation. Again, it has to be made clear that this is merely a mathematical calculation and that such things are not possible in the real world due to ground friction and turbulence from surround structures. However, it does give us an idea of what could happen and how little it may take to do it. There are basically two wind zones in the United States, hurricane zones and others C zone 1 and zone 2. There is no zone 3 or zone 0. There are criteria for anchoring all homes in each zone. So what kind of a home doesn't need any kind of anchoring at all? One that the factory in its manual says does not need any anchoring. If it is unclear in the factory manual, ask them to write you a letter, signed of course, saying that you don't need to put anchors on their home. I think it will become very clear to you that all homes need anchors. Hurricane zones may be 90 mph winds, but thunderstorms and certain winds whipping around other buildings can create considerable forces on our houses, and anchoring is cheap insurance and when it's done right is very effective.