

ANCHORING –CONVENTIONAL TIEDOWNS PART 1

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The other day, a professional installer wrote to me about anchoring a manufactured home. He asked if he only needed a tie down anchor at each corner of the home or if he should install one at every pier. Since neither answer is completely wrong or completely right, I thought we should start talking about anchoring and try to shed some light on this critical issue. Over the next several weeks, we'll talk about all the various anchoring systems.

Let's start the discussion talking about conventional anchoring systems, you know, the ground anchors with steel straps to the frame. How should they be installed to properly anchor or stabilize a manufactured home to protect from wind storms?

I wish there were a simple answer. At this point, I would typically tell an installer to check the anchoring charts in the Manufacturers Installation Instructions (MII), but I believe that the instructions are extremely confusing and not easily understood or followed. But if we start thinking about the basic fundamentals of anchoring equipment, it can start making sense.

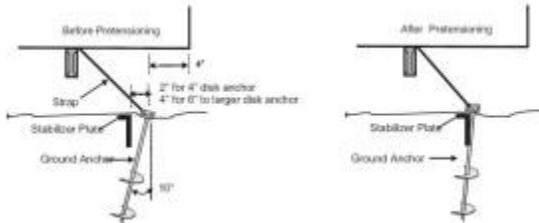
Even if you use one of the alternative anchoring systems (Xi2, Vector System, LLBS, or All Steel Foundation or some other system) they generally require conventional ground anchors and straps at each corner of single section homes. So, regardless of the anchor method you prefer, you must have a good understanding of how to properly install a conventional ground anchor and strap. Here are the fundamentals all installers must know:

- Ground anchors are designed to be installed in the ground. Not concrete!



This is NOT proper anchoring!

- Cross drive anchors are designed to be installed in solid rock. Not soil!
- Ground anchors must be installed to their full depth, and extend below the maximum frost line.
- Ground anchors should be placed roughly under the side wall of the home (sometimes call it the skirting line) at a slight back angle (10°).



- If you are using conventional ground anchors and straps, the first anchor should be placed within 2' of each end of the home. There is some variation depending on the manufacturer, so check the MII for each home.
- The anchor must be suitable for the soil where the home is being installed. We will talk more about soil holding capacity and soil classification in another post.
- Ground anchors must be at least 12" above the water table.
- Unless the ground anchor and the strap are in-line, a stabilizing plate is needed to prevent the ground anchor from slicing through the ground when the load is applied.
- Poor site grading can undermine a perfect anchoring job.



Poor site grading led to loose strap

And we haven't even mentioned the straps yet!

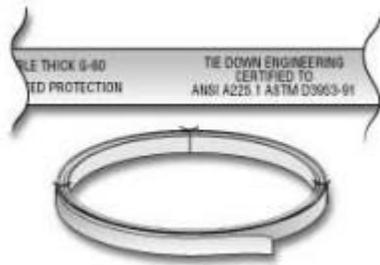
- The tie down strap generally attaches to the top of the frame (or chassis) I-beam, wraps completely around the I-beam, and down to the anchor. As an alternative, you could use a positive connection swivel strap.
- Where the tie down strap wraps around the I-beam, strap protection must be provided to prevent the strap from shearing off at the sharp edges of the beam.



Strap protectors

You can purchase them or make them out of strapping material.

- Strapping material must be certified to ASTM D 3953-97, and have identifying



markings every 5'.

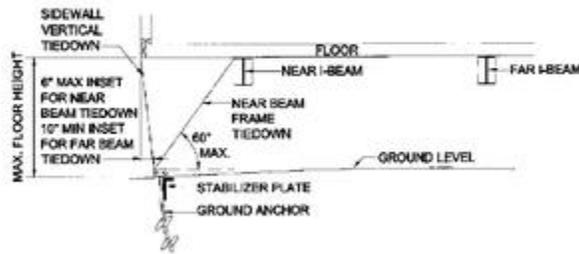
- The strap must wrap the anchor bolt 4 – 5 times.
- The strap must resist corrosion and weather deterioration.
- When installing the strap, you need to pre-tension the anchor, pulling it against the stabilizing plate.
- The angle of the strap is the most critical consideration.



Inexpensive angle gauge to show proper strap angle.

Diagonal straps are required in Wind Zone 1. If the strap is greater than 60°, you have not protected the home from sliding off of the piers.

Wind Zone 1 Frame Tiedown: When the angle of the near beam frame tiedown strap exceeds 60 degrees the far beam frame tiedown strap is installed in addition to the near beam strap.



WOW! That is an awful lot of information, so let's stop here for now. The most important thing that every professional installer must know is to make sure that the anchoring system you're using is consistent with the manufacturer's design.

Start thinking about your processes for installing tie downs. Make sure to cross check your work to the illustrations and details in the installation instructions for the homes you are installing.

Next week we will talk about how to figure out proper anchor locations and spacing.