

Put Your Best Footing Forward

By George Porter

Why do you have to put footings under a home anyway? Why aren't 4" solid blocks just as good? Well, in some cases they are, depending on the load they have to carry and the ground they have to sit on. It may be interesting for you to know that our little manufactured housing industry is well ahead of its time.

In the cold climates of Europe, they have developed many building techniques which are different from those we have in the United States. You cannot pour wet concrete within the Arctic Circle, and yet you have to put up a building. What do you do? In the Scandinavian countries, they use something called a segmented footing. These are pre-manufactured solid concrete units that are set into a bed of stone beneath the surface and the building is placed on top of that, and this system has been working quite well for more than 20 years. Little did we know that our two 4" solid blocks placed side by side underneath the stack of 8" blocks is also a segmented footing of sorts and that has placed us on the cutting edge of footing technology for the last fifty years or so. Who knew we were so smart?

Unfortunately most of our knowledge of footings in the manufactured housing industry came to a halt somewhere right after the four inch block. What a footing has to do is not hard to understand, and I'll try to make it as simple as possible.

All dirt is not the same. Different kinds of dirt have different load bearing capacities. If you've ever seen a lady walk across a lawn in high heel shoes, you will notice the high heels shoes sink in. Not because the woman weighs so much, but because the weight that is there is concentrated on a very small area C the heel of the shoe. When the same woman puts on tennis shoes, she doesn't sink in at all, because the very same weight is distributed over a larger area and the load bearing capacity of the soil is up to the task. There are soils she could walk across in her high heel shoes and would not sink. They would be very dense, compacted soils. Soft dirt needs more square inches of footing than hard dirt to hold the same weight.

So basically, what we have to determine in order to know what kind of a footing we need to have is what type of soil do we have. This can be very complicated because the load bearing capacity of exactly the same soil can change according to its moisture content, mud is dirt with a lot of water and it doesn't hold anything. So not only must we be determining its load bearing capacity, we must also achieve some sort of stability in its moisture content. That involves site preparation and will be covered at a later date.

There are three things you must know to properly design a footing: 1) you must know how much weight it has to hold; 2) you must know where it goes under the home; and 3) you must know what it is sitting on. The factory is the only one that can tell you the first two, and the installer is the one that has to find out number three.

When I did my research on the course I wrote for the installation of manufactured housing, I found that this determination was absolutely the greatest barrier to the proper installation of a

manufactured house. No one knew the dirt. Some factories suggest you consult a local engineer. This is so expensive and so time consuming, I would consider it to be totally impractical. But of course, it will work if you are so inclined.

Many companies suggest you identify one of fourteen different types of soil. You may have seen the list if you've ever looked through some of the manuals. I personally have no idea what the difference is between sandy clay, clayey gravel and gravelly sand, or the eleven other choices other than solid rock and loose sand. Those two I know. The rest are total speculation. If, however, you are a certified soil scientist there should be no problem.

There are also various pieces of laboratory equipment in the \$5,000 range that properly used will give you the load bearing capacity of the soil in pounds per square inch if you wish. After running up against this wall, it was easy to understand the frustration of factories and installers alike when it came to writing a manual with specific requirements. If you don't know the dirt there is absolutely no way you can design a footing that is guaranteed never to sink.

In an effort to solve this problem, some states' governing authorities have gotten together and passed laws saying that all the dirt in their state is the same, and they pick a load bearing capacity and make it law. While this may tidy things up considerably, I really don't believe the various soils pay much attention when they are told to have a load bearing capacity of 1,500 lbs. per sq. ft.

What happens is that when you have a really firm soil, and could use a footing three times smaller than the 1,500 lb. per sq. ft. footing, you will not be allowed to use it. Although this will be an expense that will have to be passed on to the consumer, that's not the real problem. The real problem is when the soil is less than its prescribed load bearing capacity. You can use a 1,500 lb. per sq. ft. footing in soils that are rated for over 1,500 psf, but if you use the 1,500 lb. per sq. ft. footing on soils that are less than 1,500 psf, you are now back into the problem of settling.

In my opinion, it is far better to determine the load bearing capacity of soil at the site of the installation of the home and design the footing appropriately. It is easily done in about 10 seconds with an instrument that has been around for forty-five years, costs about \$40 and is called a Pocket Penetrometer. I'll tell you more about it in the next article.

In the meantime, if you have any suggestions or questions, please write me, George Porter, Manufactured Housing Resources, P.O. Box 9, Nassau, DE 19969.