MANUFACTURED HOUSING INSTITUTE

# Overview of Manufactured Home Installation

*This guide contains an overview of the HUD-Code manufactured home installation process. This is only a guide, and it is recommended that you consult with your manufacturer on these items prior to delivery and installation of the home, as specifications and expectations will vary.*

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# site preparation

## TERRAIN PREPARATION BEFORE DELIVERY OF THE HOME

All site-work and preparation of the foundation is the responsibility of the builder/retailer. The home site should be properly graded to allow water to run away from the perimeter of the home by a distance of at least 10 feet. Special focus should be given to the first five feet of the slope as well as to the adjacent 2 feet under the home. This area should be properly graded so that any water that reaches the edge of the home cannot seep under the home. If soil is added to the site where the home will be placed, it must be compacted to its normal density to prevent any settling before placing footers. Subsurface conditions of the soil should be investigated to prevent placing the home on an unstable base.

## SITE PREPARATION AND HOME TRANSPORTATION

In order to bring in a home section which may be 16 feet wide, 80 feet long and 15 feet high, proper access to the site is high priority. Access evaluation should begin by the builder/retailer at the periphery of any urban or suburban area in which you are located and continue all the way to the project, ending where the home is to be sited over the foundation. Evaluate narrow streets and tight corners for the following items:

> Can the parking of cars on narrow streets be controlled if more room is needed for maneuvering?

> Are there power lines overhead which must be avoided?

> Are there trees or other natural obstructions which may limit the width, length or height of a home being moved?

> Are any fences in the way?

> Do any of the routes contain sharp rises or dips in the road which could hang up a house?

> Do any of the routes contain sharp turns or curves in the road that would present a problem for longer loads?

> Will you be bringing the homes up or down a steep grade? This may also present a problem at each home site if you have a severe upslope, down-slope or side-slope lot.

Should any questions arise, consult with a representative of a manufactured home transport company to visit the site with you and look for any problems. They can offer solutions for difficult-to-reach lots. Manufacturers will also work with the builder/retailer and local traffic control officials to resolve any difficulties with travel requirements. The builders' cooperation is requested in routing the homes to final destination as a requirement of the permits.

The home transporter is responsible for obtaining any necessary trip permits which your state may require. Commonly, the transporter will provide the state agency of jurisdiction a description of the home, its width, length and height, and the origination and destination points. The agency will issue the permit, including any special routing instructions which the driver must follow. While much of the typical routing is over the Interstate highway network, some low bridges, underpasses or other known obstructions may require the driver to get off the highway and go around them on local or frontage roads.

Because of varying state requirements for permits, fees, pilot or pole cars, maximum widths and other costs, the builder/retailer should get freight quotes from the manufacturer to the final destination. Be sure to understand the transportation costs before you finish your estimating and budgeting for the building project.

State requirements for pilot cars vary, depending on the width of the home. Some states also require pole cars, to check whether the homes are going to fit under each bridge. There may be time-of-day restrictions (curfews) as well, especially in or around major urban centers during the morning and afternoon commutes. Transportation companies carry public damage and public liability insurance. Consult your attorney or insurance company to evaluate the adequacy of their coverage and advise you accordingly.

## ON-SITE ACCEPTANCE OF HOUSE DELIVERY

Carefully inspect each home upon its arrival at the site. This inspection will make it much easier to work with the manufacturer's service and warranty department later. Make note of the general condition of the house. Look for anything which is broken or damaged, including any transit damage. This is an especially important time to list any cosmetic defects, such as dents or scratches in appliances, counters, sinks or cabinetry. Check the floors carefully for gouges, cuts or stains. Look for broken glass, mirrors or windows.

# types of foundations for the home

There are four primary types of foundations. As described in the *Guide to Foundation and Support Systems for Manufactured Homes* published by the Manufactured Housing Research Alliance, they are outlined below.

## PIER AND GROUND ANCHOR FOUNDATION

The pier and ground anchor system has long been the common and accepted manufactured home support and anchorage system. It also has the least initial cost for providing a support system for manufactured homes, and the installation of a pier and ground anchor foundation system is frequently accomplished in one working day. In the most frequently used configuration, piers are installed under the main beams of the home sections, under the mating line of multi-section homes and at other points designated by the home manufacturer in its installation manual. Perimeter piers or blocks may also be a part of the home's support system.

The most common pier types are steel jack stands or hollow core concrete masonry blocks with open cells placed vertically and stacked one on top of the other to the required height. These can be single stacks of blocks or double stacks, laid in an interlocking configuration.

Piers are set on square footers or pads on the ground which spread the load from a pier over a larger areas, making a more stable base. The square pad footers may be concrete, either poured in place or pre-cast, preservative-treated wood or acrylonitrile butadiene styrene (ABS) pads or other material approved by the local building authority.

## SLAB FOUNDATION

In a slab set foundation, the piers that support the home are placed on a concrete slab. This foundation system provides a crawl space of between 28 and 42 inches in height. Slabs are not unique to manufactured homes. They are recognized and accepted for many other types of buildings, including site-built, single-family homes and commercial structures. They are commonly found in areas with freezing and expansive soils. Because there are no footings or piers extending into the earth below the slab itself, in areas that have deep frost lines or expansive soils, the savings can be significant compared to the use of deep piers.

The most popular pier material for a slab foundation is the hollow-core concrete block although a fabricated steel stanchion with a screw thread cap can be used also. A home must be permanently anchored to the foundation. This is commonly accomplished through the use of anchors embedded in the concrete. Homes also can be permanently affixed through welded or bolted connections between the chassis and the piers, if the piers are permanent. (Examples of permanent piers are mortared and grouted concrete blocks, and steel stanchions bolted to the slab.)

# types of foundations for the home

## CRAWL SPACE FOUNDATION

The crawl space foundation system has two main distinguishing characteristics: it incorporates full perimeter wall support together with internal, independent support points (piers under the chassis I-beams, and column supports for the ridge beam along the marriage line). In lieu of ground anchors, the connection between the manufactured home's perimeter joists and the foundation sill plate performs these functions. The crawl space itself is not habitable. Within that very broad definition, there are many styles, designs, and ways to build crawl space foundation systems.

To optimize the placement of a manufactured home on a perimeter foundation, the factory must agree to provide the following special details on their home:

1. All steel members of the chassis - I-beams, outriggers, front and rear crossmembers – must be recessed from the edge of the floor, to clear the foundation wall. A clearance of 8" is satisfactory, 10" is optimal. Most manufacturers offer this option.
2. As part of this set-up, there must be no utility drops protruding below the floor in this perimeter zone.
3. To allow for the best attachment and trim procedure, the manufacturer must place a "z" flashing at the midpoint of the perimeter joists, and bring the siding down to this point.
4. All wood vertical trim boards should be shipped loose in 10' lengths. This permits a seamless trim detail after the home is on the foundation.

## BASEMENT FOUNDATION

A basement is both a structural support system for a manufactured home and a substantial addition to the livable space of the home. This foundation system provides a more site-built-like appearance to the installed manufactured home. A basement foundation consists of a concrete-block or poured concrete wall constructed in an excavated area of the home site.

Basements demand extreme care in their construction. The outside wall cannot be longer or wider than the floor of the manufactured home. Installers and builders of the basement foundation are advised to consult with the home manufacturer to obtain the exact floor dimensions.

There is no room for error in constructing the concrete walls. The manufacturers' floor assemblies are almost always exactly the proper length and width, meaning that the foundation cannot be out of square. Finally, the top of the foundation must be perfectly flat, or the home's floor will twist when it is set on the foundation sill plate.

Some contractors are not careful when preparing concrete forms, because carpenters can later make corrections for concrete errors in site-built homes. In contrast, the manufactured home arrives complete, and it must fit the foundation. Therefore it is advisable to have forms checked and rechecked for dimension, squareness and flatness before the concrete goes in.

# installation of the home

The installation manual provided by the home manufacturer contains information about how to properly place and size footings and piers according to the load bearing capacity of the soil, as well as other considerations. It gives details on the proper connection and installation of multi-section homes, including any optional features found on the home itself, such as light fixtures, ceiling fans and hinged roofs. The manuals also cover the connection and testing of all systems and appliances.

The manufacturer's span chart provides the points of concentrated loads that come down through the center of the home from the ridge beam. The factory will supply a drawing or chart which indicates how far the first concentrated load is from the front end wall, and how far each succeeding column is from there. Manufacturers also provide the weight in pounds for each column. Using the known soil bearing capacity, a foundation engineer can determine the size and depth of the footing needed at each of the ridge beam columns.

Most states require that the installer of the manufactured home be licensed and will also require final inspection of the installation of the home.

## MOVING THE MANUFACTURED HOME ON TO THE FOUNDATION

Most people have never seen the process of getting the manufactured home off the street and onto its foundation. This step is the single most unique on-site activity which distinguishes manufactured homes from site-built homes. It is also the most potentially hazardous phase of construction, to the safety of both the home and to the people installing the home. This should be done with experienced contractors. The most commonly used methods are:

- Backing the home or pulling the home over partially completed foundation walls (drive on);
- Using roller systems to move the house over full foundation walls; or
- Placing the home with a crane.

Any single-section manufactured home may be installed by any of these three methods, so the selection of which method to use will normally be governed by:

- The site;
- The foundation; or
- The contractor.

Obviously a level location with unlimited access will permit you to use any installation process. However, if there is a substantial amount of terrain, or if there are structures blocking access to the foundation, you may be forced to use a crane to pick up the homes and place them.

If your plan is to not recess the foundation, for whatever reason, you will probably be able to have the truck driver spot the home directly over its site upon arrival. For recessed foundations, the use of rollers will enable you to push the home sideways over full foundation walls and locate it within the excavated "pit." Depending on clearances, you may be able to leave one wall of the foundation open, then have the truck back the home into a recessed foundation. This may be possible after you have checked to make sure there is enough lateral and vertical room and the home will not hit anything. Check also for a clear track for the home's wheels. If you have a built-up foundation on a sloping lot, you will most likely need to use a crane to place the home.

Many manufactured home installation contractors specialize in simple placements - homes on piers or blocks. You may need to get help from the manufacturer or the state manufactured housing association to locate contractors experienced in working with permanent foundations.

## INSTALLATION SAFETY

This is not a job that can be learned through experimentation and by doing it yourself. Home sections can weigh 25,000 to 40,000 lbs. or more. There is a need for extreme caution and you must pay attention to safety. People must work underneath the homes as they are being affixed to the foundation. If a home falls from temporary piers or jacks, a serious permanent injury or death can occur. Experienced installation contractors know how to set up fall-stop devices under the home, and they know the limits to which the home can be pushed or maneuvered safely. Most developers and builders who employ their own people or contract for their work will consider having an experienced installer train their people. This is an excellent idea. Safety for the home is also very important and inexperienced installers can cause damage to manufactured homes due to rough handling, excessive racking, or dropping homes.

## ADJACENT STRUCTURES

All adjacent structures to any HUD-Code manufactured home, such as a garage, must be self-supporting. This means that adjacent structures are capable of containing, within their own structure and foundation, adequate support for the entire roof load, floor load and structure load. The adjacent structure can transmit no weight to the home unless the builder has worked with the manufacturer to specifically design the load into the construction of the home. Almost all adjacent structures should be built to the local building code for the area.

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