



R&H Engineering

4833 Saratoga Blvd, #286 . Corpus Christi, Texas 78413 . Phone (361) 852-4033 . Email: RH-Engineering@stx.rr.com

(361) 852 - 4033

<http://rh-engineering.vpweb.com>

R&H Engineering has been in Business Since 1996

- *Experience:*

- Foundation Inspections since 1991.
- Structural -
- Civil –
- H&H -
- Windstorm

Foundation Issues in South Texas

(Based on our experience)

- Four Types of Foundations:
 - Suspended Concrete Slab
 - Pier & Beam
 - Reinforced Concrete Slab-on-grade
 - Post-tension Slab (PTI)
- *Geotechnical Engineer should be involved prior to foundation design.*

Expansive Clay Soils in this area

- *A Geotechnical Engineer (Can explain all about soils).*

***Clay Soils will expand when
exposed to water***

&

***Will shrink when they loose
water***

PI = Plasticity Index

Defined as the mathematical difference between the LL and PL

- **Sand**
- $PI < 15$


- **Clay**
- $PI > 20$ considered expansive
- $PI > 40$ considered highly expansive

Control of Soil Movement

- For clay soils, the amount of movement is driven by the magnitude of change in soil moisture.
- Moisture changes are a result of Evaporation, Transpiration (Water removed by vegetation), rainfall, irrigation and drainage.

Active Zone

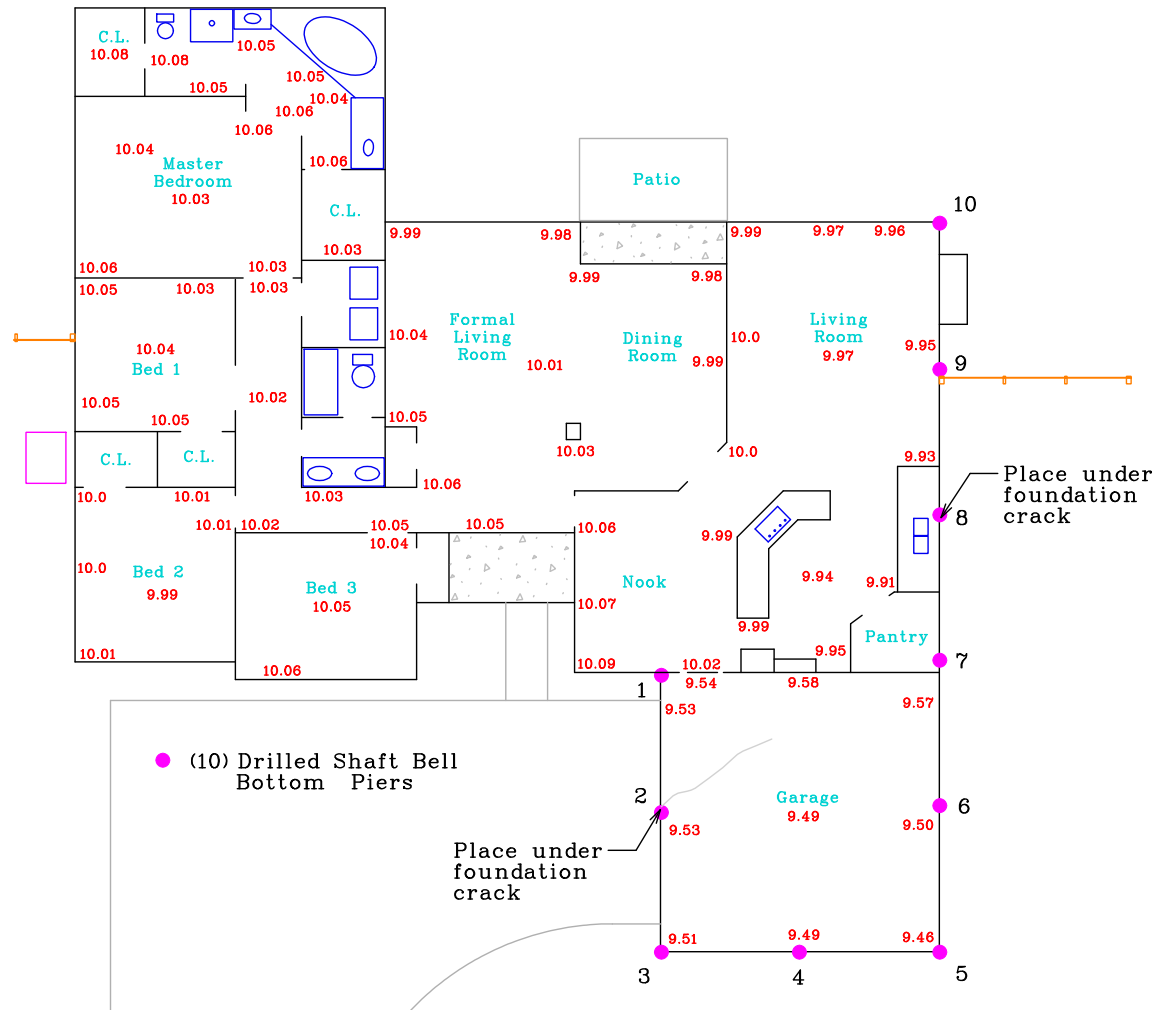
- The active zone is the portion of the soil that experiences seasonal changes in moisture content.
- Depth of active zone varies. This area is typically 6 to 7 feet deep.
- Active zone is influenced by vegetation, water table, drainage and climate.

- 
- Swelling Pressure from expansive clay soils can exceed 30,000 psf (F.H. Chen, 2000) Typical is 2000 to 4000 psf.
 - PVR – Potential heave is commonly referred to as Potential Vertical Rise.
 - Predicting Movement.

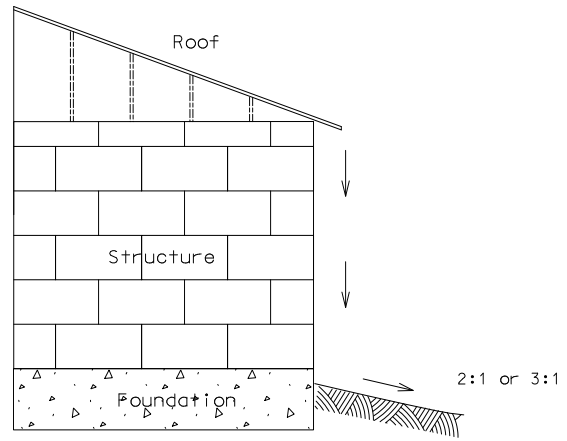
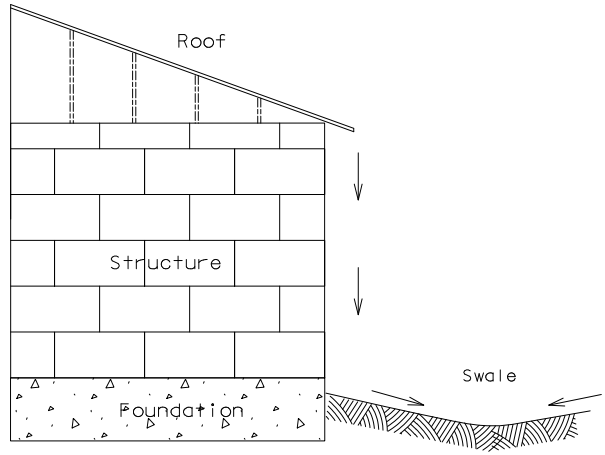
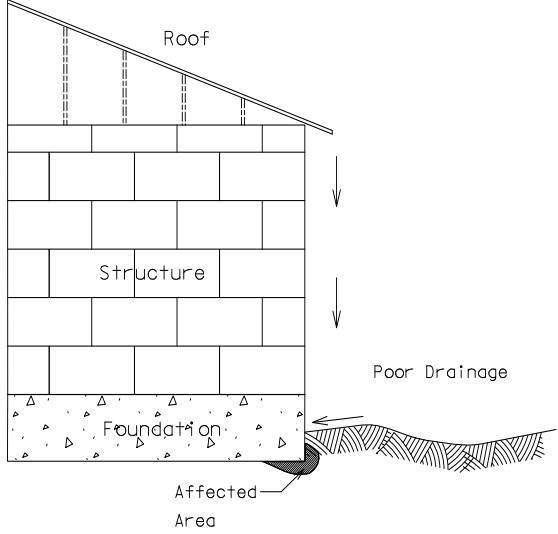
Do cracks mean foundation problems?

- Cracks in the brick veneer.
- Separations in siding.
- Cracks in stucco.
- Cracks in gypsum board.
- Cracks in the foundation (exterior beam).
- Cracks in the floor slab.
- Cracks in the floor tile.
- Cracks in the grout in the floor tile.
- Cracks in the ceilings.
- Misalignment of Doors and Windows.
- Separations between door frames and brick veneer or windows and brick veneer.
- Separations between the rafters and the ridge beam in the attic.
- Sagging of the roof profile.
- Separations between cabinets and the walls.

Relative Elevation Survey



Drainage



MAINTENANCE PROGRAM:

(To minimize foundation movement of any slab-on-grade on expansive clay soils, potential buyers should implement the following maintenance program)

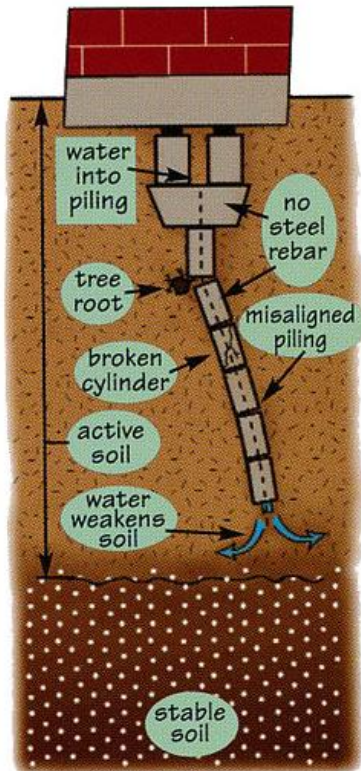
- Water the plants, trees, grass, shrubs, etc around the foundation system.
- Check the sewer lines periodically to ensure no leaks in the lines.
- Eliminate leaking outside water faucets.
- The natural ground should be a minimum of 4" to 6" below the brick ledge or siding.
- If soaker hose is being used, ensure it is 18" to 24" away from foundation system.
- Clean the window steel lintels with a steel brush, apply a rust inhibitor and paint.
 - Painting the lintel provides additional protection.

- Ensure positive drainage **away from the foundation** system by:
 - - Adding swales if 2:1 slope away from foundation cannot be obtained (see diagrams). The swales should be 5" deep and 2' wide.
 - - Adding topsoil at a 2:1 or 3:1 slope where applicable and direct runoff away from the foundation system.
 - - Adding gutters, downspouts **and extensions** where swales and topsoil cannot be added and direct runoff away from the foundation system.
 - - Fill any low depressed areas/voids with topsoil and ensure positive drainage away from the foundation system.
 - - If gravel exists, then ensure that the natural ground under the gravel is sloped away from the foundation system.

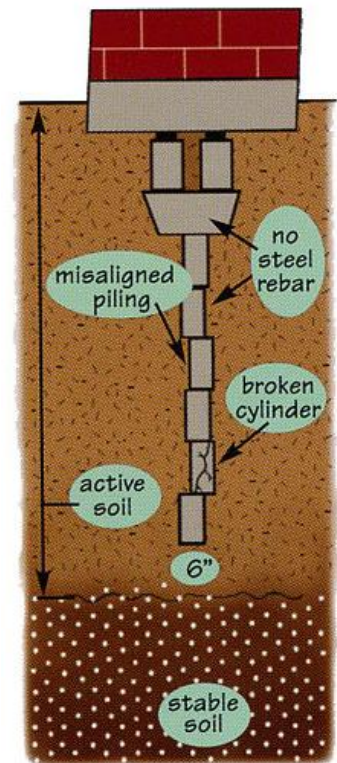
Pressed Piles (Pushed Piles)

Cost approximately \$275.00 per pile however they are spaced between 6 & 7 feet apart therefore it takes more piles than bell bottom piers.

*Interior Push Piles are very expensive due to tunneling
Range from 14,000 to 30,000*

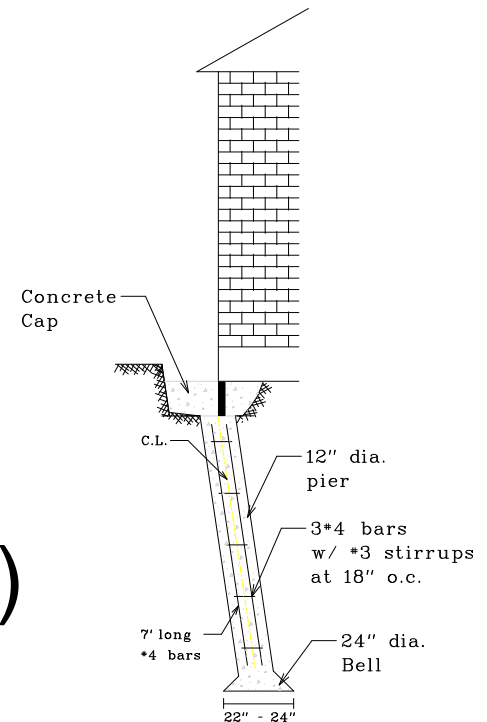


Does this occur ?



Do all homes require foundation repairs?

- Drilled Shaft Bell Bottom Piers
- 12" Shaft dia & 24" Bell
- 8' to 12' deep
- #4 rebar (1/2 inch)
- Spaced 10' apart (max)
- Life time warranty?
- \$325.00 per pier (Exterior)
- \$525.00 per pier (Interior)





Contractors experience is very
important and critical.



Thank You