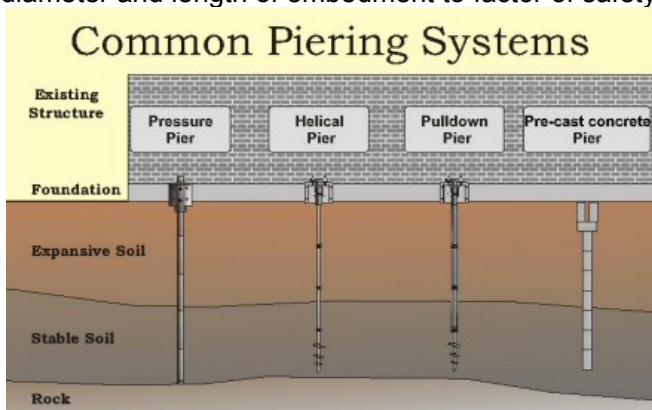


When a homeowner, buyer, or seller faces foundation problems with the structure, it is common to take estimates from two foundation repair companies. But how does one make a proper comparison and know what is best? Foundation repair contractors like to recommend what is best for them, and that may not be what is best for the remedy to the foundation problems of the structure. I provide an unbiased LICENSED ENGINEER'S RECOMMENDATION as to which pier system or how much pier is actually needed, or if another solution would be better

Engineers are not as precise as accountants. In the life of a structure the loads may change. Weather and other external factors come into play, and there may be construction difficulties. For this reason, engineers use a "factor of safety." For example, the failure stress of the reinforcing steel in concrete is 60,000 pounds per square inch. In design, the structure is specified so that the maximum stress on the steel is 24,000 psi, hence the factor of safety is 60,000/24,000 or 2.5. Foundation leveling procedures are:

Press down piers where the maximum resistance available is the weight of the foundation structure

Study of the soil properties at the site calculating the resistance for a drilled concrete pier with specified diameter and length of embedment to factor of safety



The steel or concrete piers first require a bracket placed under the grade beam of the foundation. Piers are then jacked down against the bracket to whatever depth produces a rise in the foundation. This capacity is no greater than the present resistance of the foundation. To an engineer the factor of safety is therefore only 1/1 and cannot withstand any variation from the conditions on the day it was installed.

If the owner or prospective buyer is concerned by evidence of distress, the procedure is to call upon a foundation repair contractor to obtain a proposal for the needed repair. A specialized professional engineer can explain the consequences of the proposed action and determine if the procedure will remedy the problem. To do this the engineer should explain the concept of engineering used for the design in the first place.

Soil, like humans, is organic and has long term and short term support capabilities. If you can lift 100 pounds and I hand you 50 pounds, your short term factor of safety is 100/50 or 2/1. A 100/100 factor of safety is 1/1. A 100/200 factor of safety is 1/2 or 0.5. However, your long term factor of safety is less than the short term because you are getting shorter under just the weight of the upper body.

Distress in a structure is evidence the long term factor of safety is less than 1. This is because of either poor design from ignorance of soil properties, or design by customary standards.

In "pressed" pier repair, without any real knowledge of the properties of the soil layers, a steel bracket is put under the grade beam and down through it against the building a steel or concrete pier is jacked in small sections until by end bearing support and side shear drag on the smooth sides it is strong enough to barely lift the beam. The building provides the only resistance for the downward force so the factor of safety of this process in the short term is no more than 1/1 and in the long term the factor of safety is less than 1.

In drilled pier design it is first necessary to take samples, disturbed and undisturbed, of the soils to obtain their extents and strengths. With the facts of extent and soil characteristics the professional engineer uses the bearing capacity equations of geomechanics to size the piers in diameter and length to support the building sections with a factor of safety of not less than 3/1. Holes of rough sides and prescribed depth are drilled under the foundation. Fresh concrete is poured and reinforcing rods are inserted. After curing, the fastening process is completed.

With the pressed procedure, if there is NO lifting before fastening, only the existing long term soil support and the short term pier support is provided. Therefore the factor of safety is less than 2/1 and the procedure is mere stabilization. If it is necessary to change the inside elevations of the foundation, the support is only from the pier. This short term factor of safety from the pier alone can be no more than 1/1.

For the drilled type, with NO lifting before fastening, the support by both the soil and the pier is less than 1/1 plus 3/1. If lifted before fastening, the short term factor of safety is 3/1.