SOIL STABILIZATION TREATMENT SAVES DEVELOPERS AND BUILDERS FROM 'SLOW-MOVING EARTHQUAKES'

Builders and foundation specialists are heading off damage - and resulting liabilities – through more effective environmentally friendly chemical stabilization

To a developer or builder, one of the biggest nightmares occurs when swelling clay has been discovered under buildings, roadways or other structures – after they have already been constructed.

In many cases, when moisture gets into the clay it can swell up and lift a building off its foundation, or heave up parking lots, roadways and even runways. "In effect, swelling clay is like a slow-moving earthquake," says Shawn Lawson, a foundation repair expert from Texas. "The damage doesn't happen as quickly, but the results can be just as bad."

Lawson's company, Perma-Pier, specializes is repairing foundations and under pavements that have been damaged by swelling clay throughout the Texas prairie lands in the Austin, Dallas-Fort Worth and San Antonio regions. Although his firm does a lot of remedial work, he recommends that developers and builders pre-treat soil containing problematic clay so that the damage doesn't occur in the first place.

"The right pre-treatment will eliminate the problem before it gets started," he says. "And it can be a long-term solution. Virtually 100 percent of the soils we've treated with an electromechanical solution have remained stable."

Charged clay the culprit

In volume, swelling clay attracts water because the clay is electrically charged with ions that pull the moisture into it. This electrical attraction is so strong that it can draw in water from distances of up to 12 ft. In the process, the flow of water creates a vast network of tiny, sponge-like capillaries through which the clay can rise and, later, fall.

"The damage can range from stuck doors and windows to severely buckled walls, floors, roadways and commercial structures," Lawson says. "Utility lines fail. And most attempts to solve the problem through mechanical means or drying agents will not last. As a result, damage recurs."

Lawson adds that recurring problems can inflict painful consequential damages as well as structural ones. Commercial buildings can lose insurance certifications, or be subjected to tenant turnover lawsuits and safety issues.

He says traditional mechanical or chemical approaches to solving a swelling clay problem are inadequate. Swelling clay can rise above piers inserted under homes, creating severe damage and even knocking the structure off these supports. Conventional chemical treatment substances, such as lime and potassium chloride, are temporary and are also considered hazardous to the environment.

The most effective solution for Perma-Pier and other foundation specialists is to permanently stabilize the soil by injecting a solution that neutralizes the electrical charge present in swelling clay. The solution Lawson uses is called Condor SS, an "electromechanical" (both electrical and mechanical) soil-stabilizing compound that produces ions with a charge from opposite those in the clay. Once the ions in the clay have been neutralized, the clay no longer attracts water. The moisture already present in the soil will likely evaporate in warm weather. Or, the water can be "squeezed" out of the soil by compaction, which removes the water passageways in the clay. Either way, the water and its electrical attractor are gone.

Heading the problem off

Most developers are aware of the problems that result from building on soils containing swelling clay. Their structural engineers, who design foundation plans, work with geotechnical specialists to have soil studies performed that test the stability of the earth in which foundations are placed.

However, since swelling clay is often concentrated in pockets, some of this thirsty earth may remain undiscovered, causing damage to structures once they are in place.

If swelling clay is identified before building, the developer or builder may decide to excavate and replace the clay with inert soil. Or they may choose to install chemical water barriers in the area where structures will be built. In some cases, developers "pre-swell" the soils so that they get them as close as possible to the maximum PVR (potential vertical rise). However, both approaches are expensive, and may not be a thorough solution.

For those reasons Lawson recommends that developers and builders pre-treat soils with the swelling prevention solution like Condor SS.

This form of pre-treatment is a very good investment and easy to apply, he adds. Manufactured by Earth Science Products (Wilsonville, Ore.), Condor - Condor SS is an environmentally safe concentrate that is mixed with mater and then injected into the soil. After injection, the soil will shed moisture rather than absorbing it and swelling during the wet season. This treatment maintains the soil in a more consistent state, allowing construction to occur without bringing in select fill or using other expensive measures to counter the adverse effects of clay and variable moisture.

A Texas-size pre-treatment

The developers of Frisco Square, a master-planned development near Dallas, decided that pre-treating the entire 147-acre site with injected soil stabilization solution would be a good investment for protecting the life of the structures in the multi-generational complex.

"We stabilized the entire town," explains Shane Kennedy, Earth Science Products president. "All of the building pad sites, driveways, walkways and parking lots were stabilized with Condor SS while under construction. The chemical stabilizer allowed the project to function as though clay soils were non-existent, resulting in smooth streets and curbs, healthy landscaping and a distinct lack of the usual problems associated with the swelling and contracting of clay soils."

In an earlier case, contractor Rockwell Construction of Texas chose to inject the same electromechanical stabilizer as an alternative to removing six ft. of expansive soil (including swelling clay) that was spread across a 130,000 sq. ft. parcel. The goal of proposing this alternative process for soil stabilization was to find a more cost effective method of reducing the potential for vertical movement (PVR) of the building pad to within the limits set by the owner's geotechnical engineer (one inch or less PVR). When the figures were run, the net cost savings to the owner turned out to be approximately $135,000. After installation, the stabilization process met or exceeded the geotechnical engineer's requirements for potential vertical movement reduction.

Thomas LaLonde, president of stabilEarth, an Arlington, Texas-based distributor of advanced soils treatment products, agrees that pre-treatment is by far the ideal solution to potential swelling clay problems.

He adds that foundation specialists can see major benefits from using the product also. "One of the main benefits that foundation companies enjoy in using this technology is that they have fewer callbacks and warranty for damage that recurs from moving structures. If they inject the stabilization product they will limit future problems, and that's a big deal."

For more info, including a U.S. map of areas high in clay soils, and instruction on how to tell if you have clay soil, visit www.earthscienceproducts.com call 1-503-678-1216; e-mail info@earthscienceproducts.com; or write to Earth Science Products, P.O. Box 327, Wilsonville, OR 97070.