

Tech Spec: Clay Nation

Earth Science's Condor SS provides an effective solution to soil stabilization.

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If you've ever visited Texas, you know that the state—and everything in it—is really, really big. But did you know that Texas gets bigger? Every time it rains.

That's because Texas has an abundance of clay in its soil. Clay really loves water. It soaks it up from as far as 12 feet away, and then it swells. As evaporation and compaction slowly remove the water, it contracts. This is why you see cracks in clay soil. It also is why you'll find a heap of cracked foundations, potholes, and collapsed retaining walls in Texas. The problem, like everything else in Texas, is mighty big.

To be sure, it's not just Texas that suffers from an abundance of clay. There's a clay corridor that runs north from Texas through Kansas and Nebraska up into the Dakotas, where there's even more clay than in Texas, and over into Montana. There's another that runs east from Texas through the Deep South into the Carolinas. In other words, a lot of places where production home builders build.

Still, according to Shane Kennedy, who with his family owns a company called Earth Science Products in Aurora, Ore., "Texas is truly ground zero."

Earth Science has a solution—literally—for the clay problem. Called Condor SS, it is a sulphonated oil liquid, made from the waste created in the refining of aviation fuel, that is injected into the clay soil. Clay, which is formed as rare earth elements such as feldspar and granite degrade, acquires a negative ionic charge. Water, which is electrically neutral but structured in such a way that the positive and negative charges are located at either end of the molecule, acquires a positive ionic charge as it flows through soil. That creates the clay/water affinity.

Once Condor gets into the soil, it substitutes itself for the water by sharing a proton with the clay molecule, forming a strong chemical bond through an ion exchange. As Kennedy puts it, "That soil becomes stable. It no longer will expand and contract with the introduction or withdrawal of moisture."



Photo: Courtesy Earth Science Products

SOIL TSUNAMI: Annually, more monetary damage is caused from expansive soils than in all other natural disasters combined nationwide, according to Earth Science Products

Traditionally, contractors and developers would deal with the clay in one of three ways: flood it, seal it, and cap it so it retained maximum moisture; drive foundation piers clear down to bedrock; or excavate the clay and replace it with more stable fill. The first option is cheap but not particularly effective over the long term. The second two work fine but are prohibitively expensive.

Condor SS is injected into the soil via a specially outfitted dozer that can stabilize the average building lot in a day. The cost, according to Kennedy, runs between \$2,000 and \$10,000 for the average lot, depending on the amount and type of clay in the soil.

We tried to hunt down a builder that uses Condor SS and found that builders in general do not wish to talk publicly about the unstable soil upon which their communities are built, after remediation, of course. But we did find Thomas LaLonde, P.E., president of stabilEarth, an Arlington, Texas, engineering firm that uses Condor SS for several large home builders he would not identify for publication.

"The use of Condor in treating our soils allows us to build houses on a soil foundation that has much less expansive movement to it," says LaLonde. "That results in happier homeowners. It saves builders money in the longer term on warranty issues."

LaLonde says he's been using Condor SS for two-and-a-half years now with a 100 percent success rate on new construction and a 95 percent rate on remediation work.

Some developers are using Condor SS on entire communities. At one, Frisco Square near Dallas, the entire 147-acre site was injected with Condor SS. "We stabilized the entire town," says Kennedy. "All of the building pad sites, driveways, walkways, and parking lots were stabilized with Condor SS while under construction."