



# PAD SITE Stabilization

With **CONDOR SS**®

*CONDOR SS Was Selected As The Stabilization Product of Choice For The Emery Freight Facility At DFW Airport.*

**A**

nnually, swelling or shrinking soils inflict over \$2 billion in damages to homes, buildings, roads, pipelines and other structures.

The CONDOR SS Treatment Process can prevent damage caused by the heave and contraction of clay-based soils. Our unique process improves the physical and mechanical properties of soil.

**CONDOR SS Features:**

Fast Economical Application

Non-Hazardous, Non-Toxic,  
Non-flammable, Non-Corrosive

Treatment Is Into The  
Expansive Clays – Not  
The Top Surface

Electro-chemical Cation Exchange  
Process Stabilizes Clay

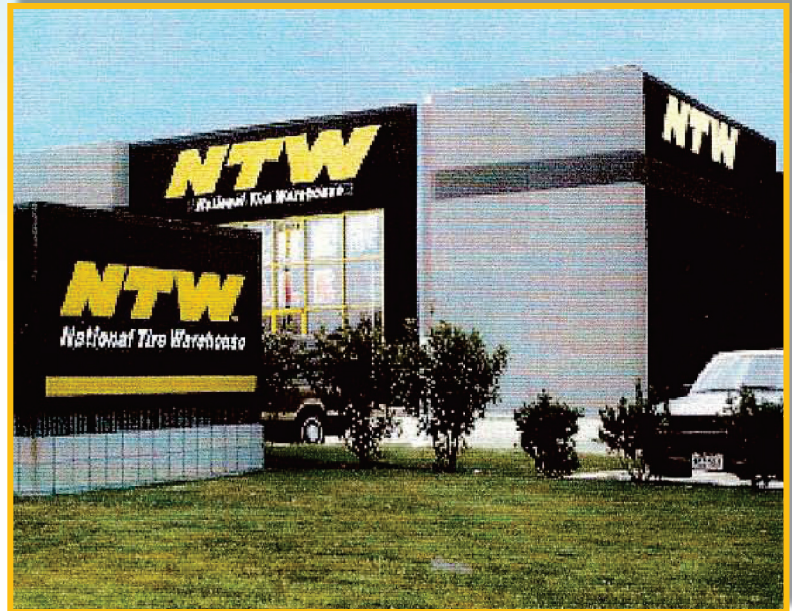
Treatment Is Permanent

Reduces The Swell Potential  
Of Clays



# CONDOR SS®

The geotechnical investigation of the NTW site revealed that expansive clay composed the upper 10 ft of soil at the site. NTW's construction team turned to CONDOR SS to save their budget, fit their schedule and stay within the PVR tolerance of 1 inch. The stabilization contractor completed the 15,000 sq ft project in a condensed schedule of 3 days.



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lthough soil stabilization has been practiced for centuries, applications using lime, cement and asphalt were not developed until the twentieth century.

Today, engineers and owners of lightly loaded structures have been presented with significant design challenges due to subgrade failure caused by shrinking and swelling of the subgrade, due to the migration of water and the inability of the soil to drain freely.

Problematic soils can be treated in one of three ways...

- *Change the original design of the structure.*
- *Remove and replace the existing soil.*
- *Alter the properties of the existing soil.*

The first two are cost-prohibitive. The last method, called stabilization, is a chemical, mechanical or physical treatment of a problematic soil to improve its stability, as well as other engineering properties.

CONDOR SS, an Ionic-Exchange Resin (IER) manufactured only by Earth Science Products Corp., is an electrochemical soil stabilizer. Unlike normal chemical soil stabilizers, it contains water-soluble sulfonated oils which perform chemically as weak organic bases. When combined with a strong sulfuric acid, the reaction proceeds in the direction of forming a weaker species, resulting in a weaker acid with useful properties.

These oils are particularly effective as soil electrolytes because of their high chemical stability, great affinity of ringed structures for metal ions, and their powerful ionizing capability.

CONDOR SS works by saturating the soil with ions which form a permanent chemical bond with the clay minerals. The process results in a permanent chemical reaction and is irreversible.

# CONDOR SS®



*Before construction began at the Ted Arendale Ford dealership in Arlington, Texas, pre-injection testing revealed swelling potential as high as 10%. By using CONDOR SS over conventional methods of cut and replace with select fill, post-injection testing revealed that swelling potential had been reduced to less than 1%, and the contractor saved over \$150,000.*



## A pplications...

...CONDOR SS will be of benefit to sites containing at least 3 feet or more of expansive clay.

Primarily used as a soil stabilizer to treat building pads, this chemical limits potential movements to design tolerances (usually 1 inch or less). The chemical has also been shown to be effective in stabilizing buildings which have moved due to swelling of expansive clay soils.

## D esign...

...In order to determine the best method for stabilizing a job site, the stabilization contractor works closely with Geotechnical Engineers.

While the depth of the clay determines the injection depth, it is not always necessary to treat the entire depth of a clay soil mass.

The depth of the treatment is typically the depth required to decrease the Potential Vertical Rise (PVR) to 1 inch.

Standard Geotechnical Engineering testing methods are used in the laboratory to determine the PVR of a site.

## D elivery System

...Although chemical stabilization has been used for years, some chemicals leach or are simply not effective. Since the change in moisture content is the main factor influencing the volume change of expansive soils, it is obvious that if the soils could have the excess water removed or equalized from those changes, then volume change could be reduced to minimums.



## Frisco Square, Texas



*This 145 acre mixed-use site is one of the largest in the United States. Still under construction, all of the building pad sites, driveways, walkways, parking lots etc...have been stabilized with CONDOR SS. While there are other stabilizers on the market, Frisco Square has chosen to use only CONDOR SS for the stabilization of this renowned project.*

*CONDOR SS has allowed this project to function as though clay soils are not present. Smooth streets and curbs, healthy landscaping and a distinct lack of the usual problems associated with the swelling and Contracting of clay soils. Frisco Square is an example of pad site stabilization at its best, providing permanent, cost-effective value to the project's owners, tenants and visitors.*



## C

### Chemical Stabilization...

CONDOR SS, a dark, heavy liquid, is a water-based sulfonated naphthalene chemical with a high stability and powerful ionizing capability. It is designed to free, by replacement, the “bound” water molecules normally associated with clay particles.

In addition to the ionization, CONDOR SS contains ions that will neutralize the sites on the clay platelet that attract and bind water.

Once the clay loses the ability to hold water and the binding sites on the clay platelet are neutralized, the platelet behaves as friable, unlubricated particles, and the water is free to drain away from the treated area...an effective soil stabilization process!

The reaction is a permanent chemical ion exchange and, once the soil has been treated with CONDOR SS, its particles will not revert to their original unbalanced ionic state.

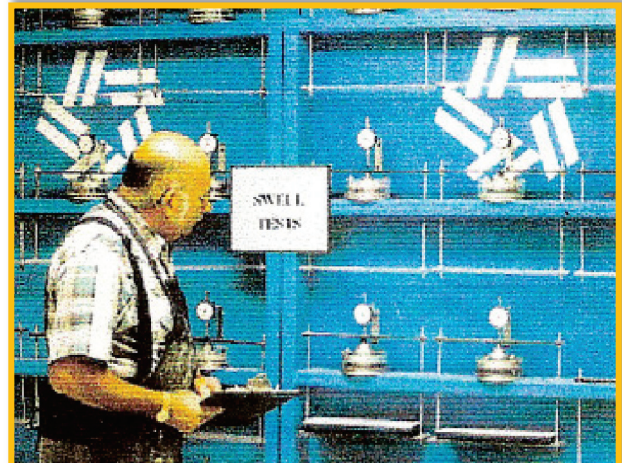
## Q

### Quality Control

Once chemically treated, a site undergoes stringent testing and quality control. Using in-situ examples of treated soil extruded in Shelby tubes, the specimens are taken to a lab and fitted into consolidation rings.

After placement in a swell meter device, the sample is immersed in water. Each sample undergoes testing which includes one swell test for every 2 ft of treatment depth.

A site is deemed stabilized when the average swell of the samples tested is less than 1%.



*Swell meters, such as though pictured here, are utilized to measure the swell potential of soil samples taken from a chemically-injected site.*

With the outstanding features listed below, you can be assured that CONDOR SS is right for your next construction project.

- Large areas treated in a single day
- Cost is less than other stabilization products
- In-situ material does not need to be removed
- No protective breathing apparatus or special clothing required
- Safe for fish and wildlife
- Safe around trees, bushes and grass
- Has less than standard minimums for BTEX/TPH concentrations
- High-pressure injection technique is utilized
- Minimum 3 ft depth is standard
- No waste
- Less than 1% PVR is common
- Lowers cracking and heaving in foundations
- Improvement of physical and mechanical qualities
- Treatment is permanent