

SIP&T

One of the largest Deep Soil Mixing Tip

SIP&T innovative soil mixing tips and bars have been used on the one of the biggest deep soil mixing job ever performed in the world to shear the soil in situ and mix it with a cementitious slurry pumped at low pressure. This method has created a large soil mix columns of 2.5 m in diameter to depths of up to 25 m

Technology

The Deep Soil Mixing method (DSM) was invented in Japan and Scandinavia. Its use in strengthening and sealing weak and permeable soils is growing around the world. The technique leads to significant improvement of the mechanical and physical properties of the in-situ soil, which is mixed with cement or compound binders to form the so-called soil-mix (or soil-cement). The resulting stabilised soil material generally has a higher strength, lower permeability and lower compressibility than the original soil.

DSM technology is based on a stimulating concept of improving natural soils to match adopted design requirements, thus eliminating problematic excavation and replacement or more expensive deep-foundation methods. The broad range of applications and variable patterns of execution of soil mixing columns allow safe and very economical ground engineering solutions. The use of non-toxic binders firmly position DSM as an environmentally friendly technology. The key benefits are economical, vibration free, flexible in application, reduces construction time, environmentally friendly. Typical applications are embankments on soft soils, support of strip, pad and slab foundations, bridge and wind-turbine foundations, excavation protection walls using reinforced columns, slope stabilization, mitigation of liquefaction potential, cut-off walls and



> Soil Mixing Tips



> Detail of the upper joint used to connect the tip with the bars



> Soil Mixing Tip having mobile intermediate wings with different inclination (left)
Soil Mixing Tip having changeable wings

barriers, encapsulation and immobilisation of pollutants.

The project

It required liquefaction and lateral spreading mitigation under both bridge abutments. The system design required 80 soil mixed columns, 2.5 m in diameter and up to 25 m in depth, with steel beams inserted in the center of each column to impart lateral ductility. The construction was performed within the confines of a residential neighborhood. The soils at the site were primarily silty sands and silty clays with gravel lens-

es. Soil mix columns were required to attain a minimum 400 psi unconfined compressive strength. The flexible tooling allowed by this system was ideally suited to create large diameter columns, and the low pressure grout injection was compatible with the site environmental constraints.

SIP&T is next-minute oriented

A company that looks toward the future has a fundamental goal: to constantly seek innovative solutions. In other words, to constantly develop new ideas and new strategies for customers in order to more effectively satisfy the demands of the constantly changing world of the foundation technologies. SIP&T is next-minute oriented, that's for sure. But it also has an open mind along with farsighted vision. The experience and background help it look toward the future every day, while always focusing on constant improvement. People are the company's main strength. It believes that personnel, technicians and engineers generate the driving force needed to ensure constant growth: personal and, naturally, professional growth. The best proof has been the design of the soil mixing tip used on the project described above. The experience and that of the contractor, the careful soil analysis, the modern software in use at the technical office, a constant synergy between the parties, all united by an iron will to innovate, have led SIP & T to produce tips from modern design ensuring the possibility of modifying their shape according to the needs. In addition to business aspects, SIP&T knows quite well that sometimes just one call and one immediate answer are all that's needed to solve a big problem. Rapid turnaround and the right solutions are just some of its strong points.