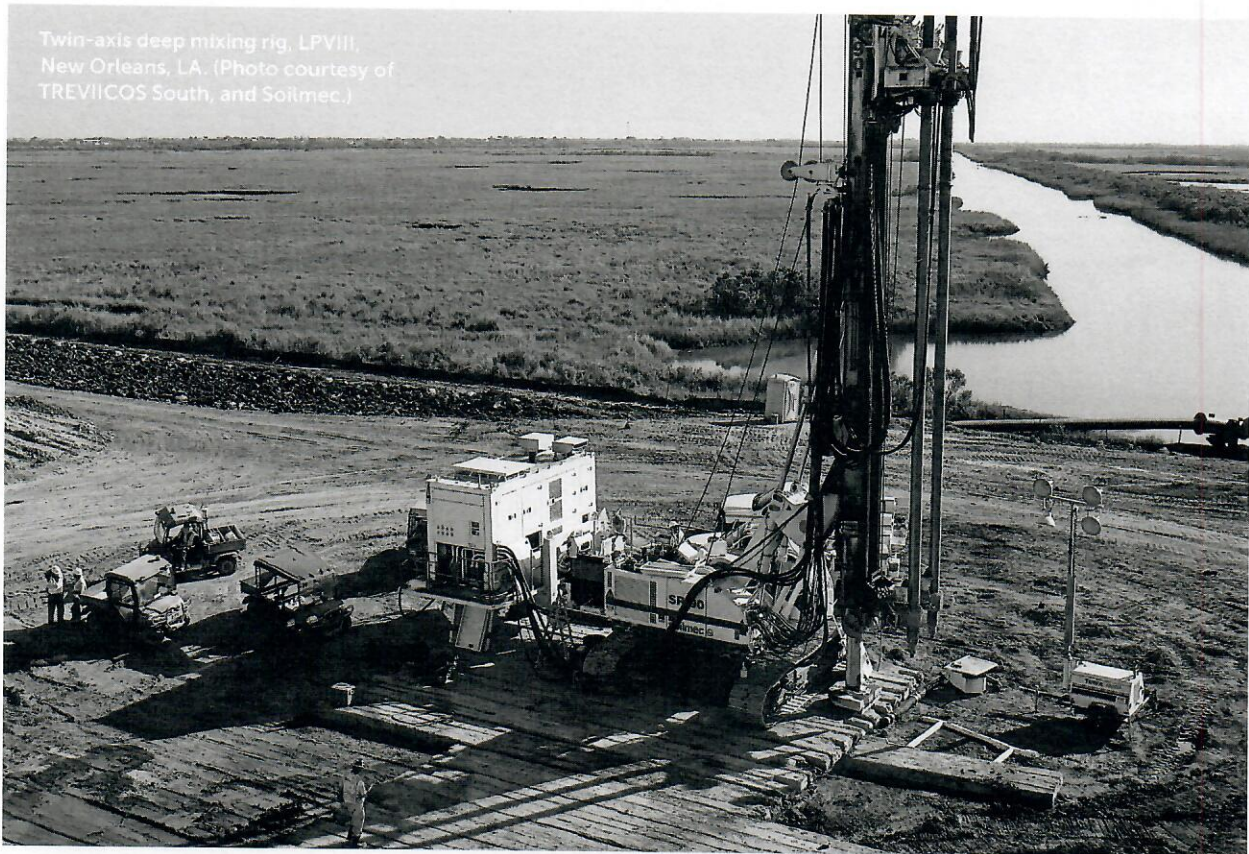




As I See It

The Pivotal Role of Equipment Manufacturers in Specialty Geotechnical Construction

By Donald A. Bruce, PhD, C.Eng, LG, LEG, D.GE, M.ASCE



"Location, location, location!" is the mantra of real estate agents, while "competition, competition, competition!" could easily be the refrain of equipment manufacturers who serve the specialty geotechnical construction industry.

This competition is waged on five continents, and is particularly keen in North America. There's a handful of "big boys," primarily with European roots, who in broad terms offer similar ranges of models in each of the major equipment categories. Then there's myriad smaller manufacturers who try to fill niches in the market that are otherwise unattractive to, or overlooked by, their bigger brothers.

Yet all chase the same clientele — specialty geotechnical contractors — in a nationwide market where a surprisingly small percentage of it is served by the top 10 largest contractors: the market is extremely diffuse. Furthermore, in addition to the jackpot of selling new equipment, there's also robust activity in rental fleets, and the resale of "gently used" equipment that is surplus to the requirements or mentalities of their former owners. In this regard, it's not uncommon for contractors to write-off

their mechanical assets at a rate of “one per mil per day,” i.e., one thousandth of the capitalized value per calendar day. While this accounting procedure does not by any means result in equipment being automatically disposed of at the end of the depreciation period, it does

of hydromill development. (Such machines have subsequently made as much of an impact on deep-diaphragm wall construction as tunnel boring machines [TBMs] have made on large-diameter tunneling.) The hydromill/cutter/hydrofraise in

nuts and bolts seemed remarkably clean (had they been removed and then replaced?), the most interesting observation was the number of clean, straight marks on the flat surfaces of the machine, as if a tape measure had been used to record dimensions (surely not?...). This mechanical communism is further (and more legally) nurtured by the fact that within the fraternity of field construction personnel there are no secrets. Hence, a “good idea” developed for one machine, usually for a specific project or market segment, is rapidly transmitted throughout the industry. This is a good thing for the fraternity and for clients, but not necessarily for the individual contractors themselves.

In the midst of all these dynamics, it's easy to overlook the obvious: without the skills, resources, and energy of the equipment manufacturers, the specialty geotechnical construction market could not continue to advance effectively. In other words, the manufacturers are industry partners and, as such, stand on the same dias as the contractors, consultants, and owners. Examples of the partnership in recent action include:

- Development of powerful modular drilling rigs, capable of working in low headroom, tight-access conditions, such as often characterize the flourishing micropile market
- Development of splendidly articulating drilling rigs for the long tieback market, especially in urban settings
- Development of automatic and semiautomatic batching plants capable of delivering families of multicomponent grouts and drilling slurries with accuracy and consistency
- Further developments in hydromill technology, as illustrated by one specialty contractor's recent trialing of a machine in Italy capable of reaching over 800 ft beneath the

The machine vanished over the weekend, only to be found back at its original location first thing the following Monday morning.

highlight the hard life of wear and tear anticipated from geotechnical equipment in general.

It's common to find what can kindly be called “reverse engineering” — exactly the situation in the automobile and aircraft industries, as examples. One apocryphal case (that I've been assured actually happened, although I wasn't there) occurred in the early days

question was left suspended above the trench at the completion of the working week one Friday evening, on a site that was not well secured. The mill had a film of bentonite slurry on it from the panel from which it had been retrieved. The machine vanished over the weekend, only to be found back at its original location first thing the following Monday morning. While certain

surface with a controllable accuracy of little more than 0.1 percent

- Refinements in control and monitoring systems for jet grouting and deep mixing equipment, to permit the thorough treatment of all the different soil types encountered in any one element
- Improvements to operator safety and comfort in drilling rigs, such as remote operation, automated tool handling, and climate-controlled cabins. This is an overlooked point, especially when considering the challenges of attracting operators in an ever-tightening construction labor market.
- Modifications to large-diameter drilling processes when used to build deep secant pile walls in difficult ground conditions

Numerous factors have played into these quick advances, for example:

- Drive to maintain competitive advantage
- Increasing contribution of computer-aided design and simulation tools to technical challenges posed by very complex deep-foundation projects like deep cutoffs in karst for dam remediation
- Desire to make drilling rigs safe and more user friendly
- Parallel developments in real-time machine instrumentation and data display
- Cost impact of outsourcing certain components to cheaper offshore centers

Looking to the future, all of these factors will continue to be in play, meaning that we can expect equipment manufacturers to continue to innovate, and to enhance their product lines. Such endeavor by a vital industry component should be applauded, appreciated, and encouraged by all partners in the specialty geotechnical construction market. 

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