

20 Years and Counting

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From the time it was introduced in 1984, microtunneling has led almost a bipolar existence in the United States. At times it has been viewed as the next great wave within trenchless technology; other times it has been viewed as a scourge to be avoided.

Microtunneling's true place in the subsurface utility construction market obviously lies somewhere in between. While it is certainly not a panacea, some well-publicized failures that have cast microtunneling in a bad light have been the result of misapplication, not necessarily a failure of the process itself.

Microtunneling was spawned in Japan in the early 1970s and eventually spread to Europe before landing in the United States. Growth was slow throughout its first decade here, going from about 10,000 ft in 1986 to about 55,000 ft in 1994.

The use of microtunneling in the United States really took off in 1995 at the height of the Greater Houston Wastewater Program. That year saw a two-fold increase in installed footage from the year before, going from 55,000 ft in 1994 to more than 110,000 ft in 1995.

The completion of the work in Houston - the city had accounted for nearly 50 percent of all microtunneling in the U.S. through the mid-1990s - saw a leveling off in the industry. By the end of 2001, changes within the market were apparent. The number of contractors actively engaged in microtunneling had dropped by roughly half from a high-water mark of nearly 40, and Iseki, a pioneering manufacturer, had vacated the North American market.



TBM: Tunnel Business Magazine, as sister publication to *Trenchless Technology*, which has actively tracked microtunneling projects in North America for the last six years, has also seen a decrease in both the number of jobs reported and the number of contractors completing the work. However, some of this may be attributable to a reluctance to share information in a highly competitive market due to the economic downturn.

So what does the future hold for microtunneling in the United States? Has it settled into a niche within the utility construction market or will it once again be viewed as a method poised for growth?

THE MARKET

Industry experts generally agree that the market for microtunneling has been flat over the last few years - one estimate has the annual installed footage at between 100,000 and 125,000 for conventional microtunneling. However, the consensus is that the market will pick up as the overall economy improves.

"Traditionally, we see bids come out in the spring, but this year there has not been as many as we have seen in the past," said Tim Coss, president of Microtunneling, Inc., a microtunneling supplier and consultant based in Boulder, CO. "Part of it is because of budget deficits faced by many state and local governments. In many cases, the budget crunch results in water and sewer work getting put on the back burner."

"But the work is there. There are plans under way and eventually more projects will be let as the economy improves. This time next year there could be a lot of microtunneling work going on."

Unfortunately for many involved in microtunneling - as well as the municipal market in general - the effects of a strengthening economy are slow to impact government revenue.

Another problem facing microtunneling is the rising cost of materials, including steel and copper. Prices for commodities, which are used in the things from machine manufacture to wiring to piping, are driving the cost per foot higher for what was already an expensive option.

Nonetheless, the need remains. Mandates by the Environmental Protection Agency (EPA), which have spurred sewer-improvement programs such as the one completed in Houston in the 1990s, are driving work in all corners of the United States.

"EPA consent decree programs are lurking that should increase the demand for microtunneling starting in 2005 or 2006," said Steve Caneen, president of Huxted Tunneling, a Palmetto, FL.- based contractor. "There are many potential projects, but limited funds for construction right now."

GROWTH POTENTIAL

Like many new technologies, microtunneling has gone through a learning curve as engineers, utility owners and even contractors learn the intricacies of the process. Organizations including the North American Society for Trenchless Technology (NASTT) and Colorado School of Mines Office of Special Programs and Continuing Education have been instrumental in spreading the word. Coss, as course instructor for the Colorado School of Mines annual three-day Microtunneling Short Course, says that more than 1,000 owners, engineers and contractors have completed the course over its 10-year history.

"Just a few years ago there were significant areas where microtunneling was not a known method, and there were many states that did not have a single project on which microtunneling was used", Said Mark Bruce, president of Can-Clay Corp., a pipe supplier actively engaged in the microtunneling market. "Today, with the efforts of many organizations and the gradual dissemination of knowledge, projects have been completed in most all areas of the United States and the knowledge is widespread. The result will be increasing usage of microtunneling."

While great strides have been made in educating potential end-users of the benefits of microtunneling, there is still more ground to cover. And this is despite the fact that more than 1 million ft of pipe has been installed in the United States by microtunneling.

"I had hoped by now that everyone would know about microtunneling's capabilities and its limitations, but we still spend a lot of time educating designers and owners on when this method should or should not be used," said Ron Tumbleson, director of sales and marketing for Akkerman, Inc., a Brownsdale, MN.- based microtunneling equipment manufacturer.

Another factor limiting the growth of microtunneling in the United States is cost - or perhaps more to the point, perceived cost.

"A very competitive marketplace in open-cut construction has kept microtunneling as an assumed more "expensive" option in many cases, but this is without the real advantages of trenchless being factored into the cost calculation, " said Paul Nicholas of Wirth Service, Inc., with manufactures Soltau microtunneling equipment.

Vin Calio, project manager for Modern Continental, a Cambridge, Mass.- based contractor involved in microtunneling, concurs. "I think a lot of owners are put off by the higher up-front cost of doing microtunneling vs. open-cut." he said. "It is sometimes hard for an owner to quantify and consider the many indirect benefits of trenchless methods, such as public inconvenience, and weigh them against the higher construction cost."

Bruce added: "Some of the aspects of microtunneling that are sometimes overlooked are the fact that it can be performed in a highly urban environment with a low risk of injury and less potential for settlement and resulting damage to structures and roads. The method also allows for installation of pipes in a manner that is generally superior to open-cut, with potential reduction of in-situ loads and longer service life."

Again, some owners' views of microtunneling are tinged by project gone awry. While, as Caneen says, inexperienced designers and poor project assessment by some contractors have conspired to cast the industry in a negative light, the inherent risk of microtunneling - indeed, subsurface construction in general - is also a culprit.

"The projects that utilize microtunneling are often done in the most difficult soil conditions and in heavily congested urban areas," Tumbleson said. "Therefore, they are, by nature, extremely difficult to build and are more costly."

If the need exists but the risk is inherent, what is the best way to approach a microtunneling job?

"There will always be risk in underground construction, and the majority of claims that arise in microtunneling are from differing site conditions usually having to do with unanticipated soil conditions or obstructions," Calio said. "The way to minimize risk is to perform and publish the most thorough subsurface investigation possible prior to designing and advertising a project."

"This, along with a reasonable differing site condition clause, will allow the prospective contractors to assume less risk and offer more competitive pricing. Sometimes this is easier said than done, especially considering budget and access constraints, but every effort needs to be made to provide as much subsurface information as possible."

Or, as Tumbleson sums it up: "Pay up front for soil investigation or pay later in claims."

Contracts can be, and are, amended in an attempt to deal with the inherent risks of microtunneling. It is not uncommon for some owners to prequalify contractors for a microtunneling project. In some cases, payment items for obstructions or rescue shafts are included, which can help lower a contractor's risk and allow for more competitive pricing.

While the risks may be ever-present, there are many ways in which owners and contractors can allocate risk and help avoid some of the claims and litigation that have marred previous projects.

Since its inception in the United States, microtunneling has continued to evolve. One of the trends that has developed is the movement toward larger diameters. Early microtunneling projects in the United States typically involved 24 and 36-inch pipelines. However, projects now routinely include diameters ranging from 60 to 90-inch - and larger.

In addition, the capabilities of the boring machines have improved. Today's more sophisticated, more powerful machines are capable of handling longer drives and more difficult ground conditions. In addition, advances in guidance systems allow for curved tunnels to be constructed.

While today's machines are getting bigger and more powerful, there is also a trend developing at the other end of the scale. So-called pilot tube microtunneling, which can be characterized as a hybrid between directional drilling and microtunneling, is offering a low-cost alternative to some owners given the right soil conditions.

The pilot tube system - also referred to as guided boring - is limited to installations up to 24 inches in diameter and in lengths up to about 300 ft. It is also limited in the ground conditions it can accommodate, but given the proper conditions, costs can be much less than slurry microtunneling.

Changes have abounded in the subsurface utility construction market over the last 20 years and change will certainly continue over the next 20. But there has been at least one constant, and that is microtunneling is here to stay as a vital tool in the trenchless toolbox.