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# Soft Trencher

*The "Soft Trencher" is designed to provide safer, more economical excavations.*

By Paul Dybro

In 1988, the Electric Power Research Institute (EPRI) sought a safer, more cost-effective and efficient way to dig trenches to install utility cable. EPRI, based in Palo Alto, CA, commissioned Battelle Memorial Institute in Columbus, OH, and Concept Engineering Group, Inc. in Pittsburgh, PA, to build a trencher that would meet its goals.

Battelle and Concept Engineering Group set out to develop a machine that would reduce the cost of underground installation of electric power transmission cable, improve operator safety and cause less damage to existing buried conduits. The trencher was primarily designed to accommodate electric power transmission cable in urban areas where there are a lot of buried utility lines.

The "Soft Trencher" (patent pending), as it is called, has been in development since late 1989. A prototype of the machine is in the testing stage. It works similar in principle to a vacuum evacuation truck. It has an excavation head that uses high-velocity supersonic air jets to crumble soil. Three interchangeable digging heads have been developed so far. Once the material is excavated, it is sucked up by a vacuum tube and carried away on a conveyor built into the machine. The conveyor and a chute can discharge the soil directly into a dump truck or onto the ground in windrows.

The Soft Trencher can trench from 1- to 6-ft

trenching size is 2- to 3-ft wide and 5-ft deep. On a single pass, the excavation head removes 2 to 5 in. of soil, depending on the soil type, and can remove and pass rocks as large as about 7 in. in diameter.

The trencher is 31-ft long, 8 1/2-ft wide, 11-ft 5-in. tall and weighs 30,000 lbs. It is powered by a 270-hp, 426-cid diesel engine. Ground drive is via hydraulic motors for two wheels. The machine's maneuvering speed is 4 mph in forward or reverse, with a nominal trenching speed of 1 fpm. The maximum excavation rate is designed to be 15 cu ft per minute for normal soils.

The unit's drive and control systems are electric over hydraulic, including the boom movement and conveyor. The trencher is equipped with a telescoping boom that operates vertically to a forward 50-degree angle and can swing left or right +/- 25 degrees from the centerline. The Soft Trencher can be maneuvered from the operator's seat or from a tethered remote control box to allow visibility of the trenching head and exposed utility lines.

"The beauty of this machine is its ability to trench without cutting into non-porous materials like gas line and other pipes," explained Battelle project manager Gary Brawley. According to Tom Rodenbaugh, project manager for EPRI, "The Soft Trencher eliminates the slower and more costly, labor-intensive hand digging around utilities."



*The Soft Trencher was designed for more efficient and environmentally safe excavation.*

developing, commercializing and managing technology. Concept Engineering Group is a multidisciplinary engineering company located in Pittsburgh that specializes in safe excavation technology using supersonic air jets and pneumatic vacuum transport. The Soft Trencher is not yet commercially available, however, EPRI is seeking a manufacturer to license the technology.

ELECTRIC POWER RESEARCH INSTITUTE

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