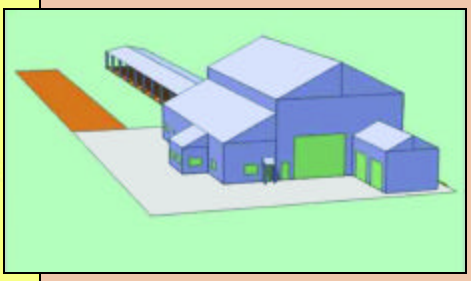
Trenchless Technology Center Newsletter

MARCH 2004

TTC Receives Major Gift Toward Its Second Decade Campaign



Mike Garver, one of the key founders of the microtunneling industry in the United States, has donated $250,000 toward the development of a national trenchless technology research and development facility.

In connection to his commitment, Garver said, "I have been a strong supporter of the Trenchless Technology Center and its role in supporting the development of trenchless technology in North America. The new research facility will greatly strengthen the center's ability to increase its national leadership in the field and, more importantly, provide a key center for research, development and education in trenchless systems."

TTC, in conjunction with its Industry Advisory Board, has developed this second decade campaign to increase the ability of the TTC to support the trenchless industry. The construction of a national research, testing and education facility for trenchless technology is the No. 1 priority of this campaign and it will consolidate all the existing TTC research facilities and provide major new facilities for work on installation, rehabilitation and inspection/assessment techniques.

A budget of $4 million has been developed for the facility and research equipment, which will be coordinated with the existing field test site. Equipment proposals, totaling nearly $700,000 have been written to the State of Louisiana and the National Science Foundation to provide research equipment for use in the facility.

"This facility will allow the TTC to move more aggressively into the development, prototyping and testing of new technologies and also to provide a richer educational experience for trenchless technology graduate and undergraduate students as well as future industry workshop participants," said Dr. Ray Sterling, TTC director.

Donations toward the campaign in cash and/or equipment will be welcome and recognition in terms of naming portions of the facility or commemorative plaques will be available at various donation levels. Please contact the TTC for more information.

Dr. Erez Allouche joins Louisiana Tech Faculty

TTC is pleased to announce that Dr. Erez Allouche has accepted a regular faculty position at Louisiana Tech University. Allouche came to Louisiana Tech last summer as a visiting faculty member but has agreed to stay at Tech to continue work with the TTC.

Allouche brings an active research program in most areas of trenchless technology and particular expertise in horizontal directional drilling. He has already demonstrated a strong ability to convert research ideas into proven field concepts and is excited about the possibilities that will develop from the new research facility under development.

Questionnaire on Sewer Laterals Available for Municipal Input

As part of the WERF-funded project on private sewer laterals, a Web-based questionnaire has been developed to gather data from municipalities on private sewer laterals and the ways in which assessment and/or rehabilitation of sewer laterals is being approached.

The questionnaire is available at the TTC Web site at *www.ttc.latech.edu* and municipalities are encouraged to fill in the questionnaire even if they currently do not have a lateral rehabilitation program.

The questionnaire collects data about the number of laterals, boundary of private/public ownership, legal and financing issues faced in developing an approach to lateral rehabilitation and experience and results from prior rehabilitation projects. Municipalities that fill out the questionnaire will receive a summary of the key results from the questionnaire and the full results of the research will be published in the report from the WERF project expected to be available around June-July 2005.

HDD Borehole Stability Research

Drs. Jay Wang, Ray Sterling and Erez Allouche of the TTC are collaborating on research on the topic of "Borehole Wall Stability Analysis in Horizontal Directional Drilling." This research examines the poro-mechanical interactions between drilling fluids and soils in order to identify an effective way to gain more insight into the problem of borehole stability and to be able to provide recommendations on minimum and maximum fluid pressures that should be used in various borehole situations.

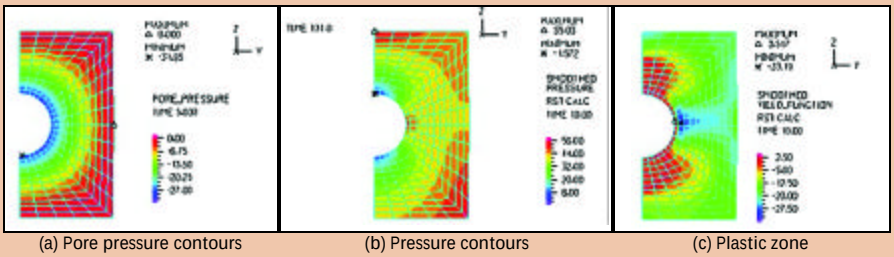
Some preliminary results from an established numerical model have already been obtained and the findings will be presented during the No-Dig 2004 Conference in New Orleans.

The study will use advanced numerical simulation strategies (porous material fluid flow coupled with soil structural response). It will examine in greater detail the role the filter cake plays in borehole stability. The filter cake effectively prevents the flow of drilling fluid into the soil mass and greatly reduces the excess pore pressure generated in borehole wall. High pore pressures within the soil reduce the contact stresses between soil grains causing a form of liquefaction of the soil. This results in soil crumbling, sloughing and potentially the collapse of a horizontal borehole.

When the drilling fluid pressure is small, the stiffness and strength of the filter cake reduces the size of the plastic yield zone around the borehole. However, as the drilling fluid pressure increases, the mechanical properties of the filter cake have less and less effect on the stability of a borehole. The accompanying figure provides an illustration of the pore pressure

and the pressure and yield zone that are created in a borehole wall under a particular borehole configuration (soil type, depth, etc.).

Over the next two to three years, research activities will focus on many aspects of borehole stability. Tasks will include the development of an efficient computational algorithm, which takes into account the chemical, mechanical and thermal interactions between drilling fluid and soil mass.



(a) Pore pressure contours (b) Pressure contours (c) Plastic zone

From simulations and some experimental verifications, the lower and upper drilling mud pressures will be found that will prevent failures of borehole walls under different conditions. Charts and tables will then be made from the results of those simulations to provide straightforward guidance to the HDD industry.

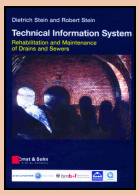
NASTT Student Chapter Activities

The Louisiana Tech University NASTT Student Chapter had a great winter and it is gearing up for another active spring. The chapter's membership reached a new high this winter with 43 students.

The student chapter also had 22 students sign-up for the 2004 No-Dig Conference in New Orleans and, with the financial support from NASTT, hopefully they will all be able to make the trip. In January, four students were able to attend UCT 2004 in Houston, where they were able to assist the speakers and monitors in the educational sessions, browse through the exhibit hall and network with industry leaders.

In February, six students, along with Dr. Jerold Stegeman, competed in the Associated Schools of Construction (ASC) / QUOIN Foundation Region V Student Competition in Dallas. There, over an 18-hour day, the students developed a plan, estimated and submitted a bid to the judges. Although the team did not win the competition, the students all felt they gained valuable experience. They were allowed to assume the role of the actual contractor and they faced the same pressures and time limits that take place in real life.

Stein CD-ROM Available at Special Price



TTC has made a bulk purchase arrangement with the publishers of the CD-ROM by Dietrich Stein and Robert Stein, *Technical Information System: Rehabilitation and Maintenance of Drains and Sewers*. This comprehensive look at sewer and drainage systems and their rehabilitation has wonderful graphics and makes an excellent reference for anyone involved in the rehabilitation industry. The regular price for the CD-ROM is 382.50 Euros (currently about U.S. $480). This is available while supplies last from the TTC at US $350, plus postage and packing. Contact TTC for additional information.

Sterling Continues Travels on Behalf of the ISTT & TTC

Dr. Ray Sterling, TTC director and current ISTT chairman, has continued a heavy travel schedule in support of the development of trenchless technology worldwide. In November 2003, he traveled to India to participate in the Trenchless Asia meeting held by the Indian Society for Trenchless Technology (IndSTT) and attended by representatives from a number of countries in the southern Asia region. Interest in trenchless technology is growing rapidly in the region and the recent government emphasis on infrastructure development has increased the possibilities for growth of the industry in India and the surrounding region. IndSTT has worked aggressively to support this growth. The association can be contacted for further information (*http://www.indianodig.com/index1.asp*).

In February 2004, Sterling visited the Italian Association for Trenchless Technology (IATT) and delivered a series of lectures on microtunneling as part of a master's course on mechanized tunneling at the Politecnico di Torino. He then traveled to London for an Executive Sub Committee meeting of ISTT. His goal is to travel to all of the 26 member societies of the ISTT within his three-year term as chairman.

Trenchless Technology Center *Newsletter*

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Trenchless Technology Center

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