

# Trenchless Technology Center *Newsletter*

M A R C H 2 0 0 1

## Utility Locating, Damage Prevention Issues Grow in Importance

The Trenchless Technology Center (TTC) has been involved in several aspects related to utility locating technology issues over the past couple of years. This has been an issue of growing importance both to the trenchless technology industry and to the owners of existing underground utilities.

Damage to underground utilities has been rising as has the total cost associated with such damage. The increasing number of incidents and the rising costs are affected by the rapid expansion of underground utility networks—notably, for instance, the installation of multiple networks of fiber-optic cables. Damage is caused both by open-cut construction and by trenchless installation techniques and there are many causes for the damage-poor records of existing utilities, problems with use of or operation of one-call procedures, inadequate technologies for locating utilities in the field, poor construction practices, etc.

Prodded by Congress, the U.S. DOT Office of Pipeline Safety initiated an effort a couple of years ago called the "Common Ground Alliance" to address issues of utility damage. This effort brought together a large stakeholder group that has addressed many issues relating to improved one-call procedures and construction

practices. After producing its report, the group has moved to create an independent non-profit organization to carry on the coordination work. To access the Common Ground report and to get further information on the Alliance see [www.commongroundalliance.com](http://www.commongroundalliance.com).

The TTC effort in this area has been directed at assisting in the identification of new technologies or combinations of technologies that may improve our ability to locate underground utilities. Initially the TTC assisted the Federal Laboratory Consortium (FLC) to prepare a statement of need for better utility locating technologies. This statement of need was distributed to national laboratories and universities and was also advertised in the media and on the Internet. The responses were collected and analyzed by Dr. Ray Sterling at the TTC and summarized in a report to the FLC. Both the statement of need and the summary report are available for free download on the Web at <http://www.nal.usda.gov/ttic/utitfml.htm> and [http://www.federallabs.org/ContentObjects/Reports/Utility\\_Locating\\_Technologies\\_Report.pdf](http://www.federallabs.org/ContentObjects/Reports/Utility_Locating_Technologies_Report.pdf).

In December 2000, the FLC in cooperation with the U.S. DOT and other agencies, such as the U.S. Geological Survey, hosted a meeting in Arlington, Va., to allow the technology devel-

opers to meet with the user community and funding agency personnel to explore how to move forward in developing better technologies. An important aspect of the meeting was exploring how to verify the performance of existing and novel utility locating technologies. This is an important missing element in this application at present. Testing and performance verification facilities exist for allied applications, such as the detection of mines in military applications (at the Mine Lanes Facility at Fort Belvoir, for example), but there do not appear to be significant non-proprietary testing facilities available for the development and testing of technologies aimed at the utility locating field.

The approach to testing and verification discussed at the meeting was to classify utility locating applications as to type of utility, pipe/cable materials, soil conditions, groundwater conditions, degree of congestion, sources of interference, etc., and then to allow manufacturers to test or verify their technologies in the various classes. This would allow simple and inexpensive technologies to be verified for easy locating applications as well as for the user community to have independent testing data on the range of applications of particular technologies.

## Industry Advisory Board Welcomes New Members

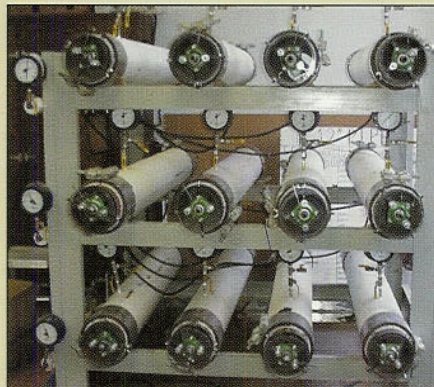
The TTC is pleased to announce the addition of a significant number of new members of its Industry Advisory Board in the past several months. On the industry side, joining the TTC's longstanding members are Tejas Tubular, an HDD drill rod manufacturer, and SE Industries, manufacturer of a dry directional drilling system. The center has also made a special effort to invite participation by the consulting industry in the IAB to complement the advice from public works and industry members of the IAB. New members from the consulting sector are Tony Almeida, Half Associates; Richard Nelson, Black & Veatch; John Struzziery, SEA Consultants; Ed Stumpf, SJB Consultants; and James Thompson, Jason Consultants.

For information on how to participate in the TTC and its programs, please visit the TTC Web site at [www.latech.edu/tech/engr/ttc/](http://www.latech.edu/tech/engr/ttc/).

## Pipe Liner Modeling at the TTC

Research to better understand the long-term behavior of pipe liners has been ongoing at the TTC for the past 10 years. This research is continuing through the efforts of David Hall, Bill Jordan and Raja Nassar. They are working on a grant sponsored by the National Science Foundation to develop a reliability-based model that accounts for the effects of creep, liner geometry variation and material property varia-

tion on the long-term stability of CIPP liner systems. Their work involves room and elevated temperature material characterization and liner buckling experiments, finite element modeling of liners and statistical study of liner response. This project will be completed in August of 2002.



The experimental setup for long-term room temperature testing of 12 liners (left) and one of the loading frames and environmental chambers for creep-deformation testing.

## New HDD Research Projects Starting Up

The TTC has initiated work on two new projects related to horizontal directional drilling.

The TTC will be working with Tejas Tubular on issues of the fatigue life of HDD drill string as well as helping Tejas assemble research and application information on HDD that can be passed on to their customers. Part of the research plan involves soliciting the participation of HDD contractors in tracking various aspects of the usage of specific sets of HDD drill string. This will be coupled with periodic on-site inspections and testing of the drill string as well as laboratory evaluations of the drill string following its removal from service.

The information gathered will start to build an accessible database of the deterioration of drill pipe according to its conditions of service. Another aspect of the research plan will be the laboratory evaluation of the drill pipe under rotation in a curved configuration. Although an idealized setting, it is anticipated that the laboratory studies will highlight aspects of the design parameters for

HDD drill string bend radii that are not well understood at the moment, e.g. the extent to which angular offsets occur at the HDD drill string joints rather than the drill string following a continuous curved profile and how this change with the number of rotational cycles of the drill string.

The TTC also will be working with SE Industries on documenting the performance and application of its dry directional drilling system. This system has been used successfully for some time in Europe and is being introduced into the North American market. The minimal use of drilling fluids and the penetration ability of the downhole hammer of the drilling system provide a machine that is easy to operate in urban conditions and in conditions with continuous or periodic rock drilling requirements. The TTC will work with SE industries to delineate the ground conditions under which the dry directional drilling systems can be used effectively in terms of hole collapse and to document the production rates associated with the use of the system in different ground conditions.

## United Nations' Efforts to Disseminate Trenchless Technology Information

Rob McKim is working closely with the International Society for Trenchless Technology (ISTT) and the United Nations Environmental Program (UNEP) to bring trenchless technology information to regions and cities across the world that are trying to develop or redevelop their underground infrastructures despite a poor state of their economies. In 1999, McKim participated in an informa-

tional seminar held in Katowice, Poland, aimed at municipalities in Poland. Following this successful event, a seminar with broad participation from lesser developed countries was held in February 2001 in Cairo, in conjunction with the Trenchless Egypt conference and exhibition. McKim was one of the featured speakers along with TTC's IAB member James Thompson.

### Other International Activities

Ray Sterling has been the vice chairman of the ISTT since 1999 and was one of the keynote speakers at the ISTT No-Dig 2000 conference in Perth, Australia, in October 2000. He traveled back to Australia the following month to give a keynote lecture at the Geoengineering 2000 Conference in Melbourne that was a joint conference for three international societies—the International Society for Rock Mechanics (ISRM), the International Society for Soil Mechanics and Foundation Engineering (ISSMFE) and the International Association of Engineering Geologists (IAEG). On the November trip, he also presented a seminar on trenchless

technology at the Institution of Engineers in Kuala Lumpur, Malaysia, and a lecture on cost-effective planning for urban underground space use in Singapore. In April 2001, he will attend the China Society for Trenchless Technology conference in Beijing and lecture on trenchless technology to a regional conference of the ISSMFE.



### Industry Advisory Board

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