



Trenchless Technology Center *Newsletter*

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TTC Seeks HDD Drilling Profile Records

Led by Drs. Raymond Sterling and Aziz Saber, the TTC is continuing its study of HDD drill string fatigue. The research addresses an important issue to the HDD industry today: how to get the most out of HDD drill pipes without risking fatigue failure during an actual bore.

The primary objective of the research is to determine the combined effects of curvature, torque, thrust and the various types of cyclical stresses imposed on drill pipes.



TTC is using laboratory testing to explore drill string fatigue.

The researchers will partially simulate the field conditions in the laboratory and also will use computer modeling to analyze the stress conditions in the critical areas of the drill string. Drill pipes of different sizes, joint configuration and composition will be exposed to well-defined but accelerated operating conditions.

The test equipment consists of a constant, speed-variable torque, electric motor and a

gear reduction system that rotates the drill rod at various speeds. A friction brake at the far end controls the torsion applied to the rod. The location of the box and three intermediate ball-bushing guides are adjustable and are positioned to provide a nearly constant radius of curvature.

The apparatus is capable of applying a controlled torque at a fixed rotation rate to three drill rods connected together. This allows the center rod and the two connecting joints to be tested without being close to the applied torque at either end of the drill string. After equipment development and preliminary testing, the testing of various drill rod parameters is under way with the financial support of Tejas Tubular Processing Inc.

To relate the laboratory and simulation results to field performance, it will be useful to understand the typical ranges of curvature and stress history that drill strings encounter. The development of statistical data on drill string usage will provide valuable reference information for contractors to understand how their own usage of drill string corresponds to the range of installation parameters across a broader section of the industry.

To compile such data, the TTC is seeking drilling records from as many contractors or owners as possible. To avoid privacy concerns, the exact location, contractor or job identification is not necessary and the TTC will either utilize the data in the form normally recorded by the contractor or provide forms on which the data can be recorded. Firms that supply data will get free copies of the data analyses.

TTC Marks Milestone

The TTC has reached a milestone in its existence: starting its second decade of service. The center was formalized in November 1991 on the same guiding principles that it follows today: to serve as an independent source of information and research in order to support the advancement of the trenchless technology community.

To commemorate the successes and achievements of the past decade, the TTC will host a birthday celebration later this year. TTC Industry Advisory Board (IAB) members, municipal representatives and Louisiana Tech University representatives will gather with TTC's faculty and staff to reflect on the cooperation and programs that have made the center successful.

Originally named Trenchless Excavation Center, the organization began as a cooperative research effort drawing from several faculty members of Civil Engineering and other departments. Tom Iseley, TTC's founder and now president of Blackhawk-PAS, helped to create a strong base for the center's efforts. In 1991, the center was formally established at Louisiana Tech University under the name Trenchless Technology Center. In 1995, Dr. Ray Sterling became TTC Director. His broad expertise in geomechanics, underground construction and underground space use has helped to further the activities of TTC by spreading the trenchless message to the broader engineering and planning community.



Ray Sterling with professors Yoshihiko Tanabashi and Yujing Jiang at the geotechnical society lecture in Nagasaki, Japan.

Japan Invitation for TTC Director

Dr. Ray Sterling traveled to Japan in February through a Japan Society for the Promotion of Science Fellowship and at the invitation of Nagasaki University. His hosts in Nagasaki were Dr. Yoshihiko Tanabashi and Dr. Yujing Jiang of the Civil Engineering Department.

During his three-week trip, Sterling gave lectures on trenchless technology and underground construction at the local geotechnical society, at Nagasaki University and at the Urban Underground Space Center of Japan in Tokyo. He also visited Nagoya University, Kyoto University, Japan Society for Trenchless Technology, Shimizu Corp. and Oyo Corp.

Numerous field visits were also conducted during the trip. They included viewing a new type of rectangular shield machine for a tunnel in soft ground and visiting a rock tunnel that was excavated using a modified NATM approach. In addition, Sterling surveyed a preserved section of the Nojima fault displacement, which in 1995 killed more than 6,400 people in the Kobe area.

The trip concluded with Sterling attending the International Tunneling Association conference in Sydney, where he presented a keynote lecture on microtunneling.

Updated Trenchless Cost Data in the Works

The TTC is excited to be updating its report, Survey of Bid Prices for Trenchless Rehabilitation and Replacement of Pipelines and Manholes. The trenchless community received the report, first published in August 2000, with enthusiasm.

An effective tool for determining likely cost ranges, the survey provides a reference point listing the as-bid cost of various rehabilitation projects in North America. Since the field of trenchless technology changes rapidly, the TTC is now in the process of collecting new data for an expanded 2002 version of the survey.

Central to TTC's mission is the concept of serving as a resource of information. "We are constantly conducting research and presenting information to further the effectiveness of trenchless technology," said Ray Sterling, TTC Director.

Jadranka Simicevic, TTC's Research

Engineer, helped realize the need for both the first and the subsequent survey. "Frequent inquiries from the industry, municipalities and contractors made me realize that the important data of the likely cost of trenchless projects were very difficult to find in published materials," she said. "Although this data was available piecemeal, no one had yet compiled it into one central document."

The new version is expected to be available in the early summer. In addition to updated information, the TTC will expand the new survey to feature methods that were absent from its first publication. TTC is still accepting bid tabulations to be included in the 2002 survey.

Please send your tabulations by mail, fax or e-mail to Jadranka Simicevic. Contributors to the project will receive a free copy of the report when it is complete.

Spring 2002 Municipal Forum Announcements

TTC's spring 2002 Municipal Forum meetings are just around the corner. These forums are organized to bring public works personnel who are interested in trenchless technology applications together for discussions and peer-to-peer information sharing on the techniques.

The forums bring together participants in a regional area and are free to public works participants. Some meetings are discussion-based and others have a main topic with demonstrations and presentations.

The series will kick off with the Houston Municipal Forum, scheduled to meet March 27 with Dr. Aziz Saber as host and monitor.

"I'm excited to meet the forum representatives and I look forward to working with them to develop the discussion topics for this session," Saber said.

Shortly thereafter, Dr. Ray Sterling will moderate the Colorado Municipal Forum April 3 in Boulder, where the group will discuss and view demonstrations of different manhole sealing techniques. Sterling will then travel to Washington to moderate the Northwest Municipal Forum meeting in Tacoma on April 4. This forum also will focus on manholes and coatings.

TTC's newest faculty member, Dr. Jerold Stegeman, will facilitate the Kansas City Municipal Forum meeting, currently scheduled for early May, and the Columbus (Ohio) Municipal Forum, April 17. Dr. Stegeman, who came from the University of Las Vegas, brings with him 20 years of experience rooted in municipal efforts.

For information on establishing new forums in other regions, please contact the TTC.

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Honors for TTC Industry Advisory Board Chairman

Congratulations to TTC's IAB Chairman, Joe Barsroom, on receiving the American Society for Testing and Materials (ASTM) Award of Merit. Established in 1949 by the ASTM Board of Directors, the Award of Merit is the highest award granted to an individual member for distinguished service and outstanding participation in ASTM committee activities.

With this award, Barsroom receives the honorary title of Fellow of the Society. Barsroom, who has provided many years of service to both TTC and ASTM, is slated to receive the prestigious award in Pittsburgh this April.

"All of us at the TTC are thrilled for Joe," said Dr. Ray Sterling, TTC Director. "He has worked very hard to ensure that trenchless technologies are used effectively in utility projects and he is most deserving of this honor."

Barsroom, P.E., L.S., is now the Engineering Division Director for Program Development with the City of Denver, a position to which he moved recently after serving as the Director of Engineering for Wastewater Management, City and County of Denver, for many years.

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