



Dedication Of TTC's Research Facility Achieves Milestone For Industry Service

by Jeff Griffin, Senior Editor

For nearly 20 years, the Trenchless Technology Center (TTC) at Louisiana Tech University has played an important role



The Trenchless Technology Center's Executive Director Dr. Ray Sterling addresses the crowd during dedication ceremonies of the new Trenchless Technology Research Facility.

in the emergence of trenchless construction methods, helping advance the industry through research and development programs and the education of engineers, government agency personnel, contractors and others about the availability and capabilities of trenchless procedures.

It was founded in 1989 as the Trenchless Excavation Center and established two years later as the TTC. As the center grew, capabilities expanded to include projects with various organizations to evaluate and assist in development of new technologies.

At the beginning of 2008, the center appears to be ready to play an even more dynamic part in the continuing development of the trenchless technologies which have dramatically changed the ways in which the world's buried utility infrastructure is built and maintained.

A milestone came last fall with the dedication of the center's new National Trenchless Technology Research Facility that includes a 20-by-20 foot soil box for testing to apply horizontal and vertical loads to soil and structures within it, and allow construction of purpose-built testing frames.

A soil box of this scale is one of only a few in North America and is one of the largest, says Dr. Ray Sterling, the center's executive director since 1995.

"The new research facility enables us to conduct controlled studies of full-scale soil structure interaction for pipes of several feet in diameter," Sterling explains. "In the laboratory, we can monitor ground movement during pipebursting and pipe jacking and study HDD (horizontal directional drilling) bore hole stability as well as utility locating and pipe characterization technologies."

Sterling added that the distributed anchor points beneath the soil box allow as much as 2.5 million pounds of vertical load to be applied to soil in the box during tests, providing the capability of conducting full-



Ribbon cutting for the Trenchless Technology Research Facility at Louisiana Tech University.



Key industry personnel receive a tour of the new Trenchless Technology Research Facility

scale testing of large diameter pipes. The soil box also can be subdivided for performing experiments with smaller pipe.

More research opportunities

In addition to the large soil box and strong floor, the research center includes a smaller soil box that can be covered and used with an air bladder beneath the cover to simu-

late greater soil depths by surface loading air pressure on the soil and an inversion chamber for inverting CIPP liner for class demonstrations and research on liner materials. A current project is investigating placement of one or more temperature strips in the liner during installation to monitor temperatures along the length of the liner during curing.

Sterling believes the research facility's capability of conducting controlled experiments is one of the reasons that the TTC was selected for a new project for the Transportation Research Board of the National Research Council about rehabilitation of culverts. The three-year project is being conducted in conjunction with CNA Consulting Engineers, Minneapolis, MN, and Queen's University, Kingston, Ontario.

Other programs recently completed or under way are testing CIPP linings for water pipes in Hamilton, Ontario; a request by New York City to investigate potential methods for lining sewers which are subject to the regular release of steam; a study about utility locating and characterization for the Transportation Research Board; research in collaboration with Battelle on water and sewer rehabilitation innovations for the U.S. Environmental Protection Agency; and research about ultra-wide-band radar applications to pipe characterization and see-ahead utility locating.

An important element in the center's success, Sterling believes, is its university, industry and government base of support. Other contributing factors include its interdisciplinary faculty's broad range of expertise, its highly-specialized testing facilities and active technology transfer and information dissemination activities to allow the latest technologies to reach those who can make effective use of them.

The center today carries out three basic types of research programs:

- Core research in conjunction with the TTC industry advisory board represents R&D that benefits all or various sectors of the trenchless industry. This may be areas such as guidance technologies that can apply to many different types of equipment or may be field or laboratory testing that helps establish design methods or the impact of trenchless methods on the surrounding ground.

- Proprietary research and testing with individual companies or groups of companies to carry out research and development or testing programs, the results of which are provided only to the companies involved.

- Public research and testing programs provide unbiased test results to the industry, user groups and the public. These differ from the proprietary research programs in that a report on the results will be made public, even if the research results are not favorable to the application of the product or process in the circumstances tested.

TTC funding is derived from core support from the industry advisory board with salary and facilities support from Louisiana Tech, income from contract research with federal and state agencies and industry organizations, from fees for seminars and

publications and from private donations.

Expansion continues

An immediate goal in 2008 is to complete portions of the research center left unfinished when funding was depleted and to continue to expand the facility's capabilities, says Sterling.

"Many of the basic approaches of trenchless construction methods have been established, but improvements and innovations continue to be made, and facilities like ours will help expedite them," he continues. "With some procedures, we still don't have a good handle on some of the circumstances that occur, and we can help develop programs that will lead to a better understanding of problem points and why they occur."

Sterling says the center is well positioned to assist in extending the range of trenchless methods in situations where stronger engineering can contribute to understanding how various processes work.

"The center," he added, "wants to work with organizations to turn an idea into a successful prototype, and certainly the new research center is giving us a big boost toward that goal."

TTC's staff has plenty to do.

"In the last two months of 2007," says Sterling, "two new three-year projects were added to those already under way, bringing to \$2 million the total of projects to be completed in the next one to three years. In the last two years, our research income has about doubled."

Sterling says with the current and projected workloads, new staff and technicians need to be added.

"Another new direction," he says, "is looking at new materials, particularly the geopolymers using fly ash from power plants mixed with an alkaline solution. When heated and cured, the substance forms a concrete-like material. It's a very green process with very interesting properties for a number of trenchless applications, and several doctoral students are working on how to apply them."

Sterling says the center owes much of its success to the support over the years of numerous organizations and individuals.

"First and foremost is the TTC's industry advisory board," Sterling emphasizes. "Without their core financial support and guidance, the center simply could not have developed to where it is today. Two industry members, Insituform Technologies and Hobas Pipe USA, have been a part of TTC continuously since its creation."

Sterling is reluctant to try to list names of other key supporters.

"There simply are too many, and some-



The Gulf Coast Trenchless Association is a founding member of the TTC Industry Advisory Board and one of several organizations that made a major donation to the new Trenchless Technology Research Facility. Representing the GCTA were Terry Anderson (left) of Future Pipe, pictured with fellow IAB member Robert Carpenter of Underground Construction.

one is certain to be left out," he explains. "However, a few must be singled out: Mike Garver, founder and chief executive officer of BRH Garver Construction, Houston, was the first to contribute funding and is a driving force in making the new research center a reality; Joe Barsoom, the long-time IAB Chairman and one of the TTC's biggest boosters; Jadranka Simicevic, TTC's Research Engineer for 10 years; and TTC Associate Director Dr. Erez Allouche, who is the key player in many of the center's current activities and has played a large part in the center's recent upsurge." ■