



Trenchless Technology Center *Newsletter*

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Student Research:

The focus in this issue is on two topics of current student research

Pipeline Scanning: Novel Methodology for Detection of Defects in the Buried Pipelines

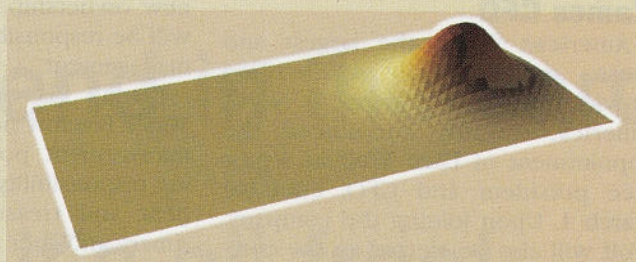
This research has been motivated by a great need for improved nondestructive testing (NDT) techniques of buried pipes and other underground structures in the United States. Perhaps there is no other place in the country where such techniques are needed more desperately than in Louisiana's coastal region. In the metropolitan area of New Orleans alone there are hundreds of miles of medium and large diameter non-metallic pipes that require inspection for defects such as cracks, voids and corrosion. Techniques involving visual inspection using CCTVs have its limitations and as a part of the comprehensive inspection tool, a novel methodology involving ultra wide band (UWB) radar system has been in the process of development.

The proposed methodology involves scanning of the pipeline interior with an UWB radar system placed on a rotating robotic platform that moves along the pipeline. As a part of the developmental process, numerical simulation is currently carried out to gain better insight about the technology. Finite difference time domain method is employed to simulate the operations of the antenna system in cylindrical coordinate system. Conical antennas are used for transmitter and receiver. The simulation space consists of an inner layer of reinforced concrete surrounded by an outer layer of soil. Concrete layer has regions of varying dielectric property to represent voids and cracks. In order to terminate the simulation domain, a perfectly matched layer (PML) boundary condition is employed. Numerical simulation will be followed by an experimental verification.

ArcView-Based Modeling of Ground Movement Due to Pipe Bursting

The impetus for this research came from the concern that ground movements from pipe bursting can cause damage to adjacent services and structures. With accurate prediction of the magnitude and extent of ground movements, however, the confidence in the use of this method

would improve. This research is developing a method for quantifying the three-dimensional surface displacements induced by pipe bursting using GIS software ArcView. The objective is to simulate the expansion and contraction processes within the in-situ soil caused by the pipe bursting operation, and to study the displacements of the soil at the ground surface. Thus, this research will provide a better visualization and understanding of the scope, magnitude and shape of the ground movement resulting from pipe bursting operation.



The incorporation of an analytical geotechnical ground movement algorithm within ArcView provides a powerful analysis tool for utility and municipal engineers. The designer can now export a shape file into the analysis module, run the analysis and obtain the predicted soil movement at various locations within the proposed alignment. Using ArcView's powerful spatial analysis capabilities, potential problem areas (i.e. displacement exceeding a predetermined threshold in the vicinity of a buried structural element) can be identified with ease.

Sewer Laterals Training Module at No-Dig 2006

As announced in the last issue of the *TTC Newsletter*, TTC is preparing a training module on sewer lateral rehabilitation for NASTT. The module will be used for an eight-hour workshop and will first be demonstrated at the NASTT No-Dig conference in Nashville, Tenn.

TTC Industry Advisory Board News

TTC welcomes three new Industry Board Members. As an industry representative, Jeffrey L. Duplantis from Amitech USA LLC joined the board in November. Duplantis is the applications engineering manager for Amitech USA, a company that brings directly to the U.S. market Meyer Polycrete Polymer concrete pipes for microtunneling and pipe jacking projects and Flowtite glass-fiber reinforced plastic pipes for sliplining installations. These pipes are manufactured in the Zachary, La. plant. Two new public works members have recently joined the board: Joe L. Smith, from the City of Houston (the deputy assistant director of the Utility Maintenance Branch, Public Utilities Division, which is responsible for maintaining 13,990 miles of water distribution and wastewater collection lines); and Richard Aillet,

from the City of Ruston, LA (the director of water utilities).

Several companies have a new representative in the IAB: Dr. Ahmad Habibian from Black and Veatch replaced Joe Barsoom (now in CH2M Hill), Douglas Ivor-Smith from KBR replaced Michael Spero, and Ali Mustapha from the City of Shreveport replaced Michael G. Hogan.

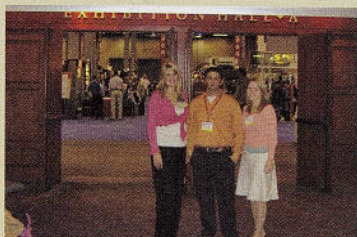


The Industry Advisory Board at a recent gathering.

The Industry Advisory Board met at the UCT 2006 Conference in Atlanta on Jan. 26. Ray Sterling and Joe Barsoom made short updates of TTC activities and the municipal forum program plans for 2006. IAB members discussed the center's directions and activities and the general consensus was that the center was doing well and moving in the right direction. The next meeting will be held at the NASTT No-Dig Conference in Nashville, Tenn., on March 28.

TTC Municipal Forums News

Four forums were held in the fall 2005: in Denver; Ruston, La.; Houston; and Whittier, Calif. (Los Angeles). Most presentations were focused on methods/technologies for pipeline rehabilitation (CIP, fold-and-form, grout-in-place, spiral winding) where either latest advancements in the design, installation and materials were presented, specific applications were discussed (water mains, sewer laterals, or large diameter, non-circular pipes), or challenging case studies were shown. Three other presentations described a new technology for cleaning large size sewers; alternate pipe materials for large diameter sewers; and electromagnetic inspection of pipelines. All forums were attended well, in particular the California forum with a total of 82 participants. Five forums are scheduled for spring 2006: Denver (a one-day inspection seminar on May 23); Santa Monica (May 24); Portland (May 25); and Minneapolis and Dallas (June 6). The forum in Minneapolis is brand new, as are two other forums considered in the fall of 2006: in Vancouver and Boston.



TTC students at UCT.

TTC Student Activities News

Six undergraduate students were able to attend this year's UCT conference in Atlanta in January. The students did a wonderful job monitoring educational sessions and networking the exhibit hall. Much larger group of students will attend the No Dig conference in Nashville in March.

TTC Stuff Update

TTC is pleased to announce that Sandi Perry started working as a new secretary in February. Lensie Stanley, a student worker, will continue her good work in the Center and help Sandi share her load.



Stanley



Perry

Industry Advisory Board

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Amitech USA, LLC

Bernie Krzys
Benjamin Media

Ahmad Habibian
Black and Veatch

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