



CENTER FOR INFRASTRUCTURE ENGINEERING STUDIES

Geophysics 2006: Conference on Applied Geophysics

By

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**University Transportation Center Program
at the University of Missouri-Rolla**

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16. Abstract The 2006 FHWA-sponsored Highway Geophysics–NDE conference was held in the city of St. Louis, Missouri, December 4-7, 2007. The conference was well-attended and the papers and exhibits were well-received. The next conference will be held in Charlotte, NC in November 2008. (http://www.ncdot.org/doh/PRECONSTRUCT/highway/geotech/geophysicsconference/)			
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UTC Report ETT145:

Geophysics 2006: Conference on Applied Geophysics

Overview:

The 2006 FHWA-sponsored Highway Geophysics–NDE conference was held in the city of St. Louis, Missouri, December 4-7, 2007. The conference was well-attended and the papers and exhibits were well-received. The next conference will be held in Charlotte, NC in November 2008. (<http://www.ncdot.org/doh/PRECONSTRUCT/highway/geotech/geophysicsconference/>)

A list of papers (by session) is appended. The complete proceedings can be viewed at <http://www.umn.edu/2006geophysics/>.

2006 Conference Proceedings (List of Paper by Session):

Session I

General Geophysical-NDE Methodologies I
Moderator: Thomas Fennessey

Considering Geophysical Methods in the Geotechnical Subsurface Exploration Process: A Geotechnical Perspective
Benjamin S. Rivers and Scott Anderson

Military Applications of Geophysics
Niklas H. Putnam

Session II

General Geophysical-NDE Methodologies II
Moderator: Mike Fritz

How Transportation Agencies Use Geophysics
Phil Sirles and Khamis Y. Haramy

Selection of Appropriate Geophysical Techniques: A Generalized Protocol Based on Engineering Objectives and Site Characteristics
Neil L. Anderson

QA/QC and Geophysical Projects
Rick Hoover

Session III-A

Abandoned Underground Mines
Moderator: Tom Lefchik

Differentiating Rooms and Pillars on Reflection Seismic Profiles: A Seismic Investigation of Two Abandoned Coal Mines

Neil L. Anderson, Derek B. Apel, Ahmed Ismail, Oleg Kovin and Vanja Dezelic

Imaging Mine Voids Using Continuous Vertical Electrical Sounding Methods

Peter J. Hutchinson

Geophysical Technologies to Image Old Mine Works

Kanaan Hanna, Bart Hoekstra, Jim Pfeiffer and Brandy Uphouse

Mine Delineation Using Geophysics — Kansas Department of Transportation — Past, Present and Future

Bob Henthorne

2D MASW Abandoned Mine Detection

Edward D. Billington

Session III-B

Determination of Engineering Properties
Moderator: Sami Eyuboglu

Use of Refraction Microtremor (ReMi) Data for Shear Wave Velocity Determination at an Urban Bridge Rehabilitation Site

Douglas W. Lambert, Glenn Adams and Veronica Hawley

Beyond Rippability — A Case History Integrating Seismic Refraction, Electrical Resistivity Imaging, and Geotechnical Boring Logs

Jonathon B. Shawver, William Dalrymple and Robert Orr

Geotechnical and Geophysical Case Studies Involving the Refraction Microtremor (ReMi) Method for Shear Wave Profiling

Satish Pullammanappallil

Geophysical Mapping of the Vertical Extent of Soft Sediments in Former Lime Settlement Ponds

Mark J. Howell

Shear Wave Soil Velocities Over Failing Culverts Using the Refraction Microtremor ReMi™ Technique

Priscilla Duskin and Satish Pullammanappallil

Session IV-A

Determination of Lithology
Moderator: John Sexton/Ed Woolery

Application of Ground Penetrating Radar for Near Surface Geology

Haydar Al-Shukri, Hanan Mahdi and Okba Al Kadi

Integrated Geophysical Methods for Geotechnical Subsurface Investigations

Mark Fish and Krystle Day

Integrating Seismic Refraction and Surface Wave Data Collection and Interpretation for Geotechnical Site Characterization

Michael L. Rucker

Session IV-B

Pavements I

Moderator: Carl D. Rascoe

Design Moduli for Flexible Pavements Using Seismic Tests

Imad Abdallah, Soheil Nazarian and Deren Yuan

Integration of FWD and GPR

Robert Parrillo, Roger Roberts and Gary Sanati

Determining Concrete Thickness and Overlay Bond Quality of Roadways Using Ground-Penetrating Radar

Jeremy S. Strohmeier, Edward D. Billington and Kenneth E. Derrenbacher

Benefits of Linking Digital Video and GPS to High-Speed Pavement GPR Data

Francisco A. Romero, Dimitri A. Grivas, Jonathan Shawver and John Makresias
(PRESENTATION ONLY)

Session V-A

Estimating Depth to Bedrock

Moderator: Neil Croxton

Examples of Subsurface Velocity Imaging Via Combined Downhole and Surface Source and Receiver Arrays

William P. Owen

Advancements in 3D Subsurface Modeling Using Seismic Refraction Data — A New Perspective

Phil Sirles, Alan Rock and Khamis Y. Haramy

Imaging Glacial Sediments and Underlying Bedrock in Illinois Using Surface Wave Data Acquired by a Land Streamer

Ahmed Ismail and Steve Sargent

Subsurface Geophysical Investigation Proposed Bridge Site for Breathitt Parkway Extension Over I-24 Christian County, Kentucky

D. Michael Gragg, Leigh Ann Croft, Bart Asher and Darrin Beckett

Session V-B

Pavements II

Moderator: Francisco Romero

Automated Processing of Ground Penetrating Radar Pavement Data

Kenneth R. Maser (PRESENTATION ONLY)

Transverse Contraction Joints Evaluation Using Ground Penetrating Radar

Cherif Amer-Yahia and Todd Majidzadeh

Step Frequency GPR Evaluation of the Natchez Trace Parkway: Pavement and Infrastructure Measurement and Assessment for FHWA Digital Highway Measurement Vehicle Applications

Michael Scott, Nicholas Gagarin, Milton K. Mills and Morton Oskard

A Brief Review on Different Surface Wave Methods and Their Applicability for Non-Destructive Evaluation of Pavements

Amit Goel and Animesh Das

Session VI-A

Bridge Foundations/Substructures

Moderator: Ned Billington/Khamis Y. Haramy

Ground Penetrating Radar Inspection to Evaluate Stability of Sound Wall Pillars

James Pfeiffer and Kanaan Hanna

Crosshole Sonic Logging: Insights on Testing Nevada Infrastructure

Gretchen C. Schmauder, Steve D. Bowman and Thomas J. Adams

Factors Affecting CSL Data Quality

Khamis Y. Haramy, Alan Rock and Nien Yin Chang

State of Practice of NDE Technologies in Bridge Inspection

Xinbao Yu and Xiong Yu

Session VI-B

Subsurface Voids/Karst

Moderator: Julian Ivanov

Combining Seismic Velocity Tomography and Single-Hole Reflector Tracing to Improve Volumetric Ground Imaging — Case Studies

Jozef M. Descour, Roger Surdahl, Yamamoto Takuji, and Shirasagi Suguru

Ground-Truthing Seismic Refraction Tomography for Sinkhole Detection in Florida

Dennis R. Hiltunen, Nick Hudyma, Timothy P. Quigley and Chandra Samakur

A Review and Evaluation of the Geological and Geophysical Surveys and General Cost Comparison: For the Investigation of Sinkholes on US-18 in Cerro Gordo County, Iowa
Matthew Trainum

Identification of Buried Sinkholes, Fractures and Soil Pipes Using Ground-Penetrating Radar and 2D Electrical Resistivity Tomography
Philip J. Carpenter and Dean W. Ekberg

Session VII-A

Mapping/Locating Utilities
Moderator: Doug Lambert

Common Bonding and Its Affect on Locating Underground Utilities
Jim Grimes
(PRESENTATION ONLY)

Computer Assisted Radar Tomography — A Tool in the Subsurface Utility Engineering Process
Kate McKinley

A GPR Sensitivity Analysis for Locating Various Utilities
Glen Adams, Veronica Hawley and Michael Roark

Session VII-B

Bridge Deck/Superstructure
Moderator: Ken Maser/Glenn Washer

Advances in Non-Contact Impact-Echo Scanning
Alex Gibson

Bridge Deck Condition Assessment Using GPR Comparison of 2 GHZ Horn and 1.5 GHZ Ground-Coupled Antennas
Robert Parrillo and Roger Roberts

Air-Coupled Impact-Echo Imaging of Concrete Decks and Slabs
John S. Popovics and Jinying Zhu

Session VIII-A

Groundwater
Moderator: Jon Robison

Determination of Groundwater Flow Direction in a Single Well by Electrical Conductivity Method
Nexhip Maska

Assessment of Karst Activity at Highway Construction Sites in Green and Jefferson Counties, Missouri, Using the Electrical Resistivity Method
Neil L. Anderson, Derek B. Apel, Vanja Dezelic, Ahmed Ismail and Oleg Kovin

Investigating Dam Seepage Using Electrical Resistivity Method

Moikwathai Moidaki, Neil L. Anderson and Estella A. Atekwana

Finite Difference Time Domain (FDTD) Modeling of Ground Penetrating Radar (GPR) for Heterogeneous Media by Using an Efficient Robust Algorithm

Sami Eyuboglu, Jeffrey J. Daniels and Kendra A. Pyke

Session VIII-B

Archaeology I

Moderator: Steve Dasovich

Geophysical Investigations for the Ruins Road Relocation Aztec Ruins National Monument, New Mexico

Donald W. Johnson and Ron Schirmer

Targeted Near-Surface Geophysical Survey as an Element of a Multi-Stage Research Design

R. Berle Clay

The Role of Geophysical Survey in Buried Archaeological Site Discovery and Evaluation

Staffan Peterson and G. William Monaghan

Ground-Truthing using the GeoScan Research FM36 Fluxgate Gradiometer: Ratz Site, 11Ms79

Steve Dasovich

(PRESENTATION ONLY)

Session IX-A

Miscellaneous Geophysical-NDE Methodologies

Moderator: Ed Woolery/Kanaan Hanna

Use of 3-D Ground-Penetrating Radar Data for Fractures Imaging

Oleg N. Kovin and Neil L. Anderson

Application of Continuous Alignment Geophysical Surveys for Florida Roadway Projects

Robert Werner and David Horhota

A 2-D MASW Shear-Wave Velocity Profile Along a Test Segment of Interstate I-70, St. Louis, Missouri

T. Thitimakorn and Neil L. Anderson

Session IX-B

Archaeology II

Moderator: Steve Dasovich

The Wyandotte County Cemetery: A Case Study in Geophysical Assessment of Historic Cemeteries

Geoffrey Jones

GPR Applied to Archaeological Investigations Supporting Transportation Projects

Robert M. Orr and Jonathan B. Shawver

Improving Excavation Accuracy and Reducing Cost Through the Use of Geophysical Applications for Archaeology

James Pomfret

Session X

Bridge Scour/Unknown Foundations

Moderator: Ahmed Ismail

Surface Geophysics as Tools for Characterizing Existing Bridge Foundation and Scour Conditions

Michael L. Rucker

Determination of Unknown Length of Sheet Piles Using Three Geophysical Logging Methods

Frank Jalinoos, Alex Gibson, John Diehl, Philip Hadfield and George Gordon

Unknown Bridge Foundation Investigations Using Wave Mechanics

J. Darren Holt

(PRESENTATION ONLY)

Session XI-A

Mapping with Electromagnetic Induction Geophysical Instruments

Mike Catalano

Session XI-B

Application of Geophysics in Karst Terrain

Lynn Yuhr

Session XI-C

The SeisOpt® ReMi V30+™ System

Satish Pullammanappallil

Session XII-A

OhmMapper TRN Capacitively-Coupled Resistivity Imaging System

Doug Groom

Session XII-B

Road Doctor Pavement GPR, Video and Data Integration/Analysis Software

Francisco A. Romero