

Technical Forum
Geological Hazards in Transportation
In the Appalachian Region
Tuesday, August 6, 2002
1:00 pm to 5:30 pm

1:00 pm Welcome: Tony Szwilski

Session A Chair: Kirk Beach, ODOT

1. 3D Laser Scanning by **Michele Anderson, Matthew Jolly, James Van Ostran of As-Built Solutions**

Abstract: The laser technology is used to remotely captures and models the surface geometry of complex structures with unprecedented speed and accuracy, providing valuable 3-dimensional data for analysis and design. The 3D point data can be used to create a TIN and contours, calculate volumes, determine surface areas, perform deformation analyses, and generate cross-sections for the most intricate surfaces.

2. Corridor H Section 16 From Elkins Kerens, Randolph Co., West Virginia: Landslides Investigation & Correction Measures by **James Fisher WVDOT**

Abstract: The focus of this paper is a 5.5-mile section of Corridor H that extends from Elkins to Kerens and is scheduled to be completed in the spring of 2002. The exposed bedrock formation consists of thinly bedded layers of gray black silty shales that are interbedded with lenses of sandstone. Five major landslides occurred during the excavation of the road cuts occurring on the western side of the road. As each landslide developed corrective designs were explored and ultimately initiated. The landslides greatly increased excavation quantities on the project, which also increased accompanying cost overruns. The paper will review the preliminary field investigation, landslide occurrences and corrective measures initiated.

3. National Karst Map Project by **Jack Epstein USGS**

Abstract: Federal and State agencies, the speleological community, and academia have repeatedly expressed the need for an accurate and detailed national karst map to better understand the distribution of soluble rocks in the United States. In the Appalachian Highlands, for example, approximately 25 percent of the area is underlain by carbonate rocks capable of developing karst. Maps at a variety of scales are needed to educate the public and legislators about karst issues, to provide a basis for cave and karst research, and to aid Federal, State, and local land-use managers in managing karst resources and assessing subsidence hazards. During the past two years, a diverse group of karst experts considered a long-term plan for karst mapping on a national scale. The resultant goal is for the US Geological Survey (USGS) to produce a national karst map in digital form, derived primarily for maps prepared by the individual States, and to link that map on a web-based network to State and local scale maps and related data. The newly formed National Cave and Karst Research Institute (Zelda Chapman Bailey, interim director, 303-969-2082; zelda_bailey@nps.gov) will establish a web-based network of karst information that will be used to build the national map.

3: 00 pm BREAK

Session B Chair: TBA

3:15 pm

1. The Use of Geophysics and NDT to Locate, Investigate and Monitor Mines Beneath Roadways in Ohio by **Tom Lefchik FHWA**

Abstract: A sudden mine subsidence resulting in the collapse of a travel lane of I-70 in Ohio focused the attention of the Ohio Department of Transportation (ODOT) on the danger that these voids beneath the roadway can present to the traveling public. Subsequently ODOT has tried many geophysical methods to locate, investigate, and monitor the thousands of locations of mines beneath roadways in Ohio. The methods tried include various types of seismic, resistivity, ground penetrating radar, and time domain reflectometry as well as other methods

2. Karst-Related Geologic Hazards Associated with Transportation by **James C. Currens, KGS**

Abstract: Karst-related geologic hazards affect large areas of the United States. Over 40 percent of the area of the contiguous states east of Oklahoma is underlain at shallow depths by soluble bedrock. Over half of Kentucky is underlain by carbonates. Therefore, construction on karst, including transportation infrastructure, although inadvisable is often unavoidable. The geologic hazards associated with karst that affect transportation are sinkhole development (primarily cover collapse), flooding, and pinnacled bedrock. In addition the transportation of hazardous materials across karst areas pose a threat to groundwater resources in karst aquifers. Cover-collapse sinkholes result from the sudden collapse of a soil arch spanning a void in the bedrock or the unconsolidated cover raveling into the bedrock void. The collapse may damage roadways, railroads, runways, or utility lines. Transportation accidents on Kentucky highways and other transportation corridors have damaged groundwater resources and resulted in millions of dollars in cleanup costs.

3. Recognition of Landslide Prone Areas by **George Hall WVDOT**

Abstract: A review of natural topographic features which suggest a high probability of landslide susceptibility. Also reviews geologic conditions in the Appalachian Plateau Province which promote landslide activity.

4. Remediation Techniques by **H.C. Nutting**

Abstact: (In progress)

The Technical Forum is an activity of The Appalachian States Coalition for Geological Hazards in Transportation. The coalition comprises fifteen representatives from the principal federal, state and private transportation entities in the Appalachian States.

Chair: Tony Szwilski, Marshall University

Co-Chair: Kirk Beach, Senior Geologist, Ohio Department of Transportation

Sponsored by the Nick. J. Rahall Appalachian Transportation Institute