Geotechnical Management Systems: Data Standards

Thomas Lefchik, P.E.
Federal Highway Administration
Kirk Beach
Ohio Department of Transportation
Why GMS?

• More data
  – Borings and soils tests
  – CPT, geophysics, others
  – Embankment and subgrade stabilization treatments
  – Foundation records
  – Etc.

• More problems
• More projects with less staff
• Better technology
$1/2 billion in assets
Accessing $1/2$ billion in assets
Protecting $1/2 billion in assets
90% of new projects
$52 million per year
Advantages

- Efficient storage and retrieval of old & new data.
- Cost & time savings
- Quality designs & fewer problems
- Access to other data
- Ability to be proactive rather than reactive
- Improved knowledge of what you have
- Informed decision making for management
One example

• If consultants reduce the amount of drilling by 10-20%, then savings of $12-24M
What is a Geotechnical Management System?
GMS Basic Elements

• **Data**
  – Investigation
  – Testing
  – Monitoring
  – Construction

• **Assets**
  – Inventory
  – Evaluation & Condition

• **GeoHazards**
  – Inventory
  – Risk Assessment
Standards

• Search of existing standards
• Assess what other DOTs use
  – FHWA & OhioDOT
    • 2003 Synthesis of Existing Practices
      – Survey State DOTs and groups in the UK
June 2004 Workshop

• Presented results of Geotechnical Management System synthesis of practice

• Presentations by:
  – State DOTs
  – United Kingdom Highway Agency
  – Consortium of Strong Motion Observation Systems (COSMOS)

• State DOT’s agreed to pursue development of geotechnical data standards
Benefits of Data Standards

• Means for information sharing
• Saves money, time and energy in system development
• Assists software makers in the development of programs that fit within the framework
Pooled Fund Project

• 2005 – OhioDOT sponsored
• Development of the “Standard”
• Participation…
Pooled Fund Project
TPF-5(111)

Objectives

- Combine existing geotechnical data standards
- Expand to include other data (i.e. geohazards, geotechnical assets)
- Survey state DOTs and others
- Finalize standards
Project Deliverables

- Data Dictionary
- Electronic data structure for database development
- Electronic data structure for the metadata
Organization

GMS GROUP

Geotechnical Data Coalition

Special Interest Groups
GMS Group

- California DOT
- Connecticut DOT
- Florida DOT
- Georgia DOT
- Kansas DOT
- Kentucky DOT
- Minnesota DOT
- Missouri DOT
- Nevada DOT
- Ohio DOT
- Tennessee DOT
- Virginia DOT

- FHWA
- FHWA Federal Lands
- United Kingdom Highway Agency
- US Army Corps of Engineers
- USEPA
- USGS
GMS Group Objectives

• Accelerate, enable, and facilitate, the development of geotechnical management systems. This will be accomplished by developing frameworks, standards and protocols ...

• Reduce the Cost and Time required to develop GMS Systems. This will be accomplished by reducing redundancy in efforts and collaboration.
GMS Group

- Oversee pooled fund project
- Develop scope and direction of work
- Provide direction to Geotechnical Data Coalition
- Review and approve products
- Provide technical assistance
- Assist in needs survey
Geotechnical Data Coalition

• Consolidate existing standards into unified standard
• Review, direct, and accept work of Special Interest Groups
Geotechnical Data Coalition
Members

- University of Florida
- Consortium of Organizations for Strong Motion Observation Systems (COSMOS)
- Association of Geotechnical and Geoenvironmental Specialists (AGS)
- Construction Industry Research and Information Association (CIRIA)
- FHWA
- Ohio DOT
- Special Interest Group Managers
Special Interest Groups

- Conduct surveys
- Compile and assess data
- Conduct reviews
- Conduct meetings and workshops
- Perform work necessary to develop the standards
Special Interest Group Members

• Technical representatives from the Geotechnical Data Coalition
• Other technical specialists
Activities

• Borehole data dictionary in several months
• Data structure and metadata
• Add assets, geohazards, geophysics, etc.
• Project completion mid 2007