Looking at Past Geotechnical Data to Reveal a Clearer Future

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IIF Moment
Geotechnical Site Characterization Process

3 Field Exploration
4 Laboratory Testing
5 Characterize and Report
Why is past Geotechnical data so important?

We are an experience based profession, but don’t do a consistent job of remembering our past experiences...
Typical “Exploration Plans”
So what’s the point?

- Commoditization
- Generic Scopes
- Wrong approach
- Unnecessary Exploration
- Inadequate Exploration
Geotechnical Site Characterization Process

Breaking it down into the elements...

1. Historical Geo Data
2. Smart Exploration Plan
3. Field Exploration
4. Samples/Data
5. Laboratory Testing

Eng. Properties
Characterize and Report
Seamless Transfer of the info...
Geotechnical Site Characterization

Breaking it down into the elements...

1. Historical Geo Data
2. Methods Consulting
3. Field Exploration
4. Laboratory Testing
5. Characterize and Report

Data Mining
Samples/Data
Smart Exploration Plan
Eng. Properties
Seamless Transfer of the info...
Big data is a term for data sets that are so large or complex that traditional data processing applications are inadequate. Challenges include analysis, capture, data curation, search, sharing, storage, transfer, visualization, querying and information privacy. The term often refers simply to the use of predictive analytics or certain other advanced methods to extract value from data, and seldom to a particular size of data set. Accuracy in big data may lead to more confident decision making, and better decisions can result in greater operational efficiency, cost reduction and reduced risk.
Valuable Historic Data

What if.....

It were Activated through GIS for useful access?
Internal Data

- 262,728 Projects
- Adding 2,500-3,000 historical projects/week over the next year
- Plus 15,000 new projects/yr
And do we have data....
STEP 1 – DATA MINING

External Data
- DOTs
- State Records
- USDA
- USGS
- FOIA
- Etc.
Name: Injected Gneiss

Age: Cambrian/Late Proterozoic

Description: Injected Gneiss - biotite gneiss and schist intruded by numerous sills and dikes of granite, pegmatite, and aplite; minor hornblende gneiss.
STEP 2 – METHODS CONSULTING
STEP 3 – FIELD EXPLORATION

1. Data Mining
2. Methods Consulting
3. Field Exploration
4. Lab Testing
5. Characterize & Report

- Truck
- Rubber Tire ATV
- Truck CPT
- Skid Rig
- Combo Rotary/CPT
- Geoprobe
**STEP 3 – FIELD EXPLORATION**

Specialized In-Situ Methods

1. Data Mining
2. Methods Consulting
3. Field Exploration
4. Lab Testing
5. Characterize & Report

- Vane Shear
- Dilatometer
- Cone Penetrometer
- Pressuremeter Testing

**Specialized In-Situ Methods**
**STEP 3 – FIELD EXPLORATION, QUALITY**

1. Data Mining
2. Methods Consulting
3. Field Exploration
4. Lab Testing
5. Characterize & Report

Instrumentation
Where do we go from here.... DiGGS – Data transfer protocol. Allows each piece of data to be connected to key metadata such as test reference, geographic location, geologic references, etc. By using a common and robust transfer protocol, the end use (interpretation, storage, presentation) is separated from data transfer.

Visit - https://www.diggsml.org/
BIM - The rendering of geotechnical data using a digital interface.....or more appropriately the display of this information in virtual reality.
Initial triangulation is generated by software for given number of points (boreholes).

Retail Site Design

Pond Design

Building Pad Design (Shallow/Deep Foundation)

Road Design

1. Data Mining
2. Methods Consulting
3. Field Exploration
4. Lab Testing
5. Characterize & Report

Geotechnical BIM opportunity
Explore existing data
Informed Exploration Plans
Keep the data “alive” for future

Next Site - Unknown Conditions
Generic Investigation
Commoditization
“Killing” Data

Two Paths
Thank you

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