



RESEARCH PROJECT CAPSULE [21-2GT]

March 2021

TECHNOLOGY TRANSFER PROGRAM

Geotechnical Database, Phase IV

JUST THE FACTS:

Start Date:
March 1, 2021

Duration:
24 months

End Date:
February 28, 2023

Funding:
SPR: TT-Fed/TT-Reg-5

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POINTS OF INTEREST:

Problem Addressed / Objective of
Research / Methodology Used /
Implementation Potential

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PROBLEM

Over the last few years, the Louisiana Department of Transportation and Development (DOTD) has made great strides in development of its Geotechnical Database. Three prior research projects have focused

on standardizing and organizing the geotechnical data collected by the Department. However, some challenges have also occurred

over the years. For example, the GIS platform developed during the Phase I is no longer supported by the current ArcGIS software, and the current DOTD document management software (ContentManager) is being phased out and moved to a newer platform (File.NET). Additionally, increased computing power has changed the expectations for how geotechnical data should be stored and utilized.

The current DOTD geotechnical database is managed through gINT software (a Bentley product) that has been customized with pLog enterprise solution. Since gINT is outdated and not integrated with an enterprise database, data entry and retrieval is cumbersome. Bentley recently purchased Keynetix and its HoleBASE software, an all-in-one enterprise database/data management solution, which is available to the Department. DOTD's use of HoleBASE was initiated through Phase III, but is currently limited to shallow subgrade soil surveys and dynamic cone penetrometer (DCP) data. Deep soil borings and cone penetrometer (CPT) data have not yet been incorporated into HoleBASE.

OBJECTIVE

This project will focus on updating the current database to modern platforms that will stand the test of time and allow GIS display of the data. The project will research and assist with DOTD's implementation of OpenGround, the Cloud-based version of HoleBASE.

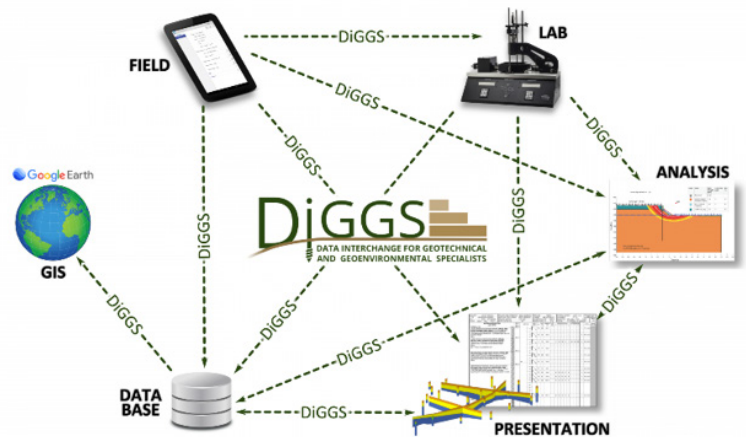


Figure 1. Data Interchange for Geotechnical and Geoenvironmental Specialists (DiGGS) | Photo from the American Society of Civil Engineers (ASCE) Geo-Institute (<https://www.geoinstitute.org/special-projects/diggs>)

The implementation of Data Interchange for Geotechnical and Geo-Environmental Specialists (DIGGS) is a DOTD goal. DIGGS will allow for the collection and transfer of geotechnical data from consultants and other entities and agencies through the (XML-based) geospatial standard schema. DIGGS is also a goal of the Federal Highway Administration (FHWA) and the American Society of Civil Engineers (ASCE) Geo-Institute.

METHODOLOGY

Initially, the research team will conduct a literature review of work from prior and current related projects. HoleBASE will be properly configured and DOTD's geotechnical data will be migrated to the new system.

The research team will work with DOTD and its consultants to update the standards for geotechnical deliverables. Consultants will be guided to provide standardized geotechnical data to the Department through the DIGGS tool, converting data, even if the consultant utilizes another geotechnical database management software.

The research team will use updated interfaces to link current data and GIS information with the proposed OpenGround interface. The team will then recommend and implement strategies using boring logs and dashboards to provide data visualization for the Department.

IMPLEMENTATION POTENTIAL

Deep borings and CPTs represent the majority of geotechnical data used by DOTD. The potential move to an all-in-one database/mapping/management solution is beneficial. This research is the next step in developing a comprehensive geotechnical database. This effort also makes strides toward locating, collecting, and storing information about DOTD geotechnical assets. This research will continue DOTD on a more formal path toward digital storage of this information in a searchable format.

Using currently available software, DOTD's geotechnical-data management procedures can achieve and advance the state-of-practice. Potential benefits include:

- General increase in efficiency due to having all geotechnical data (deep boring, CPT, shallow boring, DCP, pile load test) within a single unified database designed specifically for geotechnical asset management;
- Reduction in new borings needed for projects where soil boring data already exists;
- Time savings in generating soil boring logs, figures, and profiles for geotechnical design; and
- Reduction in the possibility for data input errors by streamlining the laboratory test reporting process.