Implementing CPT Procedures in ARDOT Geotechnical Designs

PROBLEM STATEMENT:
Current ARDOT practice for conducting subsurface soil investigation combines drilling and Standard Penetration Test (SPT). Most of soils strength design parameters are derived from SPT-N values. AASHTO discourage the use of SPT-N values to obtain shear strength parameters for cohesive soils. SPT-N values introduce high level of uncertainty which results in designs of questionable economy. As an alternative to the SPT, this problem statement (PS) proposes the use of Cone Penetration Test (CPT) procedures on ARDOT geotechnical subsurface explorations. Many DOTs have incorporated CPT procedures into their design process. CPTs offer investigation cost savings if they are used in lieu of some traditional soil test borings. Because CPTs are economical and expedient, this allows DOTs to deliver more miles of highway and more structures for the same program budget. This research study will develop routine procedures for interpreting and analyzing huge quality CPT data for most common geotechnical transportation applications.

OBJECTIVES:
The objectives of the study are to (1) determine the applicability of using CPT to reduce uncertainties associated with geotechnical subsurface investigations; (2) Investigate CPTs cost savings over some traditional soil testing procedures in transportation applications; (3) Mitigate conservative assumptions and higher construction bid prices that would cover risks posed by the uncertainties in subsurface exploration; and (4) Improve the overall reliability and cost on the design and construction of the highway structure.

FORM OF RESEARCH IMPLEMENTATION:
Project outcomes and implementation will take the form of a comprehensive research report detailing (1) CPT-sounding planning and CPT field testing procedures for specific designs; (2) CPT data presentation and geostratigraphic profiling; (3) CPT evaluation of soil engineering parameters and properties; (4) CPT design procedures for deep foundations and embankments, and (5) CPT for QC of ground modifications. In addition, CPT Data processing package may be developed/proposed for handling and post-processing the large amounts of generated CPT data, which can benefit owing to a higher degree of reliability and improved overall cost on the design and construction of the highway structure.

Estimated Project Duration: 24 months

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