IMPROVING STRAIN WEDGE MODEL CAPABILITIES IN ANALYZING LARGE DIAMETER DRILLED SHAFTS SUBJECTED TO LATERAL LOADING IN NEVADA SOILS

By: Lindsey Costello

Key Points:

Project Number:
667-15-803
Start Date:
January 1, 2016
Duration:
24 Months
Project Cost:
$184,802
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PROBLEM

Drilled shafts for bridge pylons are currently being investigating Current design approaches do not account for Vertical side shear (VSS) result in a larger shaft diameter. In addition, the consequence to design when significant difference in stiffness between adjacent layers exists when *Caliche* (rock-like material) layers are present needs to be evaluated. Having one computational tool that can account for all the factors along with the proper integration of VSS and the appropriate soil/rock model will greatly increase confidence in assessing shaft response under lateral loading. This will result in more efficient foundation design which ultimately translates into significant cost savings.

OBJECTIVE

The principal objective of this research is to improve the current state-of-practice in assessing the lateral load-displacement relationship of large diameter shafts embedded in soils that includes Caliche. This will be achieved through improving an already proven computational tool, SWM, without the introduction of correction factors.

METHODOLOGY

	Task	Outcome
1	Literature Review & Data Collection	Database of available laterally load tests conducted on drilled shafts in Las Vegas or similar soils.
2	Boring, Sample Collection and Laboratory Tests	Data from Field tests; Representative material samples.
3	Material Modeling and Implementation into SWM	Material model for Caliche
4	Verification/Calibration of the Implemented Material Model	Verify the task 3 material model for caliche and updated SWM version
5	Report and Implementation Plan	Final project report

IMPLEMENTATION POTENTIAL

This project will result in an updated modeling tool (SWM) that accounts for vertical side shear and proper material modeling of Caliche; and 2) a database of laterally load tests conducted on drilled shafts in Las Vegas (or in similar soil). UNR will provide NDOT personnel training on the new platform. significant savings expected in foundation costs due to a more efficient design. Although these savings cannot be quantified and depends on the size of the project, accounting for an additional 30 to 100%, depending on which method is used in lateral capacity assessment, will yield significant savings.

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