DESIGN OF DRILLED SHAFTS IN EXPANSIVE SOIL, PART 2

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DESIGN PROCEDURE FOR DRILLED CONCRETE PIERS IN EXPANSIVE SOIL

Document no: FPA-SC-16
Developed by: FPA Structural Committee & Dr. Bob Lytton
Committee chairs: Main Committee - Ron Kelm, P.E.
                Subcommittee - Nicole Wylie, P.E.
Sanctioned: March 2012
To Be Completed: In 2014
How it began…

-Limited data in geo reports; no suction

-Challenge to Dr. Lytton in 2011

-Dr. Lytton presented Dec 2011 to FPA

-Paper sanctioned March 2012
SC-16 Subcommittee Members

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+ 15 Auditors
The Method

Input: basic data from a geotech report

Output: approximate suction and minimum pier size/length
SOIL INPUT FOR SUCTION:

Atterberg Limits
Moisture Content
Dry Density
Unconfined Compression

OUTPUT:
Equivalent Suction, \( h_m \)
INPUT FOR PIER DESIGN:

FOR EACH CLAY LAYER:
LL, PL, % fine clay, water content, dry density, and depth

FOR EACH SAND LAYER:
Water content, N60, dry density, whether sand is silty or clean, and depth

ALSO

Equivalent Suction, Thornthwaite Moisture Index, Min. Load at Top of Pier, Water table depth, overburden, trial pier length and trial diameters of pier and bell.
OUTPUT:
Pier design is adequate or inadequate.
Iterate as needed.
LIMITATION:

The FPA recommends using suction data. However, when no suction-based design information is available, this procedure can be used as an alternative for the geotechnical or foundation design engineer to use to more accurately design or analyze the design of drilled concrete piers in expansive soil.
WHERE THE PAPER STANDS

In committee review, meeting monthly
Working on spreadsheet
Will need to test and refine method
Paper will be available to the public, spreadsheet given only to FPA members.
The Structural Committee’s next challenge for Dr. Lytton:

Determine a suction envelope based on limited test data.