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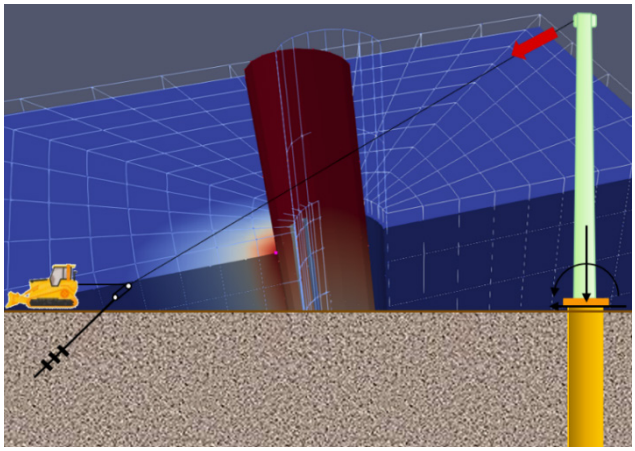
Design and Installation of Vibrated Steel Caissons: Phase 2



Project Highlights:

- Participate in full-scale testing of vibrated caissons
- Evaluate the impact of overturning and compression loads on steel caissons
- Gain access to software developed specifically for the analysis of steel caissons for overhead lines

Background, Objectives, and New Learnings

Vibrated steel caissons offer a number of advantages as a preferred foundation support type for steel poles, where conditions support their use.

Vibrated caissons may be installed more rapidly because no concrete pouring is involved and no excavation, steel fixing, or concreting is required. Under the right conditions, and with the right equipment, shafts can be vibrated to the required depth rapidly and efficiently.

Moreover, the erection of poles can commence immediately after foundation installation, as no concrete curing time is involved. The use of vibrated steel caissons is also considered environmentally preferable, especially in areas where concreting has been prohibited.

Due to these benefits, it is evident why many utilities have adopted vibrated steel caissons as a preferred foundation system. However, several difficulties related to the use of vibrated steel caissons have been reported.

Under certain conditions, vibrated steel caissons have hit refusal prior to the attainment of the founding depth. Some questions have been raised concerning the adequacy of geotechnical investigation procedures, the impact of soil type on the suitability of this technology, the selection of installation equipment, and the sizing of plant.

Furthermore, the relative flexibility of vibrated steel caissons in comparison to other pole foundations requires specific considerations to be made during the design phase.

Currently, no software exists that is specifically tailored to the analysis of vibrated caissons.

Benefits

This project seeks to enable utilities to:

- Enable greater accuracy and optimization for vibratory pile capacity analysis
- Evaluate the analytical models developed in Phase 1 using full scale testing
- Assess both compression and overturning capacity of vibrated caissons in full scale tests
- Develop software based on analytical models, adjusted based on the results of testing

Project Approach and Summary

The project will be executed in two phases; this SPN contains deliverables and pricing for Phase 2 of the project. See SPN 3002016622 for Phase 1 deliverables and pricing.

Deliverables

Phase 2 will include full-scale testing, on a number of sites, as proposed by members and based on the available funding. Members are encouraged to propose specific testing sites where projects utilizing vibrated caissons are planned.

In addition to the testing of moment capacity, the testing program also aims to include predominantly vertical load tests in order to gain empirical data for vertical bearing capacity of caissons.

Empirical data gained from tests will be used to adjust and refine analytical models, and to compile a design computer program specifically for steel caissons, which aims to incorporate the effects of caisson flexibility.

Price of Project

Phase 2: $60,000 per year for 2 years. The project qualifies for self-directed funds (SDF) and tailored collaboration (TC).

To perform the outlined scope of the project, collaboration of at least ten participants is required.

Project Status and Schedule

The scheduled duration of Phase 2 is likely to span 24 months; however, that may be extended if additional testing is allowed by the project budget.

Who Should Join

Transmission utilities that plan to use vibrated steel caissons.

Contact Information

For more information, contact the EPRI Customer Assistance Center at 800.313.3774 (askepri@epri.com).

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