

State of Hawaii

2005 Standard Specifications

for capacity loss. Perform corrective measures, including redesign of footings caused by defective shafts, at no increase in contract price or contract time. The Engineer will not pay for defective casing remaining in place.

(c) Permanent Casing. Ensure casing is continuous between top and bottom casing elevations. After completing installation, cut off permanent casing at prescribed elevation. Complete shaft by installing required reinforcing steel and concrete in casing.

When special temporary casings are in the contract documents or specified in writing by the Engineer, maintain temporary outer casing alignment with permanent inner casing. Provide watertight seal between the two casings during excavation and concreting operations.

(5) Slurry. Drilling slurry will not be allowed.

(6) Excavation Inspection. Provide equipment for checking dimensions and alignment of each permanent shaft excavation. After cleaning, measure final shaft depth with weighted tape.

Ensure a minimum of 50 percent of each shaft base has less than 1/2 inch of sediment at the time concrete is placed. Ensure maximum sediment depth or debris on shaft base does not exceed 1-1/2 inches. The Engineer will visually inspect dry shafts for cleanliness. For wet shafts, the Engineer will use inspection methods deemed appropriate.

(7) Reinforcing Steel Cage Construction and Placement. Assemble and place reinforcing steel cage immediately after the Engineer inspects and accepts shaft excavation and before placing concrete. Reinforcing steel cage includes longitudinal bars, ties, cage stiffener bars, spacers, centralizers, and other appurtenances necessary to complete cage.

Tie and support shaft reinforcing steel such that reinforcing steel placement conforms to allowable tolerances as specified in Subsection 511.03(C)(10) – Construction Tolerances. Use concrete spacers at sufficient intervals (near bottom and at intervals not exceeding 10 feet along shaft length) to ensure concentric spacing for entire cage length. Use minimum of four spacers, equally spaced around circumference, at each vertical interval. Construct spacers of material accepted by the Engineer, equal in quality and durability to concrete specified for the shaft. Furnish spacers of adequate dimension to ensure a minimum 3-inch space between outer portion of reinforcing cage and side of excavated hole or casing. Provide

cylindrical concrete bottom supports accepted by the Engineer to maintain proper distance between bottom of cage and base of shaft excavation.

Check top of steel cage elevation before and after placing concrete. When reinforcing steel placement does not meet specified tolerances, correct to required tolerances. Do not construct additional shafts until reinforcing steel cage support method has been modified and accepted.

When bottom of constructed shaft elevation is lower than shown in the contract documents, extend at least half of the longitudinal bars required in upper portion of shaft, to the shaft bottom. Continue tie bars for the extra depth, spaced 2 feet on center. Extend stiffener bars to final depth. Use lap splices or unspliced bars of proper length. Welding of reinforcing steel will not be allowed.

(8) CSL Test Access Tube Installation. When crosshole sonic log testing is specified in the contract documents, furnish and install access tubes in all drilled shafts, except those constructed in the dry or as otherwise indicated.

Securely attach access tubes to interior of shaft reinforcing steel cage. Place access tubes around shaft, inside spiral or hoop reinforcing steel and 3 inches clear of vertical reinforcing steel, at uniform spacing not exceeding 2 feet 9 inches, unless otherwise indicated in the contract documents, measured along circle passing through centers of access tubes. If vertical reinforcing steel is not bundled and each bar is not more than 1 inch in diameter, place access tubes 2 inches clear of vertical reinforcing steel. If minimum clearances as specified herein cannot be met due to close spacing of vertical reinforcing steel, bundle access tubes with vertical reinforcing steel.

Install access tubes in straight alignment and as near to parallel to vertical axis of reinforcing steel cage as possible. Access tubes shall extend from bottom of reinforcing steel cage to at least 2 feet above either top of continuous concrete placement operation or top of shaft, whichever is higher. Make splice joints in access tubes watertight if joints are required to achieve full-length access tubes. Clear access tubes of debris and extraneous materials before installing access tubes. Protect access tubes from damage during shaft reinforcing steel cage installation and concrete placement.

Fill access tubes with potable water as soon as possible after concrete placement (but no later than one day after). After filling, reinstall top watertight caps.