

## 810.03

2. **General Methods and Equipment.** Excavate for the drilled pile, to the dimensions and elevations shown on the plans, through whatever materials are encountered. Use methods and equipment suitable for the intended purpose and materials encountered. Secure the Engineer's approval for the general method selected from the following.
  - a. **Dry Construction Method.** Use this method only at sites where the groundwater table is low, seepage is not a problem, and the soil profile is sufficiently stable to support the sides and bottom of the excavation. Drill the excavation, remove accumulated water and loose material from the excavation, and place the drilled pile reinforcing steel and concrete in a dry excavation.
  - b. **Wet Construction Method.** Use this method at sites where a dry excavation cannot be maintained for placement of the concrete. Use water or mineral slurry to maintain stability of caving soils while advancing the excavation to final depth, place the reinforcing cage, and concrete in the drilled excavation. As necessary, desand and clean the slurry; final clean the excavation by means of bailing bucket, air lift, or submersible pump; and place the concrete with a tremie tube or concrete pump beginning at the pile bottom. Provide temporary surface casing to aid drilled pile alignment and position, and to prevent sloughing of the top of the excavation. The Engineer may waive the requirement for a surface casing.
  - c. **Dry Temporary Casing Method.** Use this method where caving soils occur but a relatively dry and stable excavation can be maintained with the use of casing. Install a temporary casing through the caving soils to either the bottom of pile elevation if in dry soil, or to a relatively impermeable strata if ground water is encountered. Remove excess water and soil from within the casing. Advance the casing and excavation simultaneously; however, do not drill outside the casing through caving soil layers. The bottom of the excavation must remain relatively dry and stable long enough to allow placement of the reinforcing steel and concrete. Withdraw the casing while the concrete is in a workable state. Before withdrawing the casing, bring up the level of fresh concrete in the casing so that all fluids behind the casing are displaced upward.

d. **Wet Temporary Casing Method.** Use this method where caving soils occur and a dry excavation cannot be maintained, the soil profile is relatively permeable and the groundwater elevation is above the bottom of pile elevation. Install the casing through the caving soils to the required bottom of pile elevation, then drill the excavation to the required dimensions. Advance the casing and excavation simultaneously, however, do not drill outside the casing through caving soil layers. Maintain a positive pressure differential between the fluid level in the excavation and the groundwater elevation during drilling, excavation and clean out. Place reinforcing steel and either pump or tremie concrete to the bottom of the excavation. Displace water inside the casing with the concrete. Do not pump. This method may involve drilling slurry. Final clean the excavation with a bailing bucket or air lift. Before and during withdrawal of the casing, bring up the level of fresh concrete in the casing so that all fluid trapped behind the casing is displaced upward without contaminating or displacing the shaft concrete.

3. **Casings.** Provide metal casings that are smooth, watertight, and sufficiently strong to withstand handling, installation and the pressure of both concrete and the surrounding earth materials. Provide a casing with inside diameter not less than the size of the pile. Remove all casings from the excavation, except those approved for the permanent casing.

Attach fixtures to aid in the removal of the temporary casing to the top of the casings. Remove temporary casings while the concrete remains workable. Generally, complete concrete placement in the shaft before removing temporary casing. Extract casing slowly, uniformly with the pull in line with the shaft axis. Do not apply eccentric forces that induce undesirable moments in the shaft.

When vibratory extractors are used for casing removal on cantilever foundations requiring two shafts, place both shafts simultaneously and remove the casings while the concrete is in a workable state.

4. **Slurry.** When slurry is employed in the drilling process, submit the slurry properties and construction procedures to the Engineer for approval.