455 STRUCTURES FOUNDATIONS.
(REV 6-14-10) (FA 7-29-10) (1-11)

SUBARTICLE 455-7.5 (Page 544) is deleted and the following substituted:

455-7.5 Preparation for Transportation: Cut any strands protruding beyond the ends of the pile flush with the surface of the concrete using an abrasive cutting blade before transporting the piles from the casting yard.

Cut and patch the metal lifting devices in accordance with 450-9.2.1.

SUBARTICLE 455-16.4 (Pages 570 and 571) is deleted and the following substituted:

455-16.4 Cross-Hole Sonic Logging (CSL) Tubes: Install CSL access tubes full length in all drilled shafts from the tip of shaft to a point high enough above top of shaft to allow cross-hole-sonic-logging testing, but not less than 30 inches above the top of the drilled shaft, ground surface or water surface, whichever is higher. Equally space tubes around circumference of drilled shaft. Securely tie access tubes to the inside of the reinforcing cage and align tubes to be parallel to the vertical axis of the center of the cage. Access tubes must be NPS 1 1/2 Schedule 40 black iron or steel (not galvanized) pipe. Ensure that the CSL access tubes are free from loose rust, scale, dirt, paint, oil and other foreign material. Couple tubes as required with threaded couplers, such that inside of tube remains flush. Seal the bottom and top of the tubes with threaded caps. The tubes, joints and bottom caps shall be watertight. Seal the top of the tubes with lubricated, threaded caps sufficient to prevent the intrusion of foreign materials. Stiffen the cage sufficiently to prevent damage or misalignment of access tubes during the lifting and installation of the cage. Repair or replace any unserviceable tube prior to concreting. Exercise care in removing the caps from the top of the tubes after installation so as not to apply excess torque, hammering or other stress which could break the bond between the tubes and the concrete.

Provide the following number (rounded up to the next whole number of tubes) and configuration of cross-hole sonic logging access tubes in each drilled shaft based on the diameter of the shaft.

Shaft Diameter	Number of Tubes Required	Configuration around the inside of Circular Reinforcing Cage
36 to 48 inches	4	90 degrees apart
Greater than 48 inches	1 tube per foot of Shaft Diameter	360 degrees divided by the Number of Tubes

Insert simulated or mock probes in each cross-hole-sonic access tube prior to concreting to ensure the serviceability of the tube. Fill access tubes with clean potable water and recap prior to concreting. Repair or replace any leaking, misaligned or damaged tubes as in a manner acceptable to the Engineer prior to concreting.

For drilled shaft foundations requiring anchor bolts, verify CSL access tubes will not interfere with anchor bolt installation before excavating the shaft. When CSL access tube

locations conflict with anchor bolt locations, move the CSL access tube location +/- two inches along the inner circumference of the reinforcing cage. Notify the Engineer before excavating the shaft if the CSL access tube locations cannot be moved out of conflict with anchor bolt locations.

SUBARTICLE 455-17.6.1.1 (Page 573) is deleted and the following substituted:

455-17.6.1.1 Equipment: Furnish Cross-Hole-Sonic logging test equipment as follows:

1. Include ultrasonic transmitter and receiver probes for 1.5 inch I.D. pipe which produce measurements with consistent signal strength and arrival time in uniform, good quality concrete with all tube spacings on the project.
2. Include a microprocessor based data acquisition system for display, storage, and transfer of data. Graphically display first pulse Arrival Time (FAT) during data acquisition.
3. Electronically measure and record the relative position (depth) of the probes in the tubes with each CSL signal.
4. Print the CSL logs for report presentation.
5. Provide report quality plots of CSL measurements that identify each individual test.
6. Electronically store each CSL log in digital format, with shaft identification, date, time and test details, including the transmitter and receiver gain.