TESTCONSULT

SPECIFICATION

INTEGRITY TESTING OF FOUNDATIONS BY THE SONIC LOGGING METHOD

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1. GENERAL

The Sonic Logging method measures the propagation time for an ultrasonic signal to travel through concrete from a transmitter to a receiver. In homogeneous concrete the propagation time will be constant at all levels in the pile shaft. Any changes in propagation time are caused by irregularities in the concrete.

Testing is carried out within metal access tubes, cast into the concrete during construction.

Testing will be carried out by Testconsult Limited or another similar approved specialist. The testing company shall hold UKAS accreditation for the Sonic Logging method of assessing foundations and shall be approved by the Engineer.

2. TUBE TYPE

2.1 It is recommended that the access tubing used shall be 38mm i.d., screwed and socketed, medium gauge, varnished mild steel tubing, manufactured according to BS 1387.

2.2 The tubes shall be sufficiently regular and free from defects so as to permit the free unobstructed passage of the probes.

2.3 They shall be watertight, free from corrosion with clean internal and external faces, the latter to ensure a good bond between the concrete and tubes.

2.4 Care shall be taken during concreting not to damage the tubes. If a tremmie is used, it shall not be allowed to rest on top of the tubes during concreting.

3. INSTALLATION OF TUBES

3.1 The tubes shall be fitted with a screw-on steel watertight shoe and shall be securely fixed to the interior of the reinforcement cage, with a minimum cover of a tube diameter from the pile periphery.

3.2 The contractor shall submit his proposals for the installation of the tubes to the engineer prior to construction.

3.3 The tubes shall be installed as near to parallel as possible. Where several sections of tubing are required to reach the full length, the joints shall be made watertight.

3.4 The tubes shall be filled with water and plugged or capped before concreting. The upper end of the tubes shall extend at least 30cm above the top of the foundation concrete, and continue to the very bottom of the foundation.

4. TEST EQUIPMENT

The test equipment shall consist of:

4.1 Ultrasonic probes capable of transmitting and receiving signals through at least 2.0m of sound concrete.

4.2 A data acquisition and transmitting unit capable of measuring a minimum of 50 readings per 1m of pile depth, and defining the whole of the received signal as well as its transmission time. The units shall be capable of displaying the ultrasonic signal during testing and producing waterfall, relative signal energy (dB) and FAT (first arrival time) plots during testing.

4.3 The results shall be presented and hard copied in the form of an ultrasonic log, the vertical scale being depth, and the horizontal scale time.

4.4 An instrumented winch capable of measuring the length tested with a minimum accuracy of +/- 2%.

4.5 Interpretation software that is able to calculate the percentage increase FAT, percentage relative increase in signal energy, manually adjust FAT threshold if required and produce 2D and 3D tomagraphic plots of FAT.

5. TEST PROCEDURE

Levels are to be taken on top of each tube and each tube should be plumbed and the length recorded. These details are to be provided to the testing company together with the toe level and the cut-off level of the pile, before testing commences. A plan shall be provided, showing the layout of piles on the site, and the piles to be tested shall be clearly indicated to the testing engineer together with the numbering used for the tubes.

Tubes shall be checked to ensure they are free from blockages and filled with water, prior to our arrival on site.

Where only 3 tubes per pile are provided, sonic measurements shall be made between each pair of tubes. Where 4 tubes per pile are provided, pairs of tubes around the periphery shall be tested, followed by testing between diagonally opposite tubes.

All tests shall be carried out by lowering the probes to the base of the tubes and raising them simultaneously, maintaining the probes in the same horizontal plane.

5. REPORTING

Reports shall contain the following.

5.1 Copies of each sonic coring log. Each log shall be presented on a sheet with the following information:

- Date of Test
- Site name
- Pile/panel number
- Reference level used (top of tubes/top of concrete/col)
- Profile reference (tube pairs used)
- FAT (first arrival time) plot
- Relative signal energy plot
- Waterfall plot

- Calculation of increase in FAT for significant anomalies

5.2 A record sheet giving

- Pile/Panel number
- Diagram showing tube orientation
- Pile diameter
- Date of pile installation
- Cut-off level
- Toe level
- Top of tube levels
- Calculated tube lengths
- Interpretation of results

5.3 A Tomography Sheet giving

- Pile/Panel number
- 2D tomography plot of significant anomalies
- 3D tomography plot for 3 tube and 4 tube foundations.

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