WORK INSTRUCTIONS FOR ENGINEERS

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CH-009. CHECKLIST FOR STATIC PILE LOAD TEST SUPERVISION

9.0 CHECKLIST FOR STATIC PILE LOAD TEST SUPERVISION

9.1. INTRODUCTION

A checklist for supervision of static pile load test.

9.2. 26.2 DESK STUDY

Study the following Documents and Clarify with Project Engineer.

1) Method statement on Pile installation including driving rig and equipment.
2) Specifications for Materials and Testing (Reinforcement, Grade of concrete and Dimension including end plate and shoes).
3) Construction Drawings. (Shearby for Downdrag pile, Instrumentation Piles).

Review and Comment on the following Construction.

4) S.I. and surface profiles information (Borelogs & other investigation information).
5) Pile Installation Record, Installation Date and Testing Plate (Soil Setup).

9.3. ON SITE SUPERVISION

Refer to the attached self explanation checklist behind.

No.	CHECKLIST ITEMS* *(see next page for explanatory notes on each point.)	CHECKED BY S.O.
1.0	**KENTLEDGE/REACTION FRAME/BI-DIRECTIONAL SETUP**	
1.1	Kentledge weight (nos. of blocks)/ Reaction Piles/Bi-directional (Structural & Geotechnical capacity)	
1.2	Kentledge/ Reaction Piles/Bi-directional supports (arrangement and titling of ground support).	
1.3	Kentledge block arrangement/ Reaction Frame/Bi-directional arrangement (safety)	
1.4	Independent Reference Beam (IRB) (distance, rigid, planting of IRB legs)	
1.5	Pile head preparations (smoothness, levelled tension connection)	
1.6	Bearing plate (no compressible material).	
1.7	Hydraulic Jack (calibration, serial no., technical specs, ram area)	
2.0	**LOAD MEASURING DEVICE**	
2.1	Load Cell (calibration, serial no., specs)	
2.2	Hydraulics Pressure Gauge (calibration, serial no., specs)	
3.0	**PILEHEAD MONITORING DEVICE**	
3.1	Dial Gauges (4 numbers and 2 numbers on Reaction Piles):	
	• Coincide diagonal distance	
	• Calibration	
	• Attachment to rigid IRB	
	• Initial base reading	
	• Seating on glass plate	
3.2	Optical Survey:	
	• Correction for IRB-ruler with equal distance	
	• TBM on fixed datum	
	• Pile head Movement-Ruler on pile.	
	• Reaction Piles Movement-Ruler on pile.	
	• Ruler arrangement (please tick):	
	❑ Increasing value - settlement	
	❑ Decreasing value - settlement	
4.0	**LOADING SEQUENCE**	
4.1	Follow loading sequence procedure	
4.2	Take reading every 15min:	
	1. Load measuring device	
	2. Dial gauges	
	3. Optical survey	
4.3	Check the minimum holding time and the rate of Pilehead movement: (0.25mm/hr)	
5.0	**RECORDS**	
5.1	Take and record readings before and after load increment/decrement and record all necessary info.	
5.2	Client and engineer representative to sign on field sheet record.	
6.0	**MISCELLANEOUS**	
	Ensure the following are provided on site:	

	•	Stop watch and clock • Levelling equipment. • Lighting and torchlight for night measurement.	

Explanatory Notes:

<table>
<tr><th>Item</th><th>Explanation</th></tr>
<tr><td>1.0</td><td>KENTLEDGE SETUP</td></tr>
<tr><td>1.1</td><td>Estimate the weight by counting the number of blocks and multiplied by the weight of each block (~ 1.2 times test load) or check the Structural & Geotechnical capacities of the reaction piles.</td></tr>
<tr><td>1.2</td><td>Check the arrangement of primary and secondary girders and check to make sure no tilting of the ground support blocks and the whole kentledge block or Reaction Frame.</td></tr>
<tr><td>1.3</td><td>Check the kentledge blocks arrangement or Reaction Frame so that they are positioned in a orientation as not to endanger the safety of the personnel underneath the kentledge.</td></tr>
<tr><td>1.4</td><td>Ensure that there are 2 diagonally opposite points (one on each IRB) with equal distance from and coincide to the centre of test pile.</td></tr>
<tr><td></td><td>Ensure that IRB is rigid in frame and must be firmly nailed to ground.</td></tr>
<tr><td></td><td>Check support for IRB placed not less than 3x diameter or 2m, whichever is greater, from the centre of test pile.</td></tr>
<tr><td>1.5</td><td>Ensure that the pile head is smooth and levelled for the seating of steel bearing plate or sufficient Tension connection.</td></tr>
<tr><td>1.6</td><td>Ensure bearing plate used is metal and of no compressible material underneath it.</td></tr>
<tr><td>1.7</td><td>Check the serial number on the hydraulic jack with the calibration certificate and technical specifications (especially the ram area for load conversion).</td></tr>
<tr><td></td><td></td></tr>
<tr><td>2.0</td><td>BI-DIRECTIONAL SETUP</td></tr>
<tr><td>2.1</td><td>For bi-directional pile load test on working pile, the hydraulic jack must be placed below the estimated pile toe level of the working pile. The additional pile length, hydraulic jack and test load required shall be deems inclusive in the quotation.</td></tr>
<tr><td>2.2</td><td>For bi-directional pile test and sacrificial pile, the bi-directional hydraulic jack setup shall be proposed by the contractor and approved by Engineer.</td></tr>
<tr><td>2.3</td><td>For working pile, the contractor shall demonstrate to engineer that the quality of post-grouting works of the jack assembly is acceptable to ensure that the pile is monolithic structure. Any cost and time arises from such demonstration (inclusive of coring works and other suitable pile tests) shall be deems inclusive.</td></tr>
<tr><td></td><td></td></tr>
<tr><td>3.0</td><td>PILE LENGTH MEASUREMENT</td></tr>
<tr><td>3.1</td><td>Pile length shall be measured from pile toe to pile head cut-off level (75mm above the underside of pilecaps).</td></tr>
<tr><td>3.2</td><td>All bored piles shall be concreted to not less than the concrete casting tolerance above cut-off level (A) as follow to ensure that all concrete at and below cut-off level is homogeneous and free of laitance and deleterious matter.
<table>
<tr><th rowspan="2">H* (m)</th><th rowspan="2">A (m)</th><th colspan="2">CONDITION</th></tr>
<tr><th>NO.</th><th>DESCRIPTIONS</th></tr>
<tr><td>0.15 TO ANY DEPTH</td><td>0.3 + H/10</td><td>1</td><td>PILES CAST IN DRY BORE WITHIN PERMANENT CASING OR CUT–OFF LEVEL IN STABLE GROUND BELOW BASE OF CASING</td></tr>
<tr><td>0.15–10.00</td><td>0.3 + H/12 + C/8</td><td>2</td><td>PILES CAST IN DRY BORES USING TEMPORARY CASING OTHER THAN CONDITION NO. 1</td></tr>
<tr><td>0.15–10.00</td><td>1.0 + H/12</td><td>3</td><td>PILES CAST UNDER WATER OR SUPPORT FLUID AND THE CUT–OFF IS WITHIN A PERMANENT LINING TUBE</td></tr>
<tr><td>0.15–10.00</td><td>1.0 + H/12 + C/8</td><td>4</td><td>PILES CAST UNDER WATER OR SUPPORT FLUID OTHER THAN CONDITION NO. 3</td></tr>
</table>
*FOR H>10m, THE CASTING TOLERANCE APPLYING TO H = 10m SHALL APPLY.
H = CUT–OFF DISTANCE BELOW COMMENCING SURFACE.
C = LENGTH OF TEMPORARY CASING BELOW THE COMMENCING SURFACE.</td></tr>
<tr><td>3.3</td><td>If rock is encountered during the construction works, Contractor shall inform the Client and Engineer Representative to verify the length of drilling in rock and record in the boring record sheet</td></tr>
<tr><td>3.4</td><td>Contractor shall provide at least a set of point load test machine at site for the necessary testing to determine/ confirm rock coring.</td></tr>
<tr><td></td><td></td></tr>
<tr><td>4.0</td><td>LOAD MEASURING DEVICE</td></tr>
<tr><td>4.1</td><td>Check the serial number on the Load Cell with the calibration certificate and technical specifications.</td></tr>
<tr><td></td><td>Ensure that the load cell is concentric with the test pile.</td></tr>
</table>

4.2	Check the serial number on the Hydraulics Pressure Gauge with the calibration certificate.
5.0	**PILE HEAD MOVEMENT MONITORING DEVICE**
5.1	***Coincide diagonal distance:*** Four dial gauges attached to the IRB and with the needle seating on glass plates at the bearing plate on test pile head must be equal distance and coincide from the centre of test pile. ***Calibration:*** Check the serial number on the Load Cell with the calibration certificate, and technical specifications. ***Attachment to rigid IRB:*** The dial gauges must be rigidly fixed to the IRB. ***Initial base reading:*** Record the initial base reading on the dial gauges before loading the first load increment.
5.2	***Correction for IRB:*** Ensure two rulers on the IRB, which must be diagonally opposite (one on each IRB), equal distance from and coincide to the centre of test pile. ***TBM on fixed datum:*** Ensure that the TBM are located on firm and secure datum. ***Pile Head Movement:*** Take optical readings of the pile head movement and the IRB points (2). ***Reaction Pile Movement:*** Take optical readings of the pile head movement. ***Ruler Arrangement:*** Please put rulers with clear readings (in mm) on each point on the IRB and indicate which option used: ❑ Increasing value – indicates settlement. ❑ Decreasing value – indicates settlement.
6.0	**LOADING SEQUENCE**
6.1	Follow the loading sequence as in the specifications and a copy shall be stick on the Jack for reference.
6.2	Take the readings at every 15min of the dial gauges, optical survey of the IRB and the load measuring device (load cell + pressure gauge)
6.3	Check the rate of settlement (0.25mm/60 min) and the minimum holding time, whichever is greater.
7.0	**RECORDS**
7.1	Record all the necessary information as in the specification about the pile and test setup details. Immediately record down the readings on the field record sheet after taking the readings, which includes before and after each load increment/decrement.
7.2	After the static load test is completed or abandoned, the client and the engineer representative are to sign on the field record sheet.
8.0	MISC: Ensure that stopwatch for time keeping and levelling equipment for optical measurement is provided sufficiently.