

WORK INSTRUCTIONS FOR ENGINEERS

Compiled by : _____ NHB

Checked by : _____ LSS

Approved by : _____ GSS

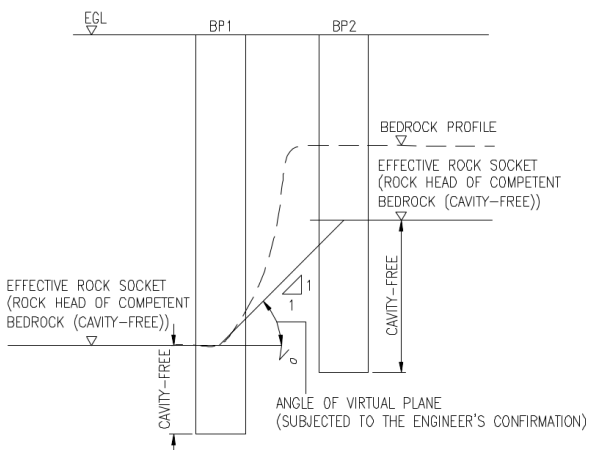
**CH-016. CHECKLIST FOR BORED
CAST-IN-PLACE PILE**

~~CHECKLIST FOR BORED CAST-IN-PLACE PILE~~

16.0 CHECKLIST FOR BORED CAST-IN-PLACE PILE

	CHECKLIST ITEMS	Checked By Engineer	Remarks
	Project Name : _____ Piling Contractor : _____		
1.0	CONSTRUCTION METHOD AND TECHNIQUES		
	• Pile Diameter _____ • Concrete Grade _____ • Pile Raked Gradient _____ Vertical : _____ Horizontal		
	• Grab Construction (Using Crawler Crane, Casing Oscillator, etc) • Rotary Drilling (Contiguous Flight Auger, Twin Head Rotary Drive) • Rock Coring (Chisel, Core Barrel, Cross Head Cutter, Reamer, etc.)	☐ ☐ ☐	
	• Direct Circulation Drill • Indirect Circulation Drill	☐ ☐	
	Concreting Method • Poured (With Tremie for Wet Hole Construction) • Injected	☐ ☐	
	Reinforcement • Reinforcement Cage : Main _____ Link _____ (eg. 32T20) (eg. T12 @ 150 Spiral) [Note: T = 460 N/mm ² , Y = 410 N/mm ² , R = 250 N/mm ²] • Lapping Length : _____ • Concrete Cover/ Spacer : _____		
	• All measuring devices (ruler, measuring tape, spirit bubble and etc.) shall be checked and verified.	☐	
2.0	PILING EQUIPMENT AND ACCESSORIES		
	Excavator: • Crawler Crane (Grab method) • Rotary Drive (Continuous Flight Auger, Twin Rotary Head)		
	• Temporary Casing		
	• Drilling Fluid (Bentonite or other Slurry Stabilisation)		
	• Concrete Tremie Pipe (for concreting under water or wet hole) • Hover with short length of chute (direct discharge method for dry hole)	☐ ☐	
3.0	PILE POSITION SETTING UP		

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	Three reference points to be setup with respect to the proposed pile point.	☐	
4.0	BORED PILE CONSTRUCTION		
	Predrilling - To determine the bored pile length - To check verticality of borehole - To check any deviation in the distance of pile point to the reference points after soil boring.	☐ ☐ ☐	
	Stability Of Borehole - Temporary steel casing with appropriate size and length (minimum 1m or below the unstable strata) should be applied to prevent loose materials falling into the bottom of borehole. - Borehole to be filled with drilling fluid to stabilise the borehole [See note ##] unless stiff clayey soils are encountered.	☐ ☐	
	Verification of Bedrock - Inspection of the excavated rock fragments - The depth achieved (rock encountered / total length) to be compared with the borehole data and checked by a measurement tape. - The bottom soundness is checked with a weight on a tape tamped on the founding strata. - In-situ rock strength test (e.g. Point Load Test) to be conducted [See note ##]	☐ ☐ ☐ ☐	
	Verification of Bedrock (Limestone) - The piling works have commenced from the lowest anticipated rock head of competent bedrock within the same pile group. - The design of rock socket lengthening has considered the situation of large differences in rock levels within the same pile group and adjacent single pile group. A virtual plane is projected from the lowest rock level along the circumferential line of 2.5 or 2.0 times pile diameter, from the pile centreline. The point of intersection between the projected line and the pile centreline is taken as the highest effective rock commencement level, as indicated in the following sketch:  - The tabulation of estimated rock head levels of competent bedrock (cavity-free) for each bored pile have been	☐ ☐	

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	compared with the actual rock head level encountered during rock coring. <table border="1" data-bbox="277 300 1034 667"> <thead> <tr> <th>Bored Pile Ref.</th> <th>Estimated Rock Head of Competent Bedrock (Cavity-free) (RL)</th> <th>Actual Rock Head of Competent Bedrock (Cavity-free) (RL)(Note ³)</th> <th>Status (Note ^{1&2})</th> </tr> </thead> <tbody> <tr> <td>BP 001-1</td> <td>50.00</td> <td>49.00</td> <td>Acceptable</td> </tr> <tr> <td>BP 001-2</td> <td>50.10</td> <td>51.50</td> <td>Acceptable</td> </tr> <tr> <td>BP 001-3</td> <td>50.20</td> <td>47.00</td> <td>Not Acceptable</td> </tr> <tr> <td>BP 001-4</td> <td>50.30</td> <td>53.00</td> <td>Not Acceptable</td> </tr> </tbody> </table> Note 1: Variations of ± 2 meters between the estimated and actual rock head (cavity free) are considered acceptable; deviations beyond this threshold must be brought to the Engineer's attention (subjected to the Project Director's confirmation). Note 2: Minimum one (1) verification rock probe shall be drilled if the variation exceeds ± 2 meters (subjected to the Project Director's confirmation). Note 3: To be tabulated during rock coring for bored piling works.	Bored Pile Ref.	Estimated Rock Head of Competent Bedrock (Cavity-free) (RL)	Actual Rock Head of Competent Bedrock (Cavity-free) (RL)(Note ³)	Status (Note ^{1&2})	BP 001-1	50.00	49.00	Acceptable	BP 001-2	50.10	51.50	Acceptable	BP 001-3	50.20	47.00	Not Acceptable	BP 001-4	50.30	53.00	Not Acceptable	☐	
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	Airlifting (Base Cleaning) • Use cleaning bucket to clean the base before carrying out air lifting. • To ensure the cleanliness of the loose and caving-in soil at base. • Make sure the hose is at the base of the pile (not suspended half-way).	☐ ☐ ☐																					
	Reinforcement Cage • The length of the cages should match with the excavated depth. • Insert fabricated reinforcement cage into the cased borehole • Full-time supervision during insertion of reinforcement cage and fabrication of sonic logging tube and during lowering to prevent them from deliberately blocking the sonic logging tube.	☐ ☐ ☐																					
	Check Lap length (if any)	☐																					
5.0	CONCRETING																						
	• Concrete overbreak after each batch of concreting • Pour in concrete (by tremie concrete method or direct discharge method), simultaneously displacing slurry. • Check the density of fluid as in the specification. • The bottom end of the tremie pipe should be always about one to two metres submerged below the level of the concrete. (Not to pull up too abrupt) • Concreting could only be stopped at about 1m above the cut-off level • Record any interruption on concreting (record the duration)	☐ ☐ ☐ ☐ ☐																					

	• Test Cube : - o at least 6 Nos. - o achieve design strength (within 28 days) • Concrete Slump Test • Record : - o Number of trucks - o Discharge amount per trucks	☐ ☐ ☐ ☐	
6.0	PROOF DRILLING		
	Core drilling to be carried out through piles to check the qualities of • Concrete • Contact between the rock and concrete • Quality of the rock beneath the toe	☐	
7.0	CHECK BORED PILE SHAFT INTEGRITY		
	• Use High Strain Dynamic Load Test (HSDLT) • Pile Integrity Test (PIT). • Sonic Logging	☐ ☐ ☐	
8.0	POST-INSTALLATION		
	Penetration length • Piling Platform level : _____ • Borehole Drilling Record : _____ • Predicted Length at site : _____ (from HSDLT or PIT)		
	Compared penetration lengths with Borehole or Proof Drilling from Subsurface Investigation.	☐	
	Check As-built position of the bored pile group (Typically eccentricity < 75mm)	☐	
9.0	COMPUTATION	☐	
	Estimate the amount of concrete and materials for each piles.		
	Signature by Engineer		

Note : [##] represents the items that will be followed if only necessary.

[illegible]