



TRANSNET SOC LTD

**DCT BERTHS 203 TO 205 - RECONSTRUCTION, DEEPENING AND
LENGTHENING**

PORT OF DURBAN

SPECIFICATION – REAR CRANE RAIL PILES

1785-CO-000-C-SPC-0006 Rev T-00

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1.0 SCOPE

1.1 Project

This specification is a project specific technical specification for the DCT Berths 203 to 205 Reconstruction, Deepening and Lengthening Project in the Port of Durban.

1.2 Definitions

All definitions of responsibilities shall be in accordance with the NEC Engineering and Construction Contract (ECC) for the construction of the *works*.

Where the standard specifications referenced in this specification refer to the “Engineer”, replace this term with the term “*Supervisor*”.

1.3 Scope

The scope of this specification covers the *Employer’s* requirement for the installation of a group of cast in situ displacement piles which support the rear crane rail beam.

2.0 NORMATIVE REFERENCES

The following *Employer* and industry standardised specifications are referenced in this specification and form part of the Works Information.

2.1 Reference Documents

The *works* shall be carried out as specified in the following documents:

- a) This Specification
- b) Industry Codes, Standards and Specifications as listed in Section 2.2
- c) Employer’s Project Specific Technical Specifications as listed in Section 2.1
- d) Project Drawings:
 - 1785-CO-100 series of drawings – Rear Crane Rail Piles and Beam
- e) Method statement prepared by the Contractor, as described in Section 4
- f) Project Geotechnical Reports, included in Part 4 - Site Information

2.2 Standard Specifications

The *Contractor* shall provide and maintain current copies of all the standard specifications referred to herein below on the site for reference by both parties.

The governing standard for this specification shall be the latest version of:

- a) BS EN 12699:2015. Execution of special geotechnical works. Displacement piles

Which shall apply in its entirety except for the variations and additions detailed in the specification clauses below.

Installation of the rear crane rail piles shall comply with the following standard specifications:

- a) SANS 1200 F:1983 – Piling.
- b) BS EN 16228:2014. Drilling and foundation equipment. Series on safety.

2.3 Employer’s Project Specific Specifications and Standards

The installation of the rear crane rail piles shall also comply with the following Project Specific Specifications and Standards:

- a) 1785-CO-000-C-SPC-0001 – Concrete for Marine Construction
- b) 1785-CO-000-C-SPC-0004 – Dredging and Reclamation (Including Vibro Compaction)
- c) 1785-CO-000-C-SPC-0007 – Paving

- d) Project Environmental Specifications (PES) as contained in the Works Information and annexures

3.0 DEFINITIONS

All definitions of responsibilities shall be in accordance with the NEC Engineering and Construction Contract (ECC) for the construction of the *works*.

Where the standard specifications referenced in this specification refer to the “Engineer”, replace this term with the term “*Supervisor*”.

For the purpose of this specification, the technical definitions and abbreviations given in BS EN 12699, together with the following definitions shall apply:

3.1 Chart Datum Port

Chart Datum Port refers to the reference level used in the Port of Durban, which is 0,900 m below Mean Sea Level. All levels referred to in this document are relative to Chart Datum Port (CDP).

3.2 Co-ordinate System

The co-ordinate system to be used for all setting out and survey shall be World Geodetic System 1984 (WGS84), L031, referred to as WG31.

3.3 Tidal Levels

The Astronomical Tide Predictions as defined by the SA Navy Hydrographer and Chart SAN 2006 are as follows:

Table 3.1 – Tide Data

Tide	Abbreviation	Level m, Chart Datum Port
Highest Astronomical Tide	HAT	2.287
Mean High Water Springs	MHWS	1.997
Mean Level	ML	1.097
Mean Low Water Springs	MLWS	0.197
Lowest Astronomical Tide	LAT	-0.013

3.4 Method Statements

Method Statements shall be compiled by the *Contractor* for all activities. The Method Statements shall be submitted to the *Supervisor* for acceptance three weeks in advance of the particular activity being undertaken. Full details of all proposed Equipment (including temporary works) and methods shall be provided for acceptance by the *Supervisor*. No activity shall commence until the method statement has been accepted by the *Supervisor*.

Further details of the requirements of particular method statements are provided in Section 4.

4.0 REQUIREMENTS

4.1 Method Statements

The Contractor shall prepare method statements that shall include, *inter alia*:

- a) Details of the all the Materials and Equipment as per Section 4.2 and Section 4.3.
- b) Descriptions and ratings of other installation Equipment not covered here including cranes and power packs.
- c) Details of the methods and procedures for the safe use of all of the Equipment and for all of the piling activities.
- d) Details of the methods and procedures for transport, handling and storage of all of the Materials and Equipment.
- e) Details of the methods and procedures for installing the piles.
- f) Details of the methods and procedures for expanding the base of the piles.
- g) Details of the methods and procedures to help facilitate driving.
- h) Details of the methods and procedures for cutting and trimming piles.
- i) Details of the methods and procedures for monitoring the pile installation.
- j) Details of the methods and procedures for the pile load tests.
- k) Details of the method and procedures for ensuring the piles are installed to the tolerances specified in Section 5.4.

4.2 Materials

4.2.1 General

All material and products shall meet the requirements detailed in the project specification, Concrete for marine construction (1785-CO-000-C-SPC-0001) and this specification.

4.3 Equipment

The piling Equipment shall comply with EN 12699 and EN 16228.

4.4 Methods and Procedures

4.4.1 General

All plant, materials and operations employed in the formation of a pile shall be such as to ensure that the completed pile satisfies the minimum required cross section and material requirements of this specification.

4.4.2 Methodology

The piles shall be installed by driving a closed ended tube (concrete shell or temporary casing) forming the hole. An enlarged base shall be formed followed by placement of the reinforcing cage and high slump concrete. The temporary shell or casing is finally extracted.

The method of forming the enlarged base shall be as follows:

1. A plug is placed in the piling tube.
2. The tube is driven.
3. On reaching the founding level the tube is held by the extracting gear while the plug is expelled.
4. Measured quantities of relatively dry concrete are expelled from the toe of the tube thus forming an enlarged base.

4.4.3 Enlarged base

The enlarged base shall have a volume of 0.32 m³ as shown on the drawings. The detailed methodology for base enlargement shall be agreed with the *Supervisor* before the commencement of the *works*.

4.4.4 Sequence of installation

The rear crane pile shall be installed after the reclamation compaction (Project specification SPC-0004) and before the installation of the pavement layerworks (Project specification SPC-0007).

4.4.5 Driving assistance

Driving assistance such as predriving, preboring, water jetting, shall be planned by the *Contractor* and approved by the *Supervisor* prior to start of work and shall only be permitted if it has no adverse effect on the pile end bearing and friction capacity.

4.4.6 Trimming of the pile to cut-off level

The cut-off levels for the piles are shown on the drawings. The top 300 mm of the pile shall be broken down or cut-off after casting, removing any poor quality concrete.

4.5 Record Keeping

- a) Site records shall be in accordance with BS EN 12699.
- b) Pile load test reporting and record keeping shall be in accordance with SANS 1200 F.

5.0 COMPLIANCE WITH REQUIREMENTS

5.1 Sampling and Testing of Concrete

All sampling and testing of concrete shall comply with the project specification, Concrete for marine construction (1785-CO-000-C-SPC-0001).

5.2 Supervision and Monitoring

Supervision and monitoring shall be in general accordance with BS EN 12699.

The full driving record of the piles should be recorded.

5.3 Pile Testing

The *Contractor* is required to undertake a minimum of two static pile load tests per construction phase. Additional static loads tests may be requested by the *Supervisor* following a review of the pile load test results.

The load tests shall be in accordance with SANS 1200F and the “British Procedure”. The test pile location shall be approved by the *Supervisor*.

In addition to the requirements of clause 7.6 of SANS 1200 F, the total deflection of the top of a pile (including elastic shortening of the pile) shall not exceed the following:

- a) When the pile is loaded to the working load the total vertical deflection shall not exceed 10 mm.
- b) When the pile is loaded to 1.5 times the working load the total vertical deflection shall not exceed 18 mm.
- c) The individual pile working load is 2250 kN.

5.4 Tolerances

The tolerances on position, verticality, dimensions and bow shall be in accordance with Section 6 of SANS 1200 F.

For the recording of construction deviations the centre of a cast in situ pile is considered as the centre of the largest circle which can be drawn within the section of the pile head.

The *Contractor* shall ensure that cumulative tolerances meet with tolerance requirements as defined within this specification.