



SOUTH BREAKWATER BERTHS

BERTH QUAY WALL PROJECT

Project Name	South Breakwater Berths
Client	Athena SA
Engineer	Moth MacDonald
Location	Port of Fujairah, UAE
Product	Sheet Piles, H Pile & Tie Rods
Total Tonnage	8,903 MT

INTRODUCTION

ESC was asked to look into the alternative for a design that proposed using an H Pile and sheet pile system from Europe for the construction of this vital part of the Port of Fujairah.

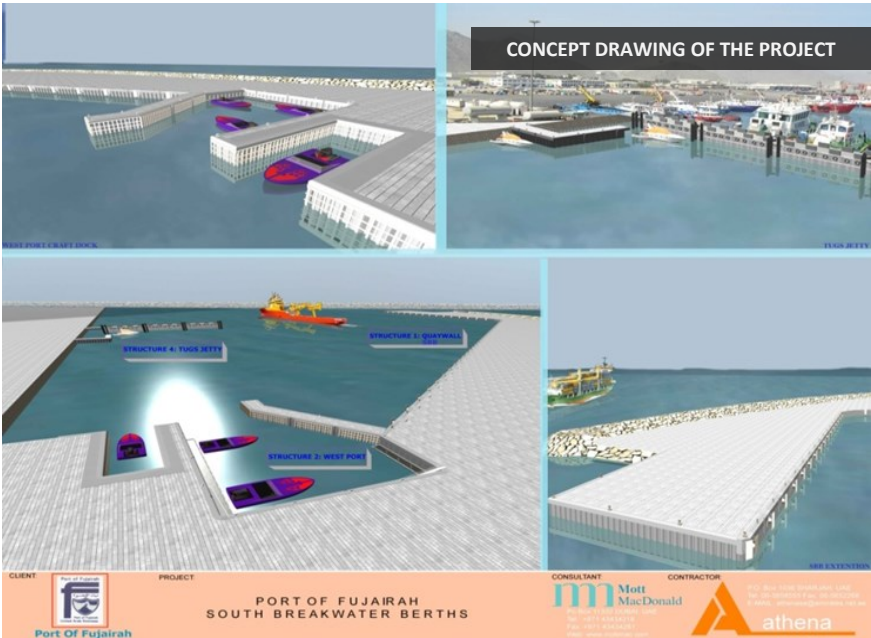
Working closely with Athena SA, ESC proposed the ESC H Pile system which eventually won the award from the Port of Fujairah and their Engineer's Mott MacDonald of the United Kingdom. During the course of the design stage of the project ESC held site meetings in the UAE and video conferencing calls with Mott MacDonald's geotechnical and structural team in London, England. ESC ensured that all facets required by the Client and their Engineers were able to be met.

ESC not only worked with the owners but the contractor Athena SA had constant site visits and communication from ESC both during the design stage and the implementation stage of the project. Designs of the wall system took into account the preferred method of construction detailed by Athena SA and were adapted accordingly whilst at the same time ensuring the stringent safety factors of the Clients Engineers were followed in terms of the seismic and structural conditions.

The Port of Fujairah proposed to construct a new quay wall and associated works at the existing facility. The type of wall to be used will be an embedded sheet pile

wall, restrained by tie rods to a buried sheet pile anchor wall. The scope of works covered the following structures;

- STRUCTURE 1: South Breakwater Berth Quay Wall
- STRUCTURE 2: West Port Craft Dock
- STRUCTURE 3: Tugs Jetty

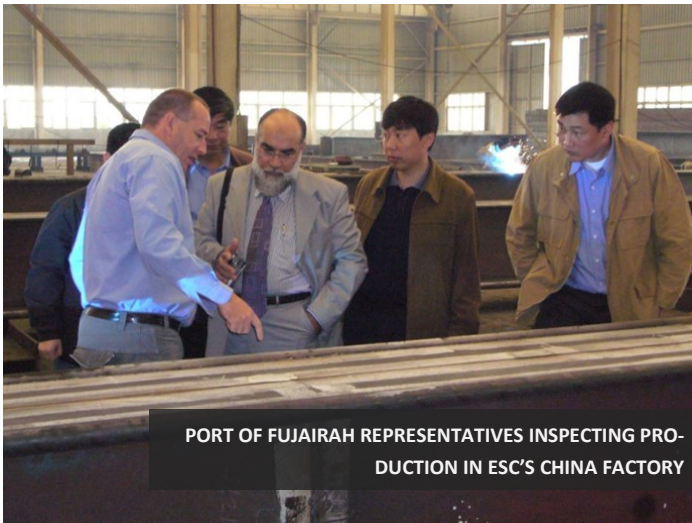


ESC SCOPE OF SUPPLY

SHEET PILES, H PILES, TIE RODS

The scope of the design covered;

- Evaluation of geological data and existing site conditions to determine a range of geotechnical parameters for use in the designs.
- Analysis of the retaining wall and restraint system given the geotechnical parameters, site requirements and loading considerations, including seismic design.
- Specification and design of necessary sheet pile and tie rod components to withstand the calculated geotechnical and imposed loads
- Evaluation of the corrosion conditions, and design of the sheet pile system components to accommodate these conditions, including specification of protective coatings



STRUCTURAL SPECIFICATIONS FOR SHEET PILES

WALL TYPE	PILE TYPE	PILE LENGTH (m)	MAX. SECTION MODULUS cm^3/m	DESIGN STRESS N/mm^2
Main Wall	ESC H70/30A-2/10a-F	25.0m	6,795	345
Anchor Wall	ESC14BP-6157	6.0m	1,815	345

PROJECT DETAILS

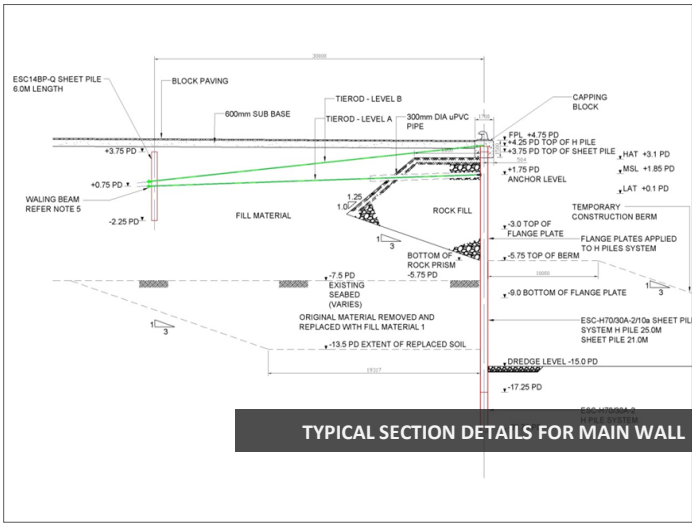
The British Standards were used as the basis for the design, unless specifically stated otherwise by the Engineer. These standards will include, but not be limited to the following:

Code	Title
BS5950	Structural Use of Steelwork in Building
BS6349	Marine Structures
BS8002	Earth Retaining Structures
BS8081	Ground Anchorages
BS EN 10249	Cold Formed Sheet Piling of Non Alloy Steels
BS EN 12063	Execution of Special Geotechnical Work—Sheet Pile Walls
Other publications that were referred to were;	
PIANC – “Seismic Design Guidelines for Port Structures”	
Global Seismic Hazard Assessment Program – Global Seismic Hazard Map 1999	

COATING REQUIREMENTS

The specified coating for the sheet piles is for shot blasting followed by 2 layers of 250 micron Jotamastic 87. The coating is to be applied to the top 5.5m front and back surface for main wall; while for anchor wall , the coating is applied to whole length both sides of piles.

All calculations for structural capacity of the sheet pile systems were



performed post corrosion loss.

The tierod system was designed based on the loads calculated in R 05. Design loads for the tie rod calculations were taken as the working loads with a factor of 2.0, or the seismic loads with a factor of 1.0, whichever is greater. All components of the tie rod system including connections and waling were designed to have to have at least the same capacity of the tierod itself. All calculations were performed post corrosion loss to the tie rod system and its components.

PROJECT MATERIALS



H PILE PRODUCTS READY TO BE SHIPPED AFTER COMPLETED PAINTING WORKS AND PROTECTIVE WRAPPING PUT IN PLACE



SACRIFICIAL ANODE FOR ADDED CORROSION PROTECTION

ON-SITE INSTALLATION



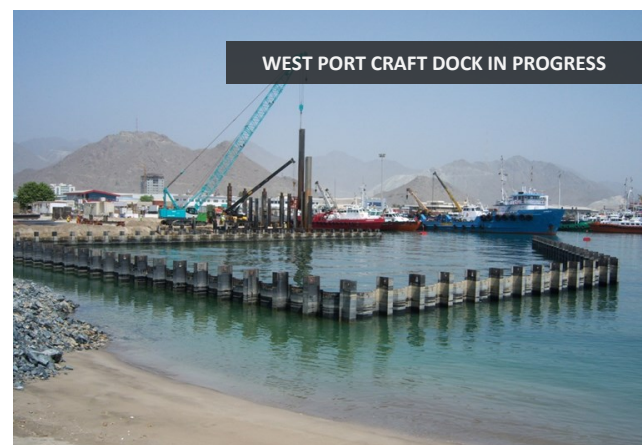
TUGS JETTY BARGE INSTALLATION BEGINS US-



TUGS JETTY SHEET PILE AND TIE RODS COMPLETE



CAPPING BEAM INSTALLATION BEGINS AT WEST PORT CRAFT DOCK



WEST PORT CRAFT DOCK IN PROGRESS

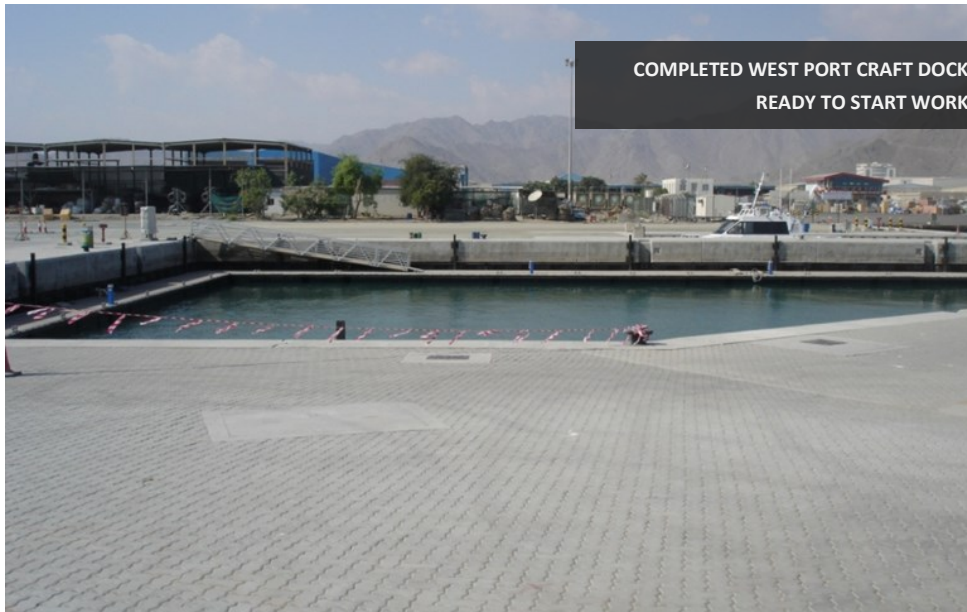
ON-SITE INSTALLATION



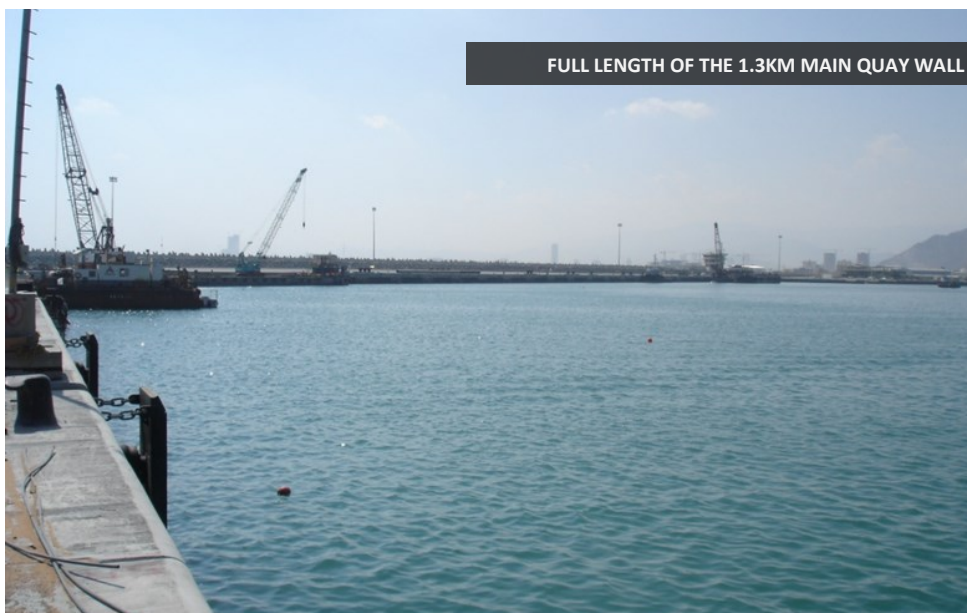
PROJECT COMPLETED



FINAL TOUCHES AT SOUTH BREAKWATER
BERTHS AND ITS READY FOR USE



COMPLETED WEST PORT CRAFT DOCK
READY TO START WORK



FULL LENGTH OF THE 1.3KM MAIN QUAY WALL