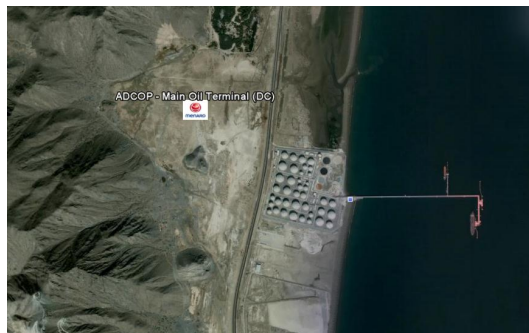


ABU DHABI CRUDE OIL PIPELINE

MAIN OIL TERMINAL

FUJAIRAH – UAE

DYNAMIC COMPACTION



Category: Industrial / Oil & Gas / Tanks
Developer: IPIC
Engineer: ILF
Contractor: CPECC
Area / Quantity: 700,000 m²



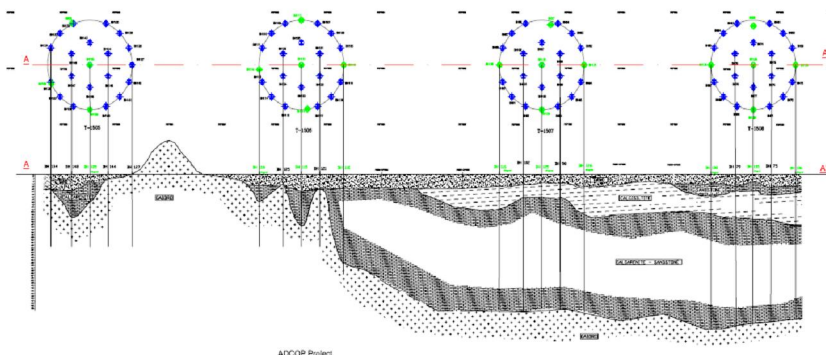
PROJECT DESCRIPTION

MOT (Main Oil Terminal) is a part of the huge ADCOP Project (Abu Dhabi Crude Oil Pipeline) consisting of a pipeline construction 370 km long between ABU DABHI and eastern coast of UAE. The MOT is composed of 8 Tanks with a diameter of 110 m and 20m high placed on a 1.2km x 0.8km Platform. The purpose of this project is to limit Oil Transportation via Tankers across Dortmund Strait and within the Gulf.

As part of this huge ADCOP project MENARD has been awarded to design & improve the soil by Dynamic Compaction under MOT including two different scopes:

- TANK FOOT PRINTS AREA including 10m offset (106,000sqm.)
- PLATFORM AREA (surrounding the tanks). The total platform area is about 600,000sqm.

SOIL CONDITION / GEOTECHNICAL PROBLEM



The site is located nearby the coast onto the famous OMANI Ophiolit. The preliminary geotechnical investigation report showed that the site's ground conditions were very heterogeneous, with Igneous Gabbros varying from the surface down to 50m deep and presence of soft clayey peat which is to be removed.

Groundwater was located about 2 m below the original ground level.

It can be noted that the project required the ground to be elevated 3 to 6m above natural ground with fill material extracted from blasting of surrounding hills.

The Main Geotechnical Issue of this project was to verify the differential settlement around the shell in respect of the huge size of the TANK and the presence of "underground canyons" due to irregular bedrock.



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MENARD SOLUTION

The soil improvement works has been conducted in 3 steps:

- 1) Removal of fine grained material down to 3-7m deep and replacement by crushed material from mountain blast.
- 2) Heavy Dynamic Compaction from a 2m thick platform over tank footprint to transmit deep energy.
- 3) Light Dynamic Compaction for final ironing of Tank foundation.

The designed energy to be applied under the TANKS has been closely controlled function of the soil conditions. Around 220 preliminary boreholes were performed to cover the whole Area.



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QUALITY CONTROL / CALCULATIONS

Quality Control consisted of several Trials Areas for the performance of TANKS settlement calculations including Cone penetration tests, pressuremeter tests and boreholes. Then the PMT was considered as relevant test for Post-DC treatment.

Settlement calculations were conducted by combination of axisymetrical and plane strain soil model by using Plaxis - FEM methodology. The challenge was to reflect the actual ground conditions in the soil modeling.

