

Liquefied natural gas train

Arzew

Soil reinforcement via jet grouting.



The project

This project involved the construction of a liquefied natural gas train in the Arzew industrial zone as well as four tanks (two LNG, one Propane and one Butane) enabling a production yield of 4.3 million tonnes of liquefiable gas.

The challenge

The soil study carried out by the "Laboratoire des Travaux Publics de l'Ouest" revealed the successive presence of the following layers:

- A layer of sand with a thickness varying from 0 to 5 metres;
- A layer of sandstone (calcarinite) with a thickness varying from 1 to 6 metres; and
- A layer of altered marl with a thickness varying from 2 to 7 metres.

The solution

Keller installed 16,600 ml of jet grouted columns (double air jet) with cement injection at 400 bars to treat:

- Settlement resulting from variations in the thickness of the sand layer on the surface.
- The sandstone-marl interface to eliminate the risk of water circulation and dissolution of the sandstone layer.

The execution of the jet grouted columns was done in two phases. First was water and air drilling with grouting (400 bar) on the way up.

A static mesh loading test was done to verify that the ground and spray column assembly could achieve permitted settlement. The reaction range was:

- Eight diwidag bars anchored in jet grouting columns,
- Beams to hold the anchors,
- Cylinder and pump assembly with a capacity of 800 tons.

The distribution mass was a concrete slab of 3.05 metres x 3.05 metres. Tiered loading was up to 500 tonnes over a 24-hour period.

Vibrating string instrumentation was used to calculate force distribution within the column (lateral friction distribution).

Project facts

Owner(s)

Sonatrach

Keller business unit(s)

Keller Algeria

Main contractor(s)

JV Saipem-Snamprogetti-Chidoya

Solutions

Bearing capacity / settlement control
Seepage control

Markets

Power

Techniques

Jet grouting

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