

Construction of a metro central control station

Algiers

Reinforcement of the ground using wet vibro stone columns for the metro command and control centre in Algiers.



The project

The project involved the construction of a central control post for the Algiers metro. The structure was based on an invert under which Keller carried out an liquefaction mitigation via stone columns.

The challenge

The ground comprised sands that were more or less clayey and consolidated down to the base, ie between 10 and 12 metres for the SPT tests and 11 metres for the pressuremeter holes. One of the pressuremetric soundings showed marl from a depth of about 6 metres below the platform elevation while the water level was raised to a depth of about 10 metres in relation to the T.N., 6 metres below the platform elevation.

The building, located in seismic zone III, was based on a one metre thick invert with stresses on the ground of 130 kPa.

Keller's soil treatment was to:

- Guarantee removal of the risk of liquefaction by significantly increasing shear strength and drainage, allowing almost instantaneous dissipation of pore pressure in treated sands;
- Increase and homogenise the bearing capacity of the treated surfaces;
- Reduce and homogenise the settlement of the treated layers.

The presence of a very hard layer in the head forced us to use an auger to make pre-holes and install optimal quality stone columns without damaging equipment within the deadline.

The solution

In total, 291 stone columns were built at depths of between four and five metres, according to three different mesh types: 2.00 metre x 2.00 metre, 1.80 metre x 1.80 metre, 3.00 metre x 3.00 metre. A loading test was carried out as par of the project and six columns tested with a heavy dynamic penetrometer.

Project facts

Owner(s)

Ministry of transportation

Keller business unit(s)

Keller Algeria

Main contractor(s)

Vinci

Solutions

Liquefaction mitigation

Bearing capacity / settlement control

Markets

Infrastructure

Techniques

Vibro stone columns / Vibro replacement

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