MebraDrain

Project report

Brass, Nigeria

The method
Vertical wick drains can be used for soil stabilization in areas with compressible and water saturated soils. When loads such as road embankments, hydraulic fills or dikes are placed on soft compressible soils, significant settlement may occur and this in turn could create serious problems. MebraDrain installed, evenly spaced, into the depth of the compressible layer, will allow pore water to flow in a horizontal direction to the nearest drain and escape freely, thereby reducing the consolidation period significantly.

The project
Brass LNG was engaged in a project to design, build and operate a liquefied natural gas plant and associated facilities. The project’s objective is to monetize the abundant gas resources and reduce flaring of associated gas through the production of LNG, LPG and C5 Liquids through the construction of this facility on Brass Island.

The project site is located along the shoreline at the mouth of the Brass River, near Brass town, in Bayelsa State of Nigeria. For the future LNG, LPG and condensate tank areas three preloads of 18 meter high had to be constructed to force and speed up settlement and minimize future settlements. In total ca. 1,000,000 m³ of vertical drainage Mebradrain MD-88H needed to be installed on the three tank areas before the preloads could be constructed. On top of the vertical drains a grid of horizontal drains Nudrain ED86 was required to ensure enough flow capacity for the extracted water to the ditches around. In total 25,000 m³ of horizontal drainage has been installed.

Because of the heavy rains and thunderstorms during rain season in Nigeria the complete sand embankment had to be covered with a HDPE plastic to prevent washouts and ensure stability of the construction.

Equipment
For this project Cofra mobilized the following equipment. An O&K RH40E excavator with our heavy MY325 winch rig. To ensure installation through the dense top layers two Down The Hole drilling sets were brought to site. One CAT385 and one CAT330 complete with drill rig, both accompanied by an Atlas Copco air compressor. To assist this all also a CAT980 wheel loader was mobilized.

Drain configuration
After pre drilling of dense sand layers on 25,000 drain locations up to depths of 24 m below ground surface, vertical drains were installed up to a maximum depth of 45 meter in a triangle spacing varying between 1.5 and 3.0 meters.

Review
All drainage works, vertical as horizontal, have been executed satisfactorily according to design to ensure all future rest settlements are brought to a minimum.