info

Superporto do Sudeste - ground improvement for stockyard handling facility

A new stockyard and port facility is being erected at Ilha da Madeira, Itaguaí in the state of Rio de Janeiro. The facility, which is located partly in an area of very soft cohesive soil, will handle up to 50 million ton of irons ore per year. Owner of the port is LLX, a company in the OSX group.
Keller was awarded by the main contractor consortium A.R.G./Civil port the execution of extensive ground improvement works necessary to allow for the stockpiling of extremely heavy iron ore heaps. The total ground pressure generated from 16 m of iron ore heaps is approx. 50 tons/m^2. The purpose of the treatment is to control settlements as well as improving stability.

Soil conditions

Ground improvement is performed in an area characterized by mangue vegetation. The average depth of the soft silty clay is 9m. Underlying the clay is competent residual soil.

Stone columns ground improvement solution

The works include ground improvement using dry bottom feed stone columns for the stockyard as well as an perimeter access road and a loop railway. The column grid commonly used is 1,75 x 1,75m. The improvements achieved by installing stone columns can be summarized as follows:

- Accelerated rate of consolidation due to the large drainage effect of the columns,
- Reduced total settlement due to the high modulus of deformation in the columns,
- Increased stability due to the high shear capacity of the stone columns.

Keller opted to perform the works using mainly leader mounted Vibrocats. These machines are relatively light weight with high productivity. The work is performed 24 hrs/day six days per week to shorten construction time to a minimum.

Quality assurance

The area is subdivided into manageable zones and a target depth is established for each zone based on the available SPT soundings. For each column, the operator inserts the vibrator tool to refusal depth. This depth of refusal is compared with the target depth for early detection of local variations of the soft soil depth. For every column the compaction effect is continuously controlled and the main contractor is provided daily with installation records showing all quality affecting parameters including a daily summary.

Owner: LLX (part of OSX)
Main contractor: A.R.G./Civilport
Design: Planave through LLX
Technology:
Dry bottom feed stone columns

Quantity: 250.000 lm

Execution period: July 2010 – May 2011

Keller Engenharia Geotécnia Ltda

Rua Victor Civitá 66, Ed. 05, sl 609
Rio Office Park, Barra da Tijuca
22775-044 – Rio de Janeiro – Brasil
Tel./Fax: +55 21 3535-9911
E-mail: comercial@kellerbrasil.com.br
www.kellerbrasil.com.br

12-09Ei