

ASSESSING THE EFFICIENCY OF GROUTING USING MASW SURVEYS

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Pontal Oceânico is an entire new neighborhood located in the Recreio district, covering an area of 600 000 m², on the west side of Rio de Janeiro. It was planned to be the Olympic Media Village during the Rio 2016 Olympic Games and then transformed into a residential area. Buildings needed infrastructure works including excavations, embankments for access roads and the building of a canal system for managing surface water drainage.

A series of field and laboratory tests were carried out for geotechnical site characterization, identifying low bearing capacity and highly compressible soft clay deposits in the area. Earthwork structures built on the weak subsoil required a foundation solution against potential failures and large consolidation settlements. Design engineers elected to use soil improvement with a Brazilian grouting method called CPR Grouting.

In order to assess the efficiency of the CPR Grouting, a series of in situ tests were carried out, including MASW surveys. Common in situ tests could only provide a local measurement of soil strength, giving poor information about the global soil improvement and stiffness. As a matter of fact, SPT or CPT are not directly related with deformation modulus, because predictions rely on empirical correlation and depend on test location. On the other hand, MASW surveys provided a macro scale measurement of soil stiffness by analyzing shear wave velocities before and after the treatment, to compare results.

Cross sections were compared with a velocity (V_s) difference plot. Analyzing the general trends of vertical and horizontal variations, it seems that the V_s difference plot identified the depth reached by the ground treatment and quantified properly the efficiency of soil improvement.