



## HARBOUR SIDE STREET CIRCUIT, VALENCIA

### KEY DETAILS

#### // CLIENT

Fomento de Construcciones y Contratas, Pavasal & Besca

#### // JOB SPECIFICATION

Installing vibro stone columns for the Valencia harbour side grand prix circuit

#### // MAIN CONTRACTOR

Geocisa

Balfour Beatty Ground Engineering (BBGE) were appointed by main contractors Geocisa to increase the bearing capacity along a stretch of coastal land where the new race track was being built.

The location presented a number of challenges with a river running along a 1km stretch of the circuit, comprising alluvial materials and soft soils, with around 2m of fill overlying 4m of consolidated clays and then between 6m and 7m of sands and gravels.

The project was further complicated by the speed of programme required, with the Client requiring a two month turnaround for work which might typically take four months in order to get the site ready for the F1 Grand Prix of Europe in 2008.

# The columns were installed using four cranes, each working 24 hours a day, seven days a week in order to complete the work on schedule.

In addition, there were many other contractors on site making plant movement more difficult.

The £700,000 ground works contract involved installing a total of 10,000 wet top feed vibro stone columns to depths of between 6m to 12m and 800mm diameter. Stone columns were specified as a cost effective and sustainable alternative to traditional piling techniques and because of the fast installation times possible.

The columns were installed using four cranes, each working 24 hours a day, seven days a week in order to complete the work on schedule. Each of the cranes were kitted out with HD150 vibroflots, water jetting pumps and data loggers to verify the quality of the columns.

A bore hole is created initially using the vibratory action and water jetting from the vibroflot. The bore created is then filled with 20mm graded stone tipped from the surface using excavators. The stone is added whilst the vibroflot is continually moved up and down until a stone column is compacted tightly into the surrounding strata to the surface. Water jetting from the vibroflot was important on the project, helping to remove fines prevalent in the alluvial soils and enhancing the compaction between the column and surrounding soil.

The stone columns were installed at 2m centres directly beneath the track and 2.4m centres elsewhere to ensure the required densification was achieved.

Stone columns were used on the majority of the site, however in certain areas power lines prevented the operation of the 20m tall cranes.

For these areas BBGE installed band drains to provide vertical pathways for water to escape, increasing the rate of settlement and allowing loading to take place sooner. The band drains consist of permeable plastic cores wrapped in a filter membrane and threaded through a hollow mandrel for installation purposes. A bespoke rig is used to push the mandrel into the ground before the mandrel is extracted, leaving the drain anchored in place. The drains are installed in a triangular grid pattern, typically at spacings of between 1m and 2.5m.

Following BBGE's ground improvement works the new circuit was completed in time for the Valencia Grand Prix.

## FOR FURTHER INFORMATION CONTACT:

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