Ground Improvement

Vibro Stone Columns

WILLENHALL, ENGLAND

Dry Bottom Feed Vibro Stone Columns

Introduction

As part of a residential development in the West Midlands, Vibro Foundations Limited was commissioned by Manton Contractors Limited to provide a foundation support solution.

Ground Conditions

The site consisted of a loose fill material comprising of clays, sands, brick and concrete rubble overlying stiff glacial fill. Groundwater was anticipated at 1.5 and 3m below the existing ground surface thus requiring the use of a bottom feed system.

Bottom Feed Vibro Replacement

The bottom feed stone column system developed by Vibro Foundations Limited with its parent the Soletanche Bachy Group offers significant benefits in terms of the quality of construction of stone columns within difficult ground.

The system has been developed to use standard civil engineering plant, such as the CAT 330C excavator pictured opposite, coupled with specialist depth

Bottom Feed "Stitcher" System being filled with stone

CLIENT:	Focus Housing Association
MAIN CONTRACTOR:	Manton Contractors Ltd.
CONSULTING ENGINEER:	Peel & Fowler
DURATION OF WORKS:	July 2002

WORKS QUANTITIES

Number of Vibro Columns	350
Foundation Bearing Capacity	150kN/m²

BACHY SOLETANCHE

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"Stitcher" Assembly constructing a stone column

vibrators or vibro-pokers which have been continuously developed since 1934.

The construction cycle is as follows:

Penetration The vibro-probe penetrates to the required depth by vibration with the aid of compressed air.

Construction Gravel is added through a tremie pipe alongside the Vibro-poker in small increments. The Vibro-poker is reinserted to form a compacted stone column. This operation is repeated until ground level is reached.

Completion The ground surface is levelled and compacted by the main contractor

Design

The development posed several problems, as the fill materials would not support the loads generated by the proposed foundations. Both total and differential settlements were also a cause for concern with the existing variable fill materials.

A Dry Bottom Feed Stone Column system was chosen to enhance both the bearing capacity and settlement characteristics of the fill materials.

Summary

In conclusion the benefits offered by a single multi-disciplinary contractor allowed a flexible and value engineered strategy to be provided.

Ground treatment offered significant benefits not only in the speed of construction, but also in terms of the associated cost, where conventional foundations were adopted rather than a more costly fully spanning solution.