

Welcome to the ground improvement webinar
'GI:The solutions with RB'

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Ground improvement webinar

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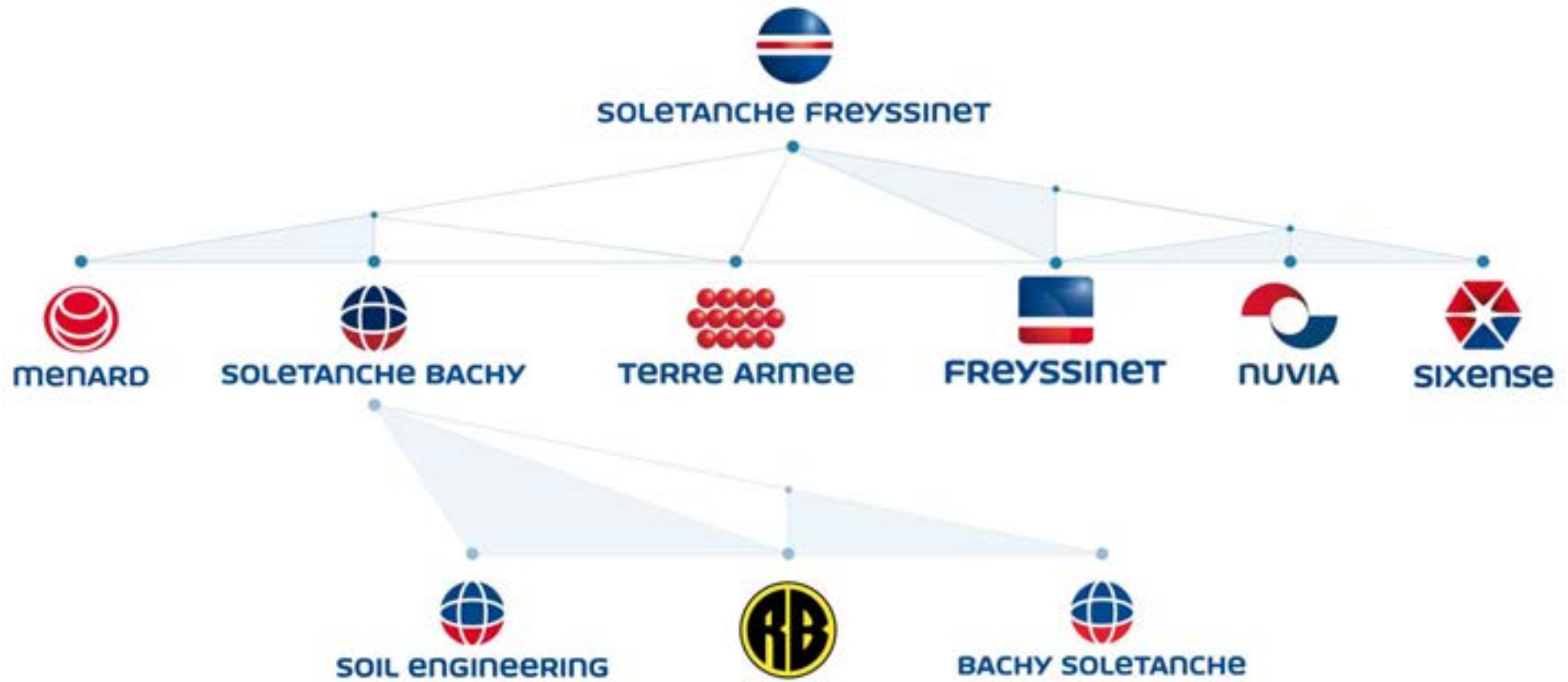
05 Questions



01

Our Business





About



Wealth of experience...



PILING



**GROUND
IMPROVEMENT**



FOUNDATIONS



**RESTRICTED
ACCESS**



Ground Improvement

Enhancing the ground bearing capacity and consolidation characteristics of weak natural soil or fill.

- Shallow Foundations
- Reduced cart away
- Improved Programme
- Minimise costs



Ground Improvement Techniques



Vibro Stone Columns



NRG Dynamic Compaction



Helical Displacement Inclusions



02

Vibro Stone Columns



Vibro Stone Columns

Densely compacted granular columns, installed by displacing the soil mass to create a void which is filled with a compacted aggregate.

Objective

Improve soft cohesive soils, loose granular soils and made ground.

- Improved bearing Capacity
- Reduced Settlement
- Homogeneous founding Strata
 - ✓ Smaller, shallower foundations
 - ✓ Improved Programme
 - ✓ Reduced arisings to cart away



Typical Applications:



Residential



Commercial



Infrastructure



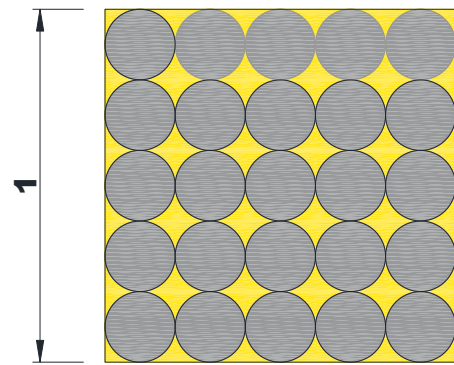
Typical performance:

- Concentrated loads (Foundations) 100 – 150kN/m²
- Distributed loads (Floors) 30-50kN/m²
- Settlement controlled to appropriate levels, typically 25mm total with angular distortion of 1/500

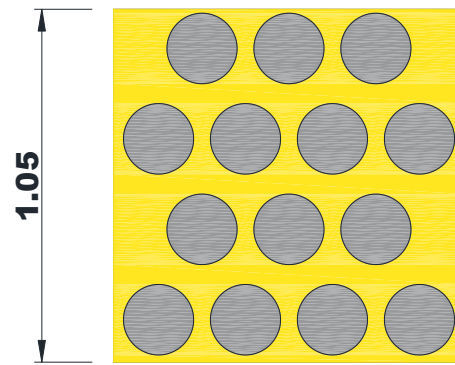


VSC in different soil types

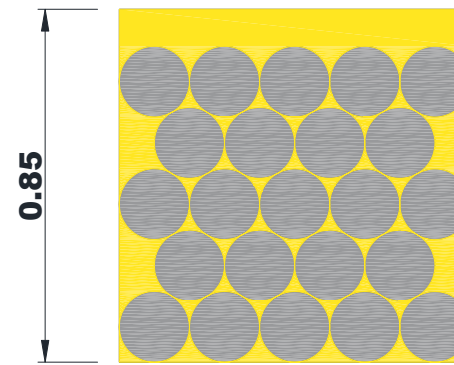
Vibro Compaction



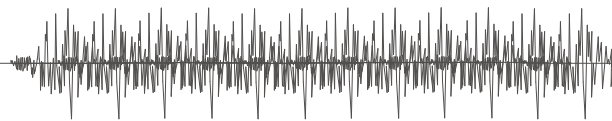
LOOSE GRAIN MATRIX



FLOATATION



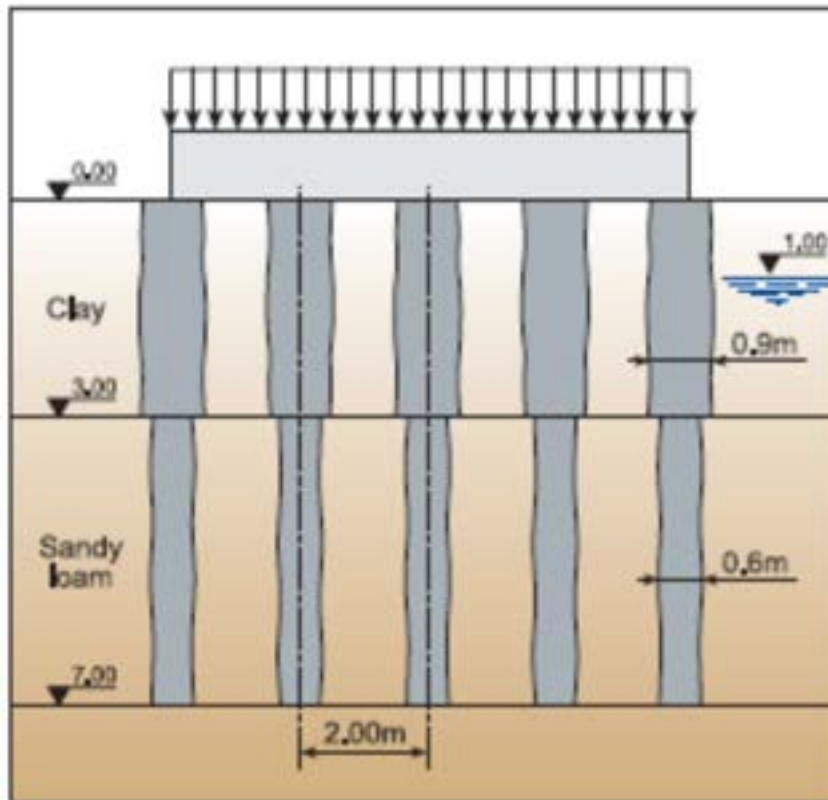
DENSE GRAIN MATRIX



VIBRATION



Vibro Replacement



VSC – Installation



Top Feed

- Poker is vibrated into the ground
- Poker is full removed leaving behind an annular void
- Void is charged with stone and column is compacted using the vibrating poker
- Treatment depths upto 8m



Bottom Feed

- Stone is introduced down, through the poker and released through the non return gate.
- Column is compacted during the extraction providing temporary lining to the bore.
- Used where the void stability is in question.
- Treatment depths upto 8m.



02

Vibro Stone Columns



Testing

Plate Load Test

Carried out on individual column to check column formation.
Frequency; 1 test per 100 column installed or 1 per shift.

Dummy Footing Test

Over several columns to validate ground improvement performance.

Frequency; 1 test per 500 column (NHBC) or 1 per 100 columns (LABC / Premier)

Zone Load Test

Carried out on column group to check column formation.
Frequency; 1 test per 100 column installed or 1 per shift.





Client

Keepmoat Homes

Main Contractor

Lambe Construction

Key issues/requirements

Development of 412 residential units on brownfield site in Walsall

Site overlain by variable depths of made ground upto 4.1m thick

Project Solution

RBL installed 5122 vibro stone columns to provide an available bearing capacity of 125kN/m² allowing the construction of shallow strip foundations.

Multiple rigs were used to meet the 4week programme required by the client



03

NRG Dynamic Compaction



Typical Applications:



Large warehouse and industrial developments



Commercial



Brownfield sites



NRG Dynamic Compaction Principle

In granular soils, high energy impacts used to facilitate void closure, reducing overall volume and causing densification.

Cohesive soils are improved through dynamic replacement where aggregate is introduced to the depression to create a granular pier to act as a reinforcing element.

Compaction carried out in passes of overlapping grids resulting in progressive improvement and finally full coverage of the treatment area



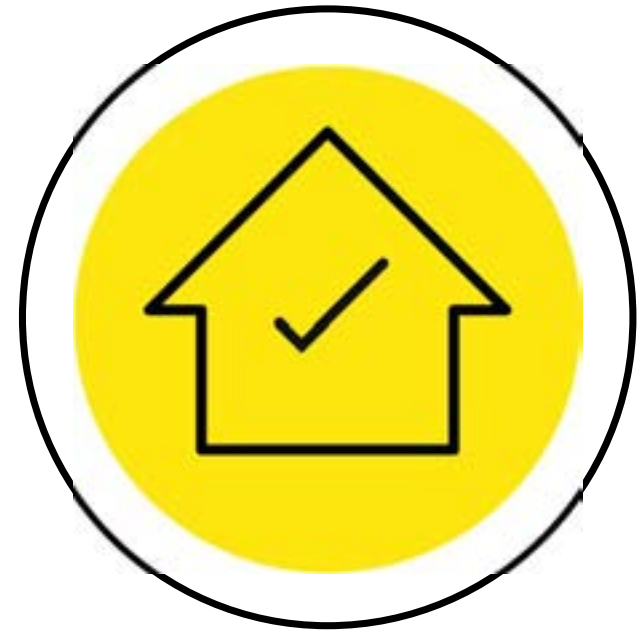
NGR Advantages:



Purpose built rigs



Leader guided weights



In House Manufacture



02

NRG VIDEO





Brecon Beacons, South Wales

Client

Walters

Main Contractor

Integral Geotechnique

Key issues/requirements

- Construction of a new wind turbine base required improvement of up to 12m of colliery spoil.
- Development site located on top of spoil heap with access up 15% gradients.
- The exposed location of the site meant that traditional crane suspended dynamic compaction would have unacceptable safety

Project Solution

- Exploiting the 12001's industry leading production rates, 1079no. compaction drops were made over a series of 3no. passes
- 12001 leader mast allowed work to continue despite exposed position of the site and meant the 5 day contract period was kept to.



04

Helical Displacement Inclusions (HDI's)



HDI'S

Rigid grout or cement treated aggregate inclusion which acts as a stiffening reinforcement in a range of poor ground conditions.

Objective:

- Provide a reinforced development platform
- Allow construction of shallow foundations and ground bearing floor slabs over improved ground.



NGR Advantages:



Commercial



Industrial



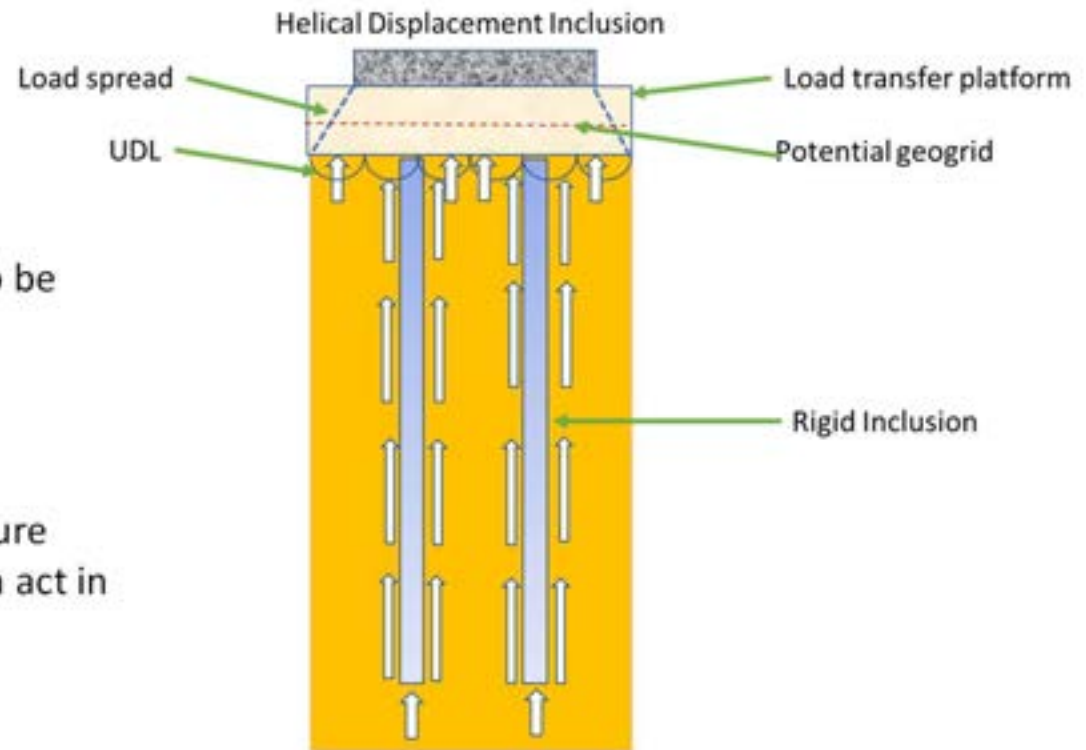
Infrastructure



HDI's Principles

Principle:

- Control soil stiffness and allow settlement to be managed.
- Integrated foundation
- An adequately designed load transfer structure ensures even loading of the inclusions which act in composite with the soil.



Helical Displacement Inclusions Installation



HDI Testing

- Static load tests on individual inclusions
- Zone load tests on formation
- Validation of load transfer platform





Client

Greggs

Main Contractor

Clegg Food Products

Key issues/requirements

- Our client was looking for a highly economic foundation solution to support a freezer extension floor slab
- The poor soils and high loads ruled out Vibro Stone Columns

Project Solution

- 926no inclusions were installed on the project, to depths of approximately 8m on a 2m x 2m grid to support the floor slab
- The technique utilises our proven fleet of 7000 series CHD Rigs and tooling. The design process utilises Finite Element (FE) analysis software to provide a Ground Improvement system that meets our clients specification.



Thank you for listening!

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