

Ground Improvement Specialists

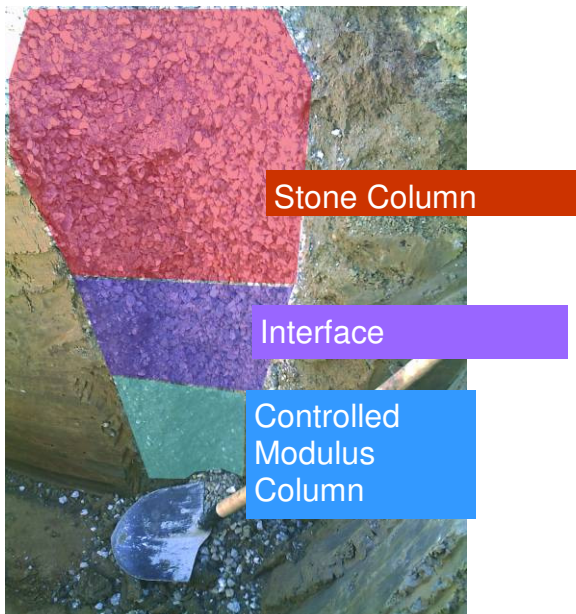
Bi-Modulus Columns

Introduction

Bi-Modulus Columns are vertical ground improvement elements composed of a Rigid Inclusion/Column, topped with a compacted granular material. The upper granular part improves the load transfer and stress distribution from the structure or building to the rigid inclusion.

Bi-Modulus Columns are an innovative combination of Stone Columns and a Controlled Modulus Column (CMC) like process. This system allows the ease of stone column footing excavation during foundation construction, without the limitations of the use Stone Columns in very soft soils.

The rigid inclusion is installed first and then before the mortar has fully set the upper granular part is installed into the mortar to form a stone/mortar transition, the stone column is then formed.



Stone Column and CMC rigs in operation building Bi-Modulus Columns



Advantages

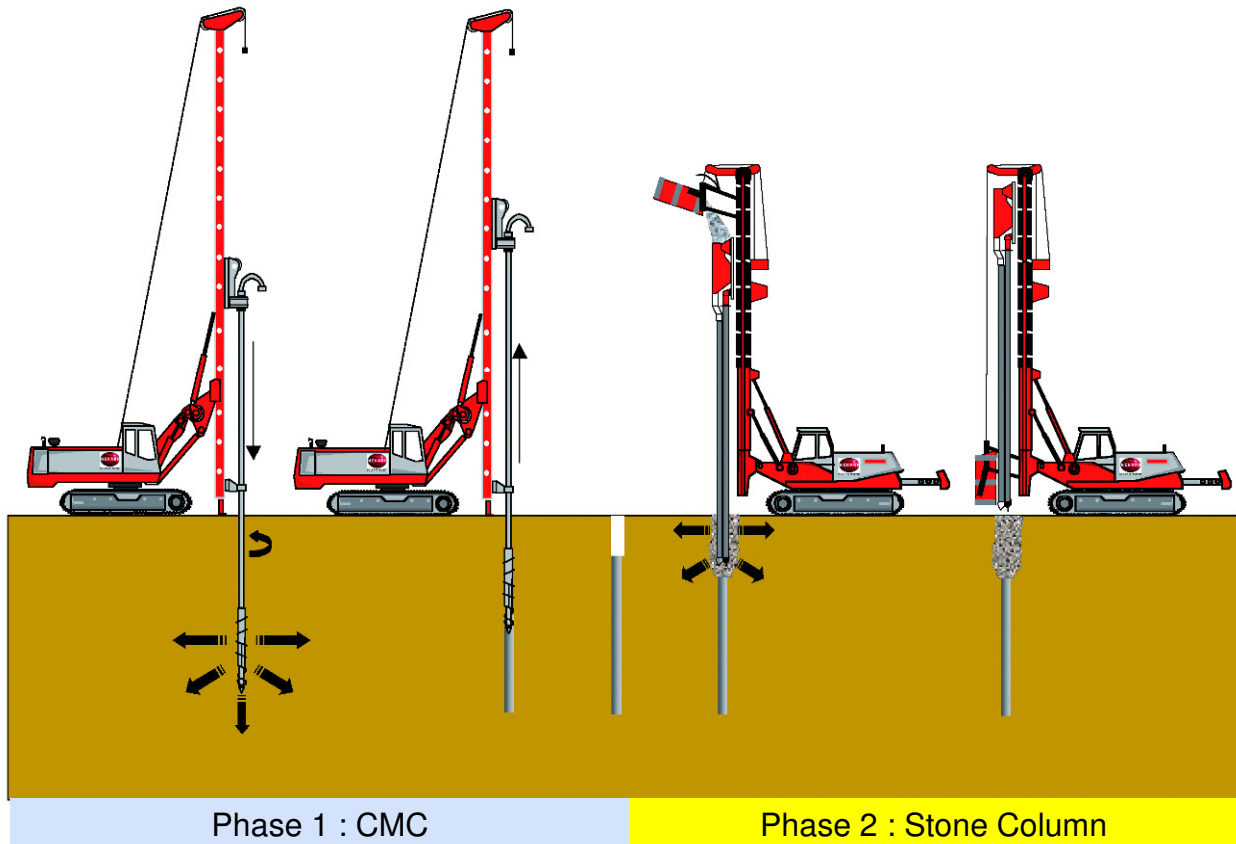
- Reduced thickness load transfer platform
- Improved column/foundation load transfer connection
- Cost savings compared with VCC

Applications :

- Low rise residential buildings
- Warehouse and reclaimed platforms
- Industrial and commercial buildings
- Liquid storage tanks
- Road & rail embankments

Bi-Modulus Columns

Bi-Modulus Column Installation Phases



Bi-modulus Columns are performed in two consecutive phases, these are:

Phase 1. The bottom part is installed using a process similar to a Controlled Modulus Column (CMC), using a 250-450mm displacement auger. At the design depth the column is then grouted under moderate pressure to form the grouted inclusion.

Phase 2. After 4-10 hours a Stone Column Vibroflot probe is inserted 1-3m into the grouted inclusion. Stone is then added, and on extraction and re-penetration the Interface and the Stone Column is formed. This planned Phasing ensures the effectiveness of the compaction of the granular tops as well as optimising the mixing of the grout in the transition zone. The quality of the transition zone/stone column interface is a key component in the effective distribution and transfer of loads from the structure to the competent soil layers below.

