

## Controlled Modulus Columns™



**Controlled Modulus Columns™ (CMCs)** are an environmentally sound and economical solution for strengthening soft ground when construction needs to begin within days instead of months. CMCs consist of grouted inclusions that work together with the surrounding soil to provide a stiff composite ground mass. CMCs are well adapted to high surface loading conditions and strict settlement requirements and are used to support slabs-on-grade, isolated footings, and embankments on compressible clays, fills and organic soils.

### Controlled Modulus Columns Applications

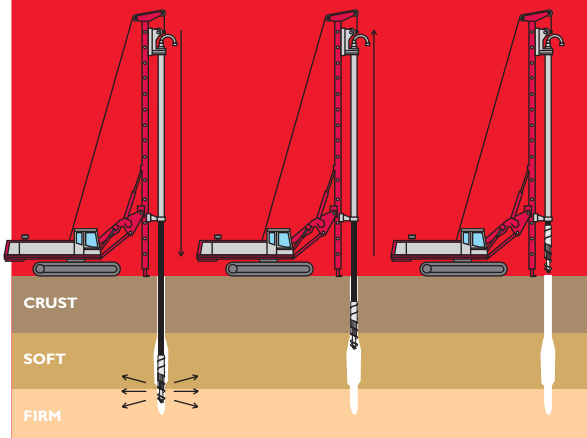
- Warehouses
- Industrial Facilities
- Storage Tanks
- Port Facilities
- MSE Retaining Walls
- Bridge Abutments
- Roadway Embankments
- Railway Embankments

### Menard Controlled Modulus Columns

Menard uses a patented CMC technology that reinforces soil by drilling a hollow auger into the soft soil and installing a cement-based grout column using pressure through the hollow auger. The combined effect of densification and reinforcement improves characteristics of the soft ground resulting in a composite system.

CMCs are installed using a specially designed auger that displaces the soil laterally, with virtually no vibration and no spoil, eliminating the need to dispose of contaminated soil. The auger is screwed into the soil to the required depth which increases the density of the surrounding soil and, as a result increases its load bearing capacity. During the auger extraction process, a column is developed by pressure-grouting to stiffen and treat the surrounding soil. The result is a composite ground improvement system where the column reinforcements and the surrounding soil share the loads.

CMCs were developed by Menard's French affiliate, Menard Soltraitement, in 1994 and are patented in the US. The two companies have installed over 5 million feet of CMCs on hundreds of projects in North America and around the world.



*Controlled Modulus Columns (CMCs) are grouted columns formed using an auger that displaces soil laterally, producing very little spoil. As the auger is extracted, a column is formed using pressure grouting to achieve a predetermined stiffness ratio with the surrounding ground.*

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