

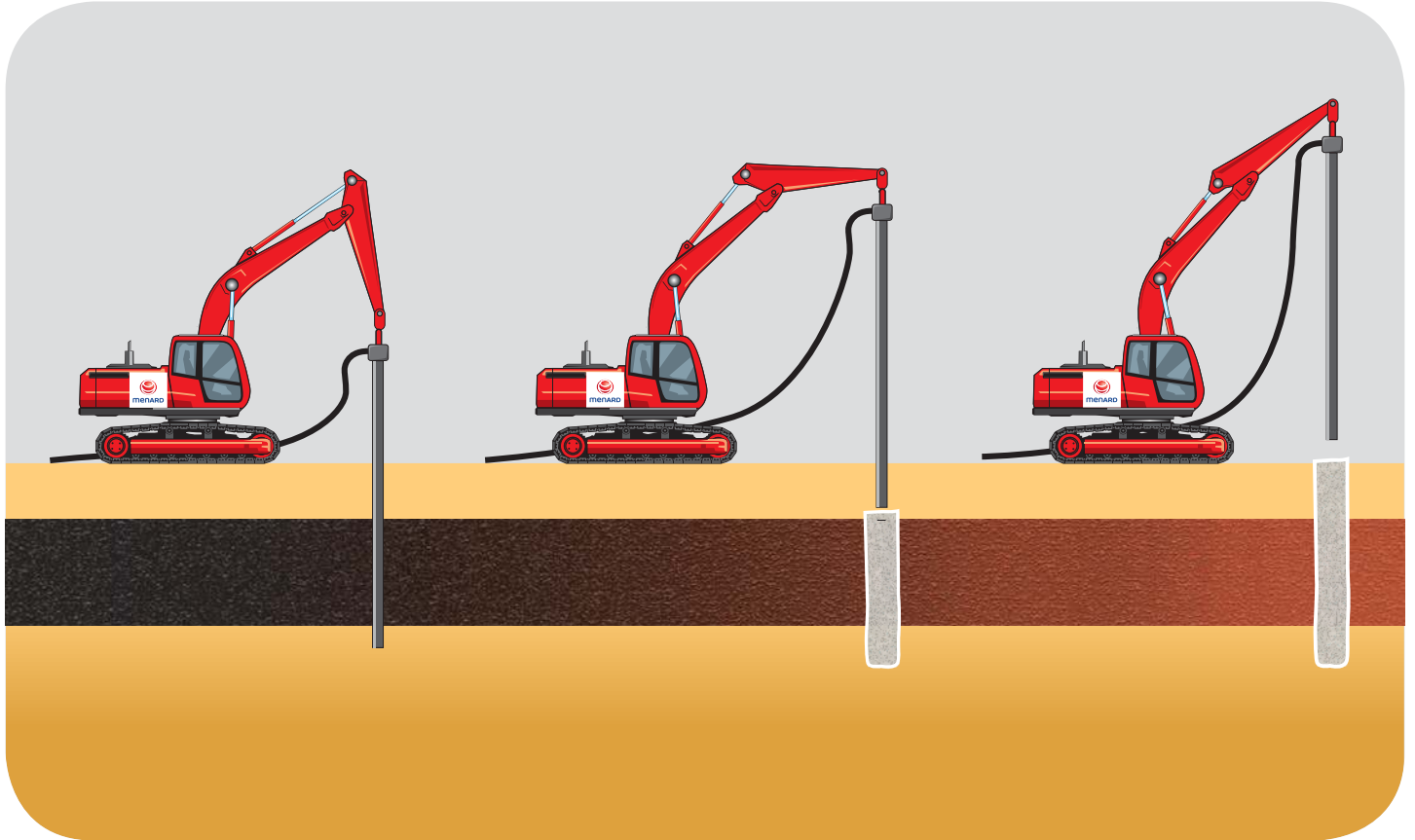
Controlled Modulus Columns (CMC), Menard Susceptible/Supple Columns (MSC)



menARD

ground improvement specialists

Construction of foundation for warehouses, small residential buildings, parking lots and other type of floorings is a challenging issue therefore new technologies of ground improvement are required to satisfy designed bearing capacity as well as rapid and cost-effective construction of small structures. The Menard Susceptible/Supple Columns meet these requirements and are increasingly efficient complement to the Controlled Modulus Columns, Stone Columns, Cement or Lime Columns.



Technology specification

The MSC is a type of displacement pile method where the soil is moved laterally rather than excavated. To form the column, a special steel rod is pushed to the ground by a vertically vibrating tool, connected with the equipment. Tool weight, vibrations, and pushing force sink the rod to the designed depth. Once the desired depth is reached, the rod withdraws while appropriately selected cement grout is pumped. As a result, a composite of soil and column is formed, which acts as a single structure of enhanced bearing capacity. The process of column formation does not damage the surface, whereas vertical vibrations of low frequency have no impact on the building structures even in close proximity. The efficiency of column construction amounts up to few hundred running meters per shift.

During the MSC construction, column parameters such as: depth, grout volume, or vibrating tool energy consumption, are monitored. Active analysis of these parameters allows constant monitoring of column quality and assessment of soil conditions at particular position.

The columns are constructed from the working platform, providing safe movement of heavy construction equipment.

Application

The MSC technology is a wide-range and cost-effective solution in case of organic soil (i.e. peat, aggragate mud, gytjas) and cohesive soil of thickness not exceeding 6.0 m and plasticity index of $IL > 0.6$. As the columns can be constructed on tight spacing grid, this method is particularly well suited for industrial floorings of large spatial structures, warehouses and shopping malls as well as many types of foundation slabs allowing also cost-effective reinforcement. It is also used as a reinforcement of parking lots, walkways and roads specifically in case of low embankments or where it is impossible to construct a transmission layer.

The bearing medium of the column core is nothing more than a grout (cement, lime, cement-lime mix with ash and other chemical additives or cement-sand, cement-lime-sand mix) with parameters selected in accordance with the design requirements. The core of a column is 0.15 m to 0.30 m in diameter, depending on the soil condition and its side resistance. Most often the spacing of column is between 1.0 m to 2.5 m on a rectangular or triangular grid pattern.

Projects

Enclosed buildings:

Residential buildings, office buildings:

- Apartments SASKA III at Bora Komorowskiego street in Warsaw, approx. 6,900 running meters

Shopping centers, halls, warehouses:

- Exhibition hall, roads and parking lots of Lublin International Fair 35,000 running meters





Advantages:

- **High performance** – MSC is a highly effective method, allowing to reach hundreds of meters of constructed column per day (with the use of single machine unit).
- **No spoils** – when the column is formed spoils are not excavated. It eliminates the problem of large soil mass removal and disposal.
- **Environmentally friendly** – no spoils, no excessive noise and quick installation make the MSC technology environmentally friendly.
- **Mobility** – relatively small size of equipment makes this technology useful in places inaccessible for piling machines.
- **Cost-effective** – high performance, mobility and possibility of proper grout selection make the MSC technology competitive as compared with other known methods of soil improvement as well as conventional soil replacement.
- **Global improvement** – MSC method improves building foundation conditions, reducing global compressibility of soil. Unlike piling, where loads are transferred directly to a pile, the MSC is designed to distribute the loads on soil (5% to 40% of loads) and on columns.

Menard Polska Sp. z o.o.
Powązkowska 44c
01-797 Warszawa

biuro@menard.pl
tel.: +48 22 560 03 00, fax: +48 22 560 03 01