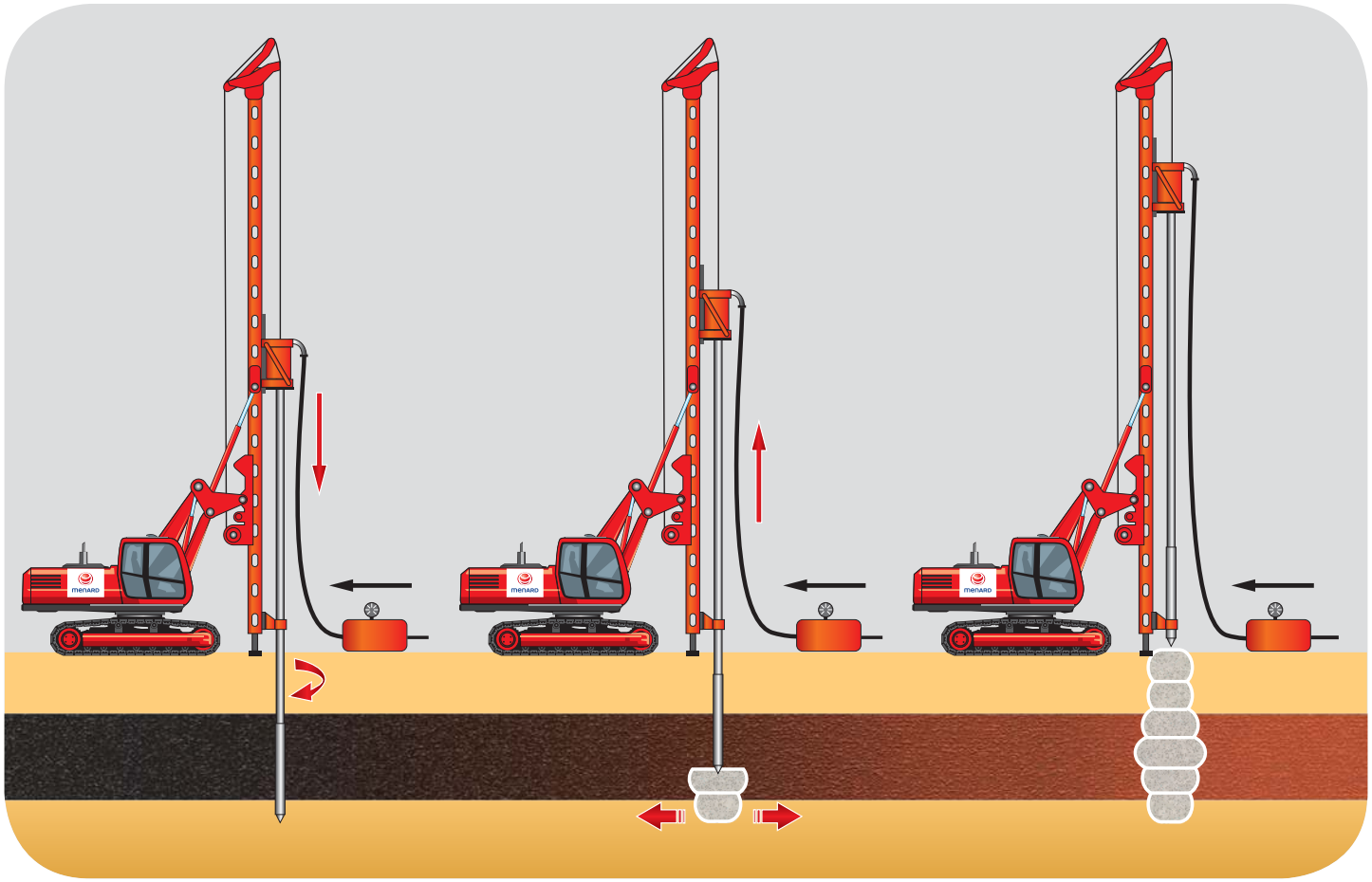
ISR compaction grouting

menard

ground improvement specialists

Compaction grouting is a technique employing injection of grout-soil mix into soil under pressure. The technology allows forming the columns of different diameters and lengths depending on the ground conditions making this technique extremely efficient in highly stratified soils.



Technology specification

Compaction grouting involves the following consecutive phases:

- sinking of the drilling tool rod – the tool enters the soil up to the designed depth displacing the soil laterally;
- injection – performed in two phases: injection into the hole under high pressure (1-7 MPa) which changes into soil compaction grouting, compressing the soil and creating a column of different volume. In addition, the surrounding soil is compacted by compression. The process is conducted until desired pressure is reached in certain amount of time;
- drilling rod withdrawal – during the gradual rod withdrawal a number of single contiguous blocks will eventually form an injection column;
- column layout – subsequent construction phases of the compaction grouting columns ensuring the most effective soil compaction are presented in the adjacent sketch: A, C, D, B – see following sketch (the sketch does not contain letter B and it should also be signed –Sketch of execution of Injection Site Reaction ISR - the sketch should be moved closer to the center of the page or closer to the picture).

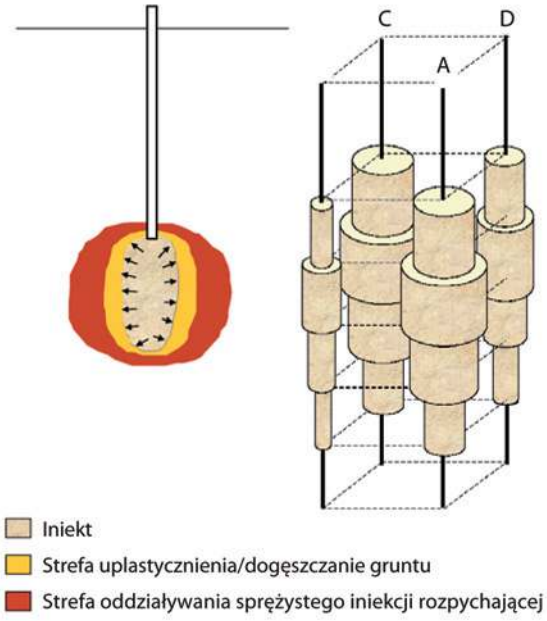
ISR compaction grouting is carried out using injection pumps and plastic grout.
Use of a pilot test area is recommended at the beginning of each compaction grouting project to determine the following parameters: optimal grout mix composition, maximum grout injection pressure, injection time and grid of columns.The volume of grout injected into the soil during works is monitored on the ongoing basis. Data recording of the drilling and grouting parameters provides an efficient quality control tool.

Application

Use of this technology is recommended for medium or good bearing soil underlain by weak bearing soil. This method has been applied by standard for densification of non-cohesive loose soil (sand, gravel), but it is also suitable for cohesive, organic and man-made soil creating stiff columns of high bearing capacity. Columns can also be constructed in waterlogged soil.

The ISR compaction grout columns can be constructed under foundation of existing buildings where enhanced bearing capacity or settlement reduction is required, under foundation of special buildings in places where the risk of soil liquefaction may occur or as stiff elements filling voids and caverns. As the method is characterized by low vibrations, ISR can be used in close vicinity of existing structures.
When it is not necessary to improve soil over the whole length of the columns, ISR can be limited to weak soil areas.
Diameters of columns usually change over their length and depend on the soil parameters, grouting pressure and applied rod type. Columns are constructed even up to a depth of 22.0 m and are usually distributed in rectangular grid of 1.50-3.50 m.

Schemat wykonania iniekcji rozpychającej



Advantages:

- **Global improvement** – ISR compaction grouting significantly improves parameters of the treated soil.
- **Good cooperation** – due to the low stiffness to cross-section ratio, foundation or slabs can be directly placed on ISR compaction grouting columns after routine cleaning and leveling.
- **Versatile application** – foundation improvement of new as well as existing buildings.
- **Environmentally friendly** – low vibration and noise level allows application of ISR compaction grouting near existing building structures and makes it environmentally friendly.
- **No spoils** – spoils are not excavated when columns are constructed.

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