Maxperm Grouting System

Reinforcement and liquefaction protection of the ground
Maxperm Grouting System

Reinforcement and liquefaction protection of the soft ground

**Development**

The MaxPerm Grouting System was developed aiming at soft ground reinforcement.

This is an epoch-making permeation grouting method developed from the principles of Dual-tube Double Packer Grouting, the most reliable grouting method, having a track record of tens of thousands of applications. MaxPerm provides a long-term improvement effect by using highly durable grout materials, which permeate into pore spaces and replace pore water without breaking soil structure.

MaxPerm injection is performed at a very low pressure. It allows smooth improvement directly under existing structures (such as oil tank and bridge pier) as well as improvement of soft ground in general.

**Advantage**

<table>
<thead>
<tr>
<th>Large size improvement</th>
<th>Cost saving</th>
<th>Cost saving</th>
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<tbody>
<tr>
<td>Large size improvement (about dia. 4m) done at one time injection.</td>
<td>Larger borehole spacing saves the number of drillings.</td>
<td>Larger injection rate saves injection time.</td>
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**Space saving**

Improvement is performed from a narrow area with small and light weight equipment.

**Workability**

Underground obstacles, such as pipes and utilities, does not affect improvement.

**Labor saving**

Computer controlled injection system saves labor.
Improvement Sequence

1. Casing drilling of dia.100mm.
2. Install the grout pipe with special sleeve packers and strainers. Withdraw the casing.
3. Install the dual-wall inner tube equipped with double packer. Inflate the special sleeve packers.
4. Re-install the dual-wall inner tube equipped with double packer. Inject grout through the strainer section.

Injection Rate

Standard injection rate is 15L/min to 20L/min. For the soil with fines, the maximum injection rate to allow uniform permeation into pore spaces is determined by water injection test (qcr test).

Improvement example under a bridge pier and abutment

Improvement example beneath a building

Fine sand
Silty sand
Sandy silt
Large diameter permeation improvement by MaxPerm

Product diameter: 2.0 to 2.5M

Product diameter: 3.0M

MaxPerm grout plant for liquefaction prevention work at Tokyo International Airport (Haneda)