

MULTIRIZER

Grouting technique suitable for improvement of complex ground



Development

In the Multirizer method, drilling and grouting are performed with the same double-wall drill rod.

- i) For cohesive soils, flash setting grout is injected to improve by the consolidation effect of the grout.
- ii) For sandy soils, permeable grout is injected to fill in sand pores after the flash setting grout roughly fills up voids around the rod and water channels in the target ground.

For cohesive soils, generally, even a highly-permeable chemical grout with a longer gel time is difficult to enter. Therefore, the flash setting grout alone is injected in 2-shot operation to obtain consolidation effect by veining intrusion.

For the ground where the cohesive soil is dominant with minor intervention of sandy soils, combined grouting is performed by injecting 2 types of grouts sequentially; the flash setting grout as a main agent with the permeable grout as a subordinate.

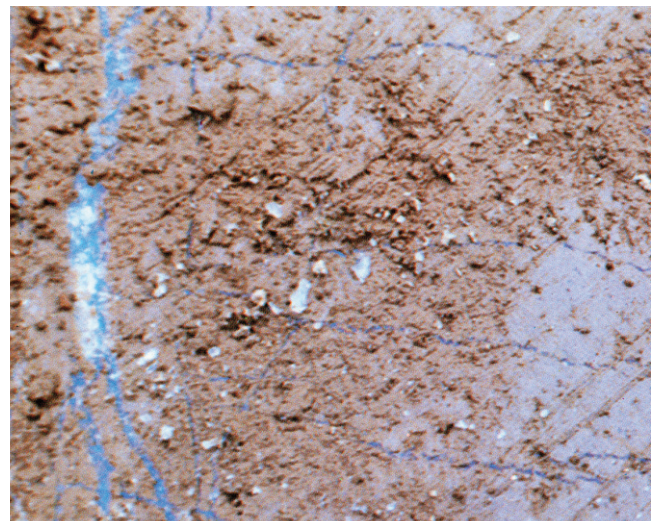
For the ground where the sandy soil is dominant, on the contrary, the flash setting grout, causing veining intrusion, results in partial solidification without continuity. Water seepage or wall collapse may occur during excavation. To avoid these troubles, the quick gel grout is first used, but only for packer formation around the pipe and for veining intrusion to bind surrounding sands. Then the permeable grout is injected as a dominant agent using the same grout pipe to create a solidified sand-grout mass.

The Multirizer System overcomes such problems as grout escape through voids in the ground or blow-up along the grout pipe by employing combined grouting. Flash-set grout is injected first, then, the permeation grouting is performed in the roughly bonded ground. The combined process allows effective ground solidification and improves workability to achieve cost efficiency.

Based on the results from a series of tests in the "New Ground Improvement Technology Development Project" conducted in 1975 to 1979 by the Public Works Research Institute of the Ministry of Construction in Japan, it was established that the high permeability grout of a long gel time should be used to obtain a continuous solidified mass. The Multirizer method, taking full advantage of the permeation grouting principle in combination with quick gel grouting, is an excellent grouting technique to obtain a continuous solidified mass in a wide range of soils.



Solidified sand-grout mass by permeation grouting



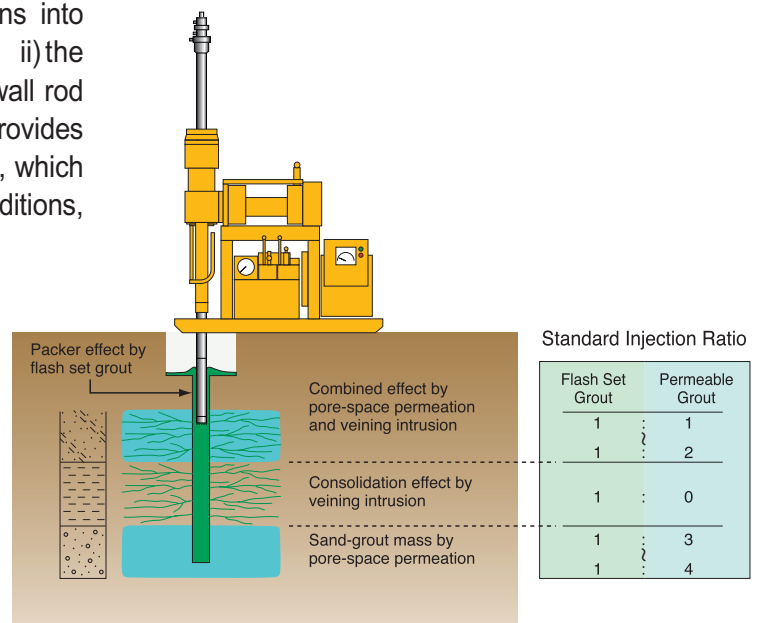
Solidified grout vein network intruded into cohesive soil



Advantages

The Multirizer System incorporates 2 functions into one system; i) the flash set grouting and ii) the permeation grouting, using the same double-wall rod injection system. This epoch-making system provides reasonable improvement approach of grouting, which is applicable to a wide range of ground conditions, from sandy to cohesive.

Combined Grouting



Equipment

● For the combined grouting

Quick gel grout injection:

The flow of agent A (permeable grout) and the flow of agent B (flash set reactant) meet at the end of the grout pipe.

Permeable grout injection:

The flow of agent B (flash set reactant) is stopped and agent A alone is injected.

● For the flash set grouting alone

Agent A (main agent) and agent B (flash set reactant) meet at the end of the grout pipe.

