

Great Performance by Highly Advanced Jet Grout Technology

Rapidjet Method

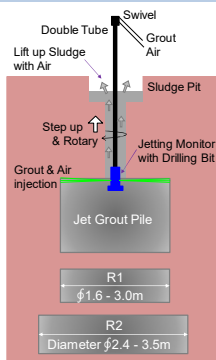
Outline of Rapidjet Technology

Public construction brings more convenience to daily life. Ground improvement technique has attracted increasing attention.

Rapidjet method bases on the jet grout theory to formed the jet grout column. SANSHIN CORPORATION has outstanding relevant construction performances in Japan and other places of Asia, developing brand new and special jetting monitor to realize cutting capacity of greater efficiency with jet grout column of larger diameter and high-speed of construction.



Concentrated Rapidjet (R2 Type)



System of Rapidjet Technology

Advantages

Formation of large diameter jet grout column by high Speed

Using the special jetting monitor, which is SANSHIN's exclusively researched and developed creation, the larger diameter jet grout column can rapidly formed.

Can setting up a wide range of jet grout column

Using two different special jetting monitor and nozzle can set up the jet grout column diameter to a wide range.

Using jet cut to achieve highly efficient construction

From drilling to jet grouting, one operating machine can complete the whole process. It can automatically switch odes between drilling and jet grouting (Direct drilling). This simple device can achieve high efficiency at jet grouting job site.

Capable of doing jet grouting within limited working space

Rapid-jet can also be applied to narrow working space or it can use large self-propelled drilling rig to formed the large scale improvement. Rapid-jet method can be widely used in a complex job site conditions.

Parameters and Performance

There are two categories in Rapid-jet system – R1 and R2, in which particular parameters are available as shown below. Each category involves representative equipment. Lower strength options with low binder content are also available for particular purpose, for example, liquefaction prevention.

Type		R1			R2	
Column Diameter (m)		2.0	2.5	3.0	3.0	3.5
Effective Column Diameter	Sandy soil $N \leq 50$	2.0	2.5	3.0	3.0	3.5
	Clayey soil $N \leq 3$	2.0	2.5	3.0	3.0	3.5
	Sandy soil $50 < N \leq 100$	1.8	2.3	2.7	2.7	3.2
	Clayey soil $3 < N \leq 5$	1.8	2.3	2.7	2.7	3.2
Sandy soil $100 < N \leq 150$	1.6	2.0	2.4	2.4	2.8	
	Clayey soil $5 < N \leq 7$	1.6	2.0	2.4	2.4	2.8
Grout Pressure (Mpa)		30 ~ 34			30 ~ 34	
Grout Flow Rate (L/min)		140	180	260	320	360
Air Flow Rate (Nm ³ /min)		Over 6			Over 10	
Lift Rate (min/m)		10 ~ 12			10 ~ 12	

Effective diameter shall be corrected as columns more than 30m depth.

Standard Construction Apparatus

Type	R1	R2
Drilling Method	Direct Drilling	Direct Drilling
Jetting Head Monitor	R1 monitor $\phi 90\text{mm}$	R2 monitor $\phi 110\text{mm}$
Double tube rods	$\phi 60\text{mm}$ $\phi 90\text{mm}$	$\phi 90\text{mm}$ $\phi 114\text{mm}$
Double tube swivel	for $\phi 60\text{mm}$ for $\phi 90\text{mm}$	for $\phi 90\text{mm}$ for $\phi 114\text{mm}$

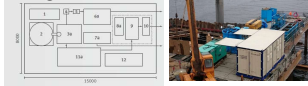
The size of the rod and the swivel is chosen in consideration of construction conditions such as construction depth or the target ground.



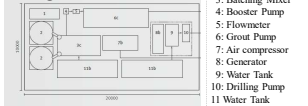
Equipment and Accessories

There are two categories in Rapid-jet system – R1 and R2. We can design and plan proper type referring to the project size and the site condition. For example, R1 type consists of the smaller equipment and has great potential together with direct drilling system by small rig in limited working condition.

Mixing Plant for R1



Mixing Plant for R2



- 1: Generator
- 2: Cement Silo Tank
- 3: Batching Mixer
- 4: Booster Pump
- 5: Flowmeter
- 6: Grout Pump
- 7: Air compressor
- 8: Generator
- 9: Water Tank
- 10: Drilling Pump
- 11: Water Tank

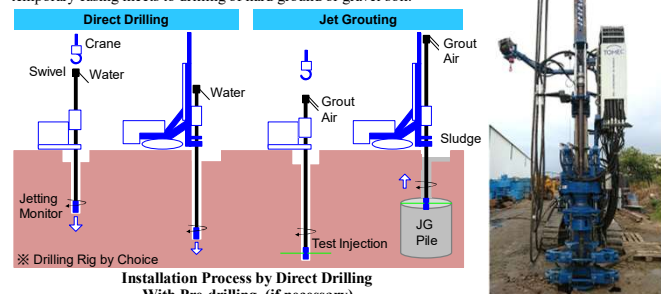


Ordinary Layout of Mixing Plant

Equipments for Rapid-jet method

Installation Procedure

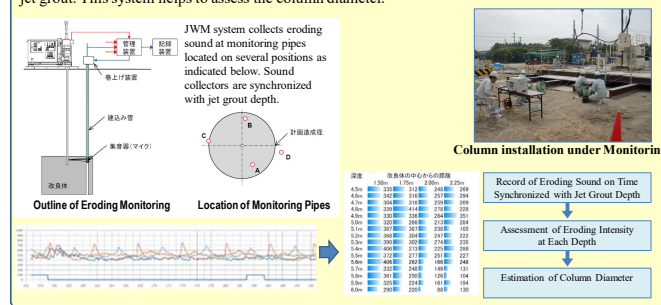
Advanced jet monitor assists direct drilling and following column installation. Optional drilling using temporary casing meets to drilling of hard ground or gravel soil.



Installation Process by Direct Drilling With Pre-drilling (if necessary)

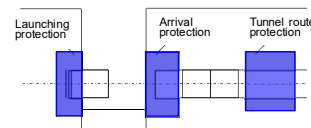
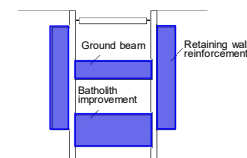
Eroding Monitoring: JWM (Jet Wave Monitoring System)

Advanced monitoring system, JWM, can detect and monitor quantitative intensity of eroding by jet grout. This system helps to assess the column diameter.



Scope of Application

- 1) Excavation work
 - a) Ground improvement for excavation
 - Heaving・Boiling prevention
 - Bearing capacity reinforcement for batholith
 - Ground beam
- 2) Shield Tunneling work
 - a) Launching・arrival protection
 - Reaction wall reinforcement, etc
 - Tunnel route protection
 - Underground junction protection
- 3) Structure
 - a) Bearing capacity reinforcement for structure



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