Jet Grouting

HEAVY-DUTY FOUNDATION IMPROVEMENT
JET GROUTING
Soil stabilisation, liquefaction mitigation and large-scale structural support

Applications
- Seismic up-grade
- Slip stabilisation
- Foundation improvement under existing structures
- Retaining adjacent future excavation

Jets of cementitious slurry with chemical additives are forced into foundation ground to mix with the in-situ soil in order to create very large columns. No vibration.

Our small machines
- Man-portable
- Columns up to 3,000mm Ø
- Up to 20m deep
- From inside buildings
- Through 200mm Ø holes

Our medium machines
- Modular equipment
- For use inside or out
- Columns up to 3,500mm Ø
- Up to 25m deep

Our large machines
- Large, greenfield sites
- Columns up to 7,000mm Ø
- Up to 60m deep
Keyhole Columns

With jet grouting, we create huge solid pillars in foundation ground by eroding the ground and then mixing the in-situ soil with cement slurry that is injected under extremely high pressure.

Large, solid pillars can be created up to many metres in diameter and 60 metres deep; and strengths of up to 3 mPa can be achieved.

Jet grouting can be performed to great depths, around obstructions, such as underground utilities, above or below the water table and in a variety of soil conditions, from plastic clays to silts and non-cohesive soils (where jet grouting can be most cost-effective).

The high velocity jets are located in a grout ‘monitor’ attached to a drill stem. After advancing to the required depth, the monitor is rotated as it is being withdrawn. Simultaneous water-jetting and slurry-jetting hydraulically erodes, mixes and partially replaces the soil with cementitious slurry, to create engineered pillars to required strength and of low hydraulic conductivity.

Operating in narrow spaces with minimal headroom, our smaller machines can create 3,500mm Ø pillars up to 20m deep. And all our jet grouting on major projects is done through penetrations of just 200mm diameter.

Contrary to some overseas practices, which create huge mess at a jet grout site, Mainmark’s practice is to pipe all waste liquid material to off-site holding tanks for later disposal. That way our jet grouting project sites are left in a very clean state.

Penetrations for all our jet grouting are only 200mm Ø.

The jet grouted columns will form around obstacles.

Our jet grouting equipment can be employed in restricted sites.
Mainmark Capabilities

Mainmark offers unique, innovative solutions for rectifying problems with foundation ground in residential, industrial, commercial and civil engineering situations. For over 20 years Mainmark, has led the world in developing and offering Uretex – the most advanced and accurate system of geo-polymeric (or resin) injection techniques for ground engineering.

Mainmark has expanded capabilities to include other innovative ground engineering solutions. As part of post earthquake remediation works in both Japan and Christchurch we have developed expertise in technologies such as JOG computer-controlled grouting and jet grouting.

Re-supports Major Art Gallery

The world-class, modern Christchurch Art Gallery was badly shaken by the earthquakes of 2010 and 2011. As the foundation ground suffered severe liquefaction, the 33,000 tonne building lost ground support. The art gallery’s footings sank unevenly across the 6,500 square metre footprint of the building. Subsidence as much as 182mm in some places.

Working in the basement and using two new, leading edge technologies, Mainmark re-supported the building firstly by jet grouting 124 jet grout columns and then completely re-levelling the structure with JOG integrated computer grouting.

Although the gallery was closed to the public since the quakes, it was occupied by the gallery staff during the whole remediation project.

Apartment Block Re-supported

A shallow, liquefaction soil stratum under a heavy weight concrete six storey apartment block in Christchurch caused the building to suffer differential settlement of up to 70mm, after the 2010-2011 earthquakes.

It was rectified using jet grouting to strengthen the foundation ground and JOG integrated computer grouting to raise the building back precisely to its design levels.

School Foundations Improved

The 2 storey structure of mostly tilt slab construction had suffered earthquake liquefaction and subsidence. 22 jet grout columns were installed, ranging from 2.5-3.5m in depth and were all 2.4m in diameter. They were finished 0.7m below ground level for subsequent connection to the existing footings.

The school’s engineers specified jet grouting as it “significantly reduced the chance of liquefaction and settlement of this building in future earthquakes.”