



SONIC DRILLING

An Advanced Soil Penetration and Capture Technique Using High Frequency Resonant Technology

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What is sonic drilling?

Sonic drilling is a soil penetration technique that can provide high quality, undisturbed soil and rock samples at depths of up to 30m. In addition to ground sampling, sonic drilling can be used to support a range of environmental, geotechnical, geo-construction and mineral exploration works.

The high frequency resonant technology produces

a very straight drill point that can penetrate and secure most ground formations for retrieval – even cobbles, rock layers and boulders.

Uniquely, the sonic drilling process enables extraction of undisturbed ground samples at greater depths than is possible using alternative methods.



How does sonic drilling work?

Sonic drilling combines the use of vibration, impact and rotation to produce extremely straight, long and relatively undisturbed drill samples. It achieves just 0.5mm deviation for every 10m and can reach depths of 30m.

The liquefaction effect on the soil around the drill string breaks the skin friction, allowing the drill bit to glide through the ground with minimal resistance. The rapid raising and falling of the drill into the soil provides additional slip, allowing it to progress with even less resistance. The soil beneath the circumference of the drill head is fractured before penetrating through lower soil layers. When harder medium rock is encountered, rotary drilling (or cutting) is used to ensure all soil types can be effectively cored through and captured.

Sonic drilling is highly efficient, with extremely fast penetration speeds in alluvial material. It is capable of rock fracturing and can penetrate concrete as well as other high-density layers.



What are the benefits of sonic drilling?

Sonic drilling has significant benefits compared to conventional overburden sampling and drilling techniques:

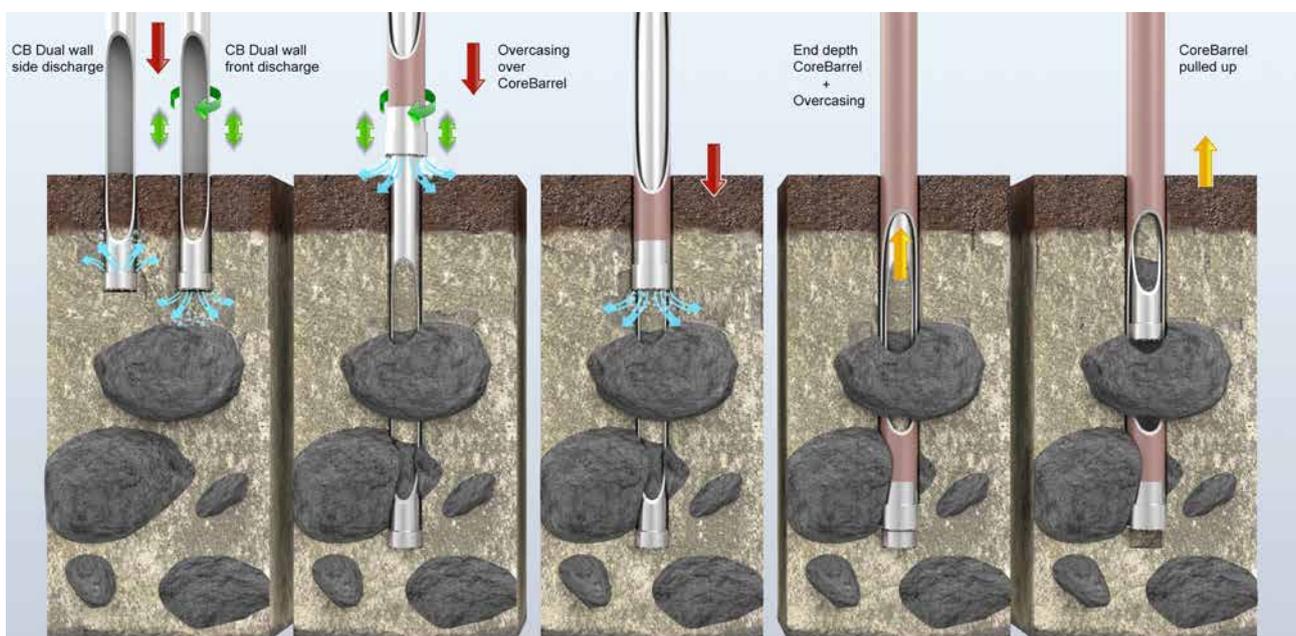
- High quality, undisturbed soil and rock samples at multiple depths, in both dry and saturated layers.
- Production rates 3 to 4 times faster than other drilling methods, reducing the cost per data point or core sample.
- Cleaner, reducing waste by up to 70%.
- Quieter than a hammering probe rig, reducing noise pollution.
- Reduces the risk of project failure due to geological surprises at the drill site.



How are high quality samples captured?

The cored head of the sonic drill means the shaft captures minimally disturbed material within its core that can be extracted and used for high quality soil and rock sampling.

This is achieved by first drilling to capture the sample, then inserting an overcast around the core piece and extracting the drill and the sample. Once the sample has been removed, the coring drill is replaced and the process starts again, allowing multiple samples to be extracted at different depths with a high recovery rate.



What are the applications for sonic drilling?

Sonic drilling is suitable for a range of ground applications:

- Environmental
 - Sampling (mixed layers and hard formations)
 - Installation of monitoring wells
 - In-situ remediation injections
- Geotechnical
 - Sampling and Standard Penetration Test (SPT)
 - Compensation grouting
 - Cone Penetrometer Testing (CPT) and Sonic CPT
- Mineral exploration
 - Sampling for grade control and estimating
 - Tailing sampling
 - Stockpile sampling
 - Injections e.g. underneath tailing ponds and landfills
- Geo-construction
 - Sampling
 - Installation of anchors
 - Installation of Tube à Manchette (TAM) grouting tubes
 - Injection
 - Grouting
 - Mini piles



The Mainmark group of companies are leaders in advanced ground engineering and asset preservation technologies. For more than 25 years, Mainmark has led the world in offering unique, innovative solutions for foundation repair, and rectifying problems in residential, industrial, commercial, civil engineering, and mining situations.

In Australasia, the Mainmark group of companies has been in operation since 1995, with seven offices throughout Australia and New Zealand. Since 2001, we have also operated wholly-owned subsidiaries in Japan and more recently in the UK.

We are a privately-owned company with highly-trained technicians and state-of-the-art equipment. Our solutions are all non-toxic, inert, and environmentally neutral. All of our works are planned, supervised, and executed by our own experienced personnel. We guarantee our products.

Companies of the Mainmark group present creative, effective solutions to many types of ground engineering problems in a wide range of sectors: industrial; commercial; residential; civil; and mining. Some of the companies offer related solutions in the building and construction areas. Many of these solutions are unique to Mainmark and its associates.

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