

Dual system delivers both sonic and rotary drilling technology

Italian drill rig manufacturer, Comacchio has collaborated with Toa-Tone Boring to deliver to the UK market a dual drilling system that allows for both sonic drilling and rotary drilling

Structural Soils' first use of its new Comacchio GEO 602 performing sonic drilling at a job site in Aberdeen

Comacchio has introduced a series of geotechnical drilling rigs equipped with both sonic and rotary systems, working seamlessly, to provide a harmonised 'dual drilling system' configuration. This system allows operators to use the same machine and easily switch between the two methods.

With growing demand for sonic drilling technology, which has evolved over 50 years through

several iterations, it is now effectively used in a large variety of applications such as geotechnical, environmental, geothermal, water well and the foundation and construction drilling sectors.

"The demand we have seen shows no signs of slowing and we are continuing to invest in this technology," says Comacchio's sales director, Flavio Durigan. "We have collaborated with Toa-Tone Boring Co. who manufacture very compact sonic drill heads that are robust and simple in design and have proven themselves to be perfectly suited for the geotechnical and geo-environmental site investigation rigs of our GEO series. These lightweight and compact drill heads have proven to be successful thanks to the combination of performance, efficiency and cost-effectiveness."

SONIC HEADS

Comacchio's current offering includes the Tone-Probe EP-26N and SP-8000 drill heads that use hydraulic motor driven vibration units to produce adjustable high-frequency resonance and substantial oscillation frequency forces to the drill string. The pairing of the sonic drill head on a Comacchio crawler or truck-mounted rig is already in use across Australia, New Zealand and the UK – and is proving its worth.

Durigan adds: "Our research and development has focused on the creation of the most cost-effective and flexible solution for geoenvironmental site investigation projects that normally require the ability to perform multiple drilling methods and tests from the same rig.

"That's why we have invested in the design of a dual system

comprising a sonic head and Comacchio rotary head, both mounted on a hydraulic side shift. Thanks to this on/off hole slidramatic side shift, the rig can easily switch from sonic to a standard rotary head.

"To facilitate equipment handling, the sonic head can be equipped with a head tilt that offers enhanced safety. Several units with this configuration have already been introduced in the UK market through our long-standing UK dealer JKS Boyles UK Ltd."

Nathan Jones, director at JKS Boyles, Comacchio's distributor for the UK and Ireland, says: "Our customers have been able to drill both sonically through tricky overburden, then switch quickly to more 'conventional' and/or wireline coring and in-situ testing methods, seamlessly with one machine. This allows multiple contract aspirations to be easily met, without the need for larger equipment that would require a higher investment in the start-up phase and thus a more expensive maintenance cycle throughout the entire lifetime of the machine."

The dual drilling system can provide a number of cost savings in key areas:

- Transport and logistics – the compact head size allows compatibility with Comacchio's lightweight and transportable drilling rig(s), as small as the GEO305, a multipurpose geotechnical drilling rig in the 4 to 5t weight class
- Small number of operating staff required and in-hole tooling requirement costs – given there is no longer a requirement for the historically accepted CP to 'rotary follow-on' format



- Reduced machine breakdown and maintenance – thanks to its simplistic design
- Improved health and safety – due to a sizeable reduction in manual handling versus the above-mentioned methods
- Efficiency and speed – sonic's basic ability to return high-quality continuous samples from near-surface unconsolidated or mixed materials

"The first GEO602 rig with dual system included was supplied to our client Structural Soils. Its first assignment was in Aberdeen, drilling 35m deep boreholes through hard glacial boulder clay containing cobbles, boulders of Gneiss and granite," Jones adds. "Despite the challenging ground conditions the ability to return high-quality continuous samples from near-surface unconsolidated or mixed materials presents a major advantage of this methodology". ▼

Customer case study – Structural Soils

Structural Soils is currently using two Comacchio rigs equipped with sonic heads in a major ongoing ground investigation project on a site in northwest England.

The contract includes approximately 40 sonic boreholes, all with rotary coring follow on to depths of up to 35m, with superficial thicknesses proven to date to be up to 25m. The sonic method was selected by the engineer as the superficial glacial soils were known from past conventional drilling attempts to be particularly challenging due to the large size of some of the clasts within the glacial till.

Both rigs are equipped with sonic heads mounted on a slide, with separate dedicated conventional coring heads which are utilised when solid ground is reached. The rotary section of each borehole has been completed using Geobor-S wireline methods.

Stephen Mackereth, MD, Structural Soils, says: "On this site, we have been using both our sonic GEO305 and sonic GEO602 rigs to undertake these boreholes. Interestingly, both rigs are progressing at a similar speed through both the overburden and solid geology,

although the larger rig has the advantage of being able to pull out the string in longer sections.

"The rigs have been the perfect choice for this site, not only because of the sonic requirement but also because the solid geology comprises strongly cemented crystalline siltstones and sandstones, which require a high-speed rotary head to facilitate the use of diamond impregnated bits to optimise core production and recovery.

"Both rigs have performed well and the drillers, the client and the client's engineer have been pleased with productivity and the quality of samples."



Structural Soils' site agent, Mark Honess, captured this shot of the company's Comacchio GEO 305 at work

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