World’s first all-electric ground-drilling rig meets tougher construction industry requirements

EMMELOORD, FLEVOLAND, THE NETHERLANDS, November 1, 2022 /EINPresswire.com/ -- Duratherm, WE Engineering and Conrad Stanen have developed and tested the first fully electric drilling rig in the world. The three Dutch companies have spent 30 months working on the 300-E, a completely emissions-free rig. Recent field testing shows excellent results.

300-E operator

Recently, Dutch Minister Hugo de Jonge of Housing and Spatial Planning made provincial construction agreements to build 90,000 new homes between now and 2030. The Netherlands faces the challenge of ensuring this is done as emission-free as possible. Drilling rigs that run on fossil fuels no longer comply with current environmental standards. In cities such as Amsterdam, the use of fossil-fuel-driven drilling rigs in the construction of ground energy systems will be banned by 2025. ‘Both the intrinsic motivation to work ever more sustainably and efficiently and the increasing impact of new regulations are creating urgency,’ says initiator Bert Draaijer, owner of wells specialists Duratherm. ‘Electric drilling will simply become the standard.’

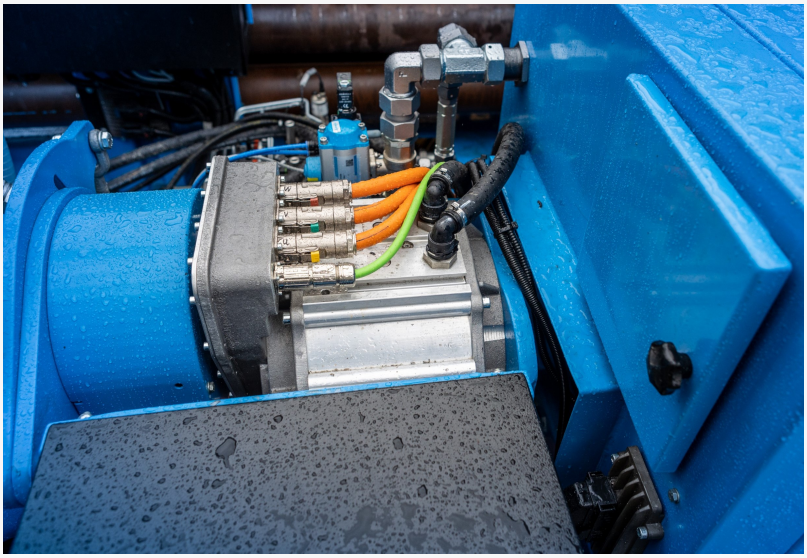
> “A huge amount of knowledge has gone into this machine’s design. It’s an engineering masterpiece and has everything it needs to meet future emissions, noise level and sustainability requirements.”
>
> *Bram Muurlink, owner and Head of Innovation at Conrad*

The 300-E, the first fully electric-powered drilling rig, has been under development since 2019. Bert Draaijer then sat down with Duratherm’s Interim Project Manager John Habers to work out how they could achieve the transition to electric drilling rigs. Making Duratherm’s machinery - some ten soil drilling rigs - more sustainable was going to involve a lot of time and money. Duratherm again sought cooperation with engineering experts

at WE Engineers, as well as with Conrad, the only manufacturer of custom drilling rigs in the Netherlands. The combination of knowledge and expertise resulted in the relatively fast development of an electric drilling rig that meets current market requirements.

As far as ease of use and operation are concerned, the new Combi 300-E is as capable as the existing Combi 300, which can be used in drilling techniques such as flushing drilling, vacuum drilling and airlift drilling. The 300-E has a pull-up force of 15,000 daNm and a drill head torque of 1,200 daNm; exactly the same figures as those produced by the diesel engine-powered Combi 300. Testing with the Combi 300-E has shown that the all-electric version has a number of additional advantages such as less noise, less maintenance and no harmful emissions.

WORLD'S FIRST 100% EMISSION-FREE AND COMPLETELY ELECTRICALLY DRIVEN AUGER, WITHOUT AN EXTENSION CORD



close-up of the 300-E

'When "electrifying" an old drilling rig powered by a powerful diesel engine, we conducted a thorough analysis of the required energy for each component. Working together, we continuously sought a balance between output, weight, size, cost and user-friendliness,' says Habers. 'Duratherm's drillers were involved from the outset. They used their expertise and extensive experience to provide valuable input allowing us to obtain the optimum performance.'

Charging batteries

The 300-E is fitted with six 192kW/hr lithium batteries producing the 650 volts required to drive the four compact and powerful water-cooled permanent magnet motors. Two of the batteries installed in the rig can be swapped during use. Two other batteries can be charged using solar

energy and two full batteries serve to replace discharged ones. During drilling, the 300-E can be powered by construction site power via a grip connection. Up to 50 kW can be used during drilling and it can also be used for recharging the batteries overnight.

The rig's operating hours depend on the type of drilling and the geological composition of the ground. 'During test drilling, we noticed that battery use was relatively low', says Bernt Barink of WE Engineers. 'The machines only used 15 of the expected 25 kWh. New tests will have to demonstrate how the Combi 300-E performs under a range of conditions and in different soil compositions.'

No loss of power
To maximise efficiency, the system is fitted with four batteries so that all the main energy consumers are directly electrically powered during drilling, without loss of power to the hydraulic components. 'Using existing solutions this results in a 20 to 25 per cent efficiency advantage, which obviously has a positive effect on battery usage', says Bram Muurlink, owner and Head of Innovation at Conrad: 'A huge amount of knowledge from the field has gone into this machine's design. It's an engineering masterpiece and has everything it needs to meet future emissions, noise level and sustainability requirements.'

Guido van Tongeren, member of the executive board at Bouwend Nederland (Dutch Construction) and Water & Engineering Manager at Henk van Tongeren Water & Techniek believes the electrification that Conrad is introducing to its product line a fine example of innovation: 'At European level, we're also welcoming these kinds of positive developments. This will be the new standard.'

In this development, the three partners in this project used a grant programme from Operational Programme East (OP Oost) for companies and knowledge institutions in the provinces of Overijssel and Gelderland. The 300-E is available immediately.

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