

Compact electric machines offer advantages

Utilising compact electric machines in construction offers major benefits for contractors – **Mike Woolf** writes

Bobcat's innovative Rogue concept machine highlights potential technology advances



An increasing number of compact construction machine makers are now developing models featuring electric power. The firms have introduced electric versions for segments such as compact loaders and excavators as well as compressors.

Firms such as JCB, Volvo CE and Wacker Neuson have been offering all-electric compact machines aimed at the utility market for some time and other manufacturers have followed suit with their own offerings. The range of equipment available using battery power in the compact machinery segment continues to grow. It is rapidly reaching a situation where all compact machine makers will offer the option of electric models across their respective ranges. While electric machines tend to be more costly to purchase than diesel-powered variants, the long-term savings on maintenance costs and the reduction of risks arising from equipment misuse are key purchase factors for rental companies.

Bobcat recently unveiled its all-electric skid-steer loader, the Bobcat S7X, in addition to a new concept tracked loader, the all-electric and autonomous RogueX. The launch of the S7X follows the 2022 release of the Bobcat T7X all-electric compact tracked loader. Bobcat says

it plans to commercialise the prototype S7X.

However, the next-generation RogueX is purely a concept machine, with no plans currently for commercialising it. The machine is designed to explore the capabilities of electric power, autonomous operation and dual lift-arm geometry.

Like the T7X, the S7X is all-electric, and is powered by a 60.5kWh lithium-ion battery. It features electric drive motors and utilises ball screw actuators for lift and tilt functions.

Bobcat says that, together, the battery and electrical powertrain deliver instantaneous torque that is triple that of conventional loaders. The S7X skid-steer loader is designed to offer smooth operation with minimal vibration and nearly silent running. The S7X can operate for up to 8 hours on a single charge depending on the application. A full charge takes approximately 10 hours.

While resembling a tracked loader, the RogueX machine is a research and development project, developed to advance Bobcat innovation, evaluate customer perceptions and test the limits of machine functionality.

As jobsites change and operators turn to remote operation, Bobcat took its concept further by eliminating an operator station, allowing the machine to be used either remotely or autonomously, in locations that would be difficult to access or dangerous for an

operator.

Hitachi Construction Machinery (Europe) is now offering 5tonne and 8tonne excavator models featuring battery power. Low working noise, low maintenance needs and high performance are features claimed for both models.

The ZX55U-6EB offers manoeuvrability



John Deere is developing its compact electric wheeled loader

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Venieri is one of several firms now introducing electric compact machines

» in confined spaces, as it features the short tail swing of the diesel ZX55U-6 model, while retaining the same high performance. Customers can choose between battery-powered operation, using 39kWh lithium-ion batteries, and wired operation, which allows the machine to work while charging from a CEE 400VAC 3-phase power source.

Reduced maintenance costs and downtime are claimed while the status of the electric drive system, including battery level and motor load factor, can be monitored remotely. Safety is enhanced by the rear camera to monitor the secure connection of the cable during wired operation. It has a rated power of 33kW, a battery capacity of 39kWh and an operating weight of 5.3tonnes, with an onboard charger rating of 22kW.

The ZX55U-6EB shares features with the 8tonne ZE85 electric excavator, which was developed by European Application Center (EAC), a joint venture between Hitachi Construction Machinery and Kiesel Technologie Entwicklung (KTEG).

The 8tonne ZX85-6EB has been designed to improve safety for operators, increase productivity and reduce lifecycle costs. It has an 800V operating voltage and provides the same powerful performance as the ZX85US-6 diesel-powered model. It shares the same hydraulic system, and is also suited to working safely and efficiently in small spaces with exceptional manoeuvrability.

Operators can work throughout the day with the ZX85-6EB, utilising the 100kWh lithium-ion batteries, and wired operation. This allows the machine to work while charging from a CEE 400VAC three-phase power source.

For faster charging, an optional CCS2 plug allows the battery to be fully recharged in 45 minutes. Depending on the application, the ZX85-6EB has an average running time of 5.5 hours. And operators could work for longer periods between charging with the optional increased 133kWh battery capacity. This also increases the machine weight so that an extra counterweight is not required.

To ensure an optimum and efficient performance, as well as high availability, a heat pump system keeps the battery module warm in cold weather. It also boosts durability

and battery life. The status of the electric drive system, including battery level and motor load factor, can be monitored remotely. Reduced external sound levels allow for greater flexibility for working times and options. Safety is enhanced by the rear camera, which provides visibility of the jobsite.

Weighing 8.75tonnes, the machine has a rated power of 40kW, a battery capacity of 100kWh (with an optional extra 33kWh), an operating voltage of 800V and an onboard charger rated at 44kW.

John Deere is working on an all-electric compact wheel loader. The 244 X-tier model is powered by a 52kW electric motor and will be offered with bucket sizes from 0.8-1.1m³, depending on the application. The machine uses a proven Z-bar linkage. Both Level 2 onboard AC and Level 3 DC charging systems will be available for the machine, allowing fast charging.

This is one of a series of electric machines from John Deere, following on from the 310 X-tier backhoe loader, which has been in development for some time. The battery electric backhoe loader features the same hydraulics as the firm's comparable diesel model. Since

the first prototype was unveiled two years ago, the battery size has been increased by 50% following testing in the field, and the machine utilises proven automotive charging technology.

Official launch dates for production versions of the electric 244 X-tier compact wheeled loader and electric 310 X-tier backhoe loader have yet to be revealed but the development process for both models is well in hand.

Other new compact wheeled loaders and excavators will be introduced soon. VF Venieri (Venieri) is launching an electric compact wheeled loader range to complement its existing diesel driven line. Based in Lugo, Emilia-Romagna, Venieri plans to keep growing in its small/middle-size equipment offering, supplying heavy-duty products powered by the best available components offered by the premium market.

And Wacker Neuson is launching a 1.7tonne battery-powered EZ17e excavator into the North American market. The zero-emission excavator has already been a success in the European market and will launch in North America in late 2023 or early 2024. ■

Bobcat

www.bobcat.com

Hitachi

www.hitachim.eu

JCB

www.jcb.com

John Deere

www.deere.com

VF Venieri

www.vf-venieri.com

Volvo CE

www.volvoce.com



Wacker Neuson is introducing its electric mini excavator to the North American market