

Robel

Robel E³ Battery Technology: Economic. Ecologic. Ergonomic.



Picture 1: Robel E³ machine fleet: 13.45 MD grinding machine, 76.20 high-pressure hydraulic aggregate, 62.20L vertical tamper, 30.20 impact wrench, 13.90 rail cutter, 10.20 rail drilling machine, 70.03 power supply, 12.20 rail band saw, all powered by exchangeable high-performance batteries © Robel

Global climate protection targets call for alternative, environmentally friendly technologies.

Railway as a traditionally “green” means of transport plays a significant role in this scenario. To reach decarbonisation ambitions, the sector as a whole needs to come up with new, clean concepts. In railway construction,

one focus lies on the development of alternative drives for vehicles and hand-operated machines. International demand is high – distributors worldwide expect 40% of all track construction machines to be battery-operated by 2025. Robel has been developing new drive and power supply technologies for their hand-operated construction machines for years. As far back as 2013, the company presented a rail drilling machine and an impact wrench with modular rechargeable

battery packs for zero-emission and ergonomic work on the track. The lithium batteries together with high-performance electric motors have since become a true alternative to the combustion engine, providing high performance and durability as well as comfortable working. In 2021, Robel, as partner company of Plasser & Theurer, has adopted the renowned E³ brand for its complete battery product range (picture 1).

The Battery-Powered Worksite

That the expansion of the battery-powered fleet of machines has a top priority at Robel, can be seen from the considerable growth of the company's 'battery family'.

Beside the rail band saw and the vertical tamper which already have a proven range of use in track maintenance, there is a new battery high-pressure hydraulic aggregate to operate both, the rail stressor and the weld trimmer (picture 2). All these machines are powered by the same interchangeable batteries.

This group is complemented by further electric machines such as a rail cutter, a welding joint grinding machine and a hybrid rail head profile grinding machine (picture 3), that can either be driven by battery or power supply. With this machinery pool, it is possible for the first time to implement a complete rail



Picture 2: One battery-powered high-pressure hydraulic aggregate operates two machines: the rail stressor and weld trimmer © Robel

exchange with battery-powered machines only.

Modular Design for More Sustainability

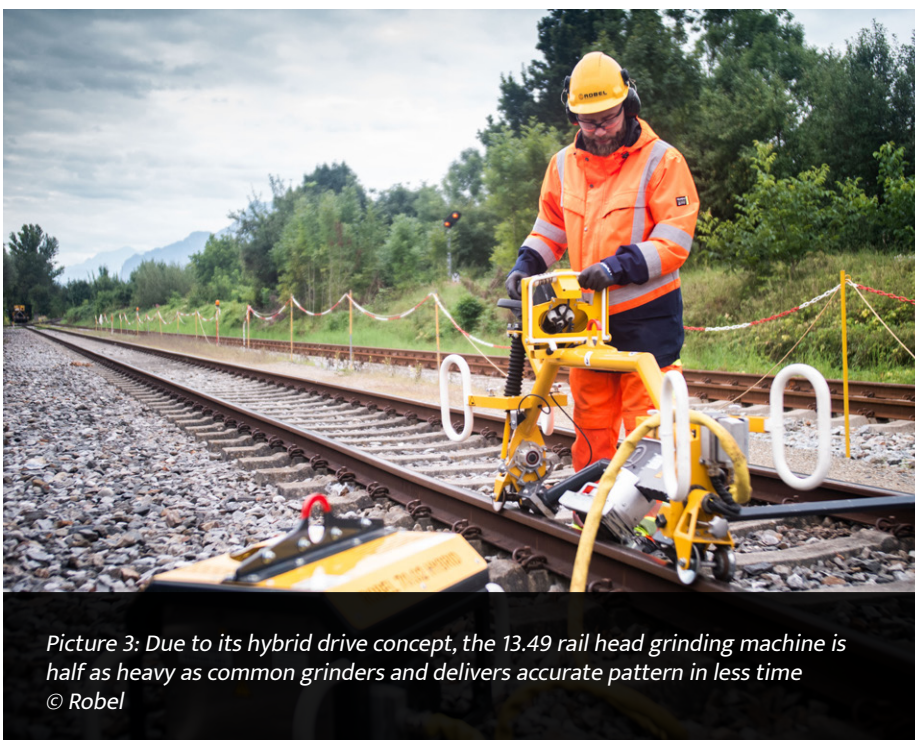
All the Robel family of battery-powered machines work with the same battery pack – a lithium-ion based accumulator with a voltage level of either 43 or 52 Volts and different capacities – 400, 700 and

2300Wh (picture 4). The battery is firmly secured to the machine through form-fit and position lock, yet it can be released with just two actions by hand.

Sustainability is a key argument in favour of alternative drives. Regardless of the task ahead, one battery charge is sufficient for at least one work shift, and usually much longer. With the rail cutter, a trained member of staff carries out up to 16 cuts per battery charge. The cordless impact wrench does more than 600 tightening cycles without reloading; the battery performance of the high-pressure power pack is enough for work at several welding points. After 500 loading cycles, the capacity is still 80%. The battery pack is completely maintenance-free. The machines themselves are capable of operating fault-free for many years due to their sturdy design and low wear.

Less Weight & HAVs for Improved Ergonomics and Safety

The latest generation of electric motors is considerably smaller and lighter than their predecessors



Picture 3: Due to its hybrid drive concept, the 13.49 rail head grinding machine is half as heavy as common grinders and delivers accurate pattern in less time © Robel

with the same output. There are no fuel tanks or handling of fuel, no hot exhausts or engine parts during operation. Furthermore, the machine operators profit from considerably less hand-arm vibrations and are no longer exposed to engine fumes or a high level of noise. The compact motor opens up new possibilities for its positioning on the machine, e.g. to optimise its centre of gravity. Thus, operation and transport of the machine require considerably less effort.

So Quiet and Clean, They Can Be Used Everywhere

It has become increasingly difficult for track construction sites in noise-sensitive areas to be accepted by local residents and local authorities due to the intolerable noise levels, especially at night. The use of battery-powered machines and tools reduces the on-site noise levels considerably: the Robel battery rail band saw is verifiably 10 times quieter than a comparable cutting device with a combustion engine.

In some other cases, maintenance only becomes possible with alternative drives, for instance, where the use of fuel is forbidden by law, such as in certain tunnels.

In terrain that is difficult to access it can be a huge benefit for operators if the machines can be transported easily by hand over longer distances with little effort. Here, the battery-powered machines come into their own due to their lightweight design. Also, a lot less material is moved to the work site as the replacement batteries are the same for all machines.

The Question of Cost – Why Battery Technology Pays Off

For the maintenance company the total cost of ownership (TCO), made up of procurement, service life and maintenance costs, is a key consideration. The TCO of battery-powered machines and tools always comes up trumps.

A 2- or 4-stroke engine has around 200 parts, many of which are

moving. The brushless electric motor essentially consists of the stator, rotor and the bearing, making it completely maintenance-free. Furthermore, a battery-powered drilling machine or impact wrench will not require a gearbox for right-left rotation, which increases the availability of the machine even further. Monitoring and routine activities, such as filling up with fuel, oil change and filter cleaning as well as the considerable spare parts logistics, including storage, in the case of combustion engines are a thing of the past.

Add to this the cost savings during operation: machines powered by electric motors are, unlike combustion engines, ready to be operated on site straight away, at full speed and performance, without the need for a warm-up phase. No more cold start attempts, which are often required for petrol engines in cold weather. Faster drilling and wrenching cycles increase the work output per shift. Intelligent design, LED lighting of the work area and the positioning of the switches and handles, deliver a better work result in shorter time.



Picture 4: All Robel cordless machines work with fully compatible 400, 700 and 2300Wh batteries © Achim Uhlenhut

More about the ROBEL E³ machinery pool: <https://www.robels.com/en/e3/>

