

## **Alternative drive concepts by Liebherr – the ideal solution for every application**

- In inner cities – electric drives produce lower emissions
- In recycling operations and at ports – electric powered material handling machines
- The XPower wheel loader with tried-and-tested power-split driveline technology fitted as standard.
- In tough mining conditions: diesel-electric mining trucks and electric powered mining excavators

**Munich (Germany), 8 April 2019 – At Bauma 2019, Liebherr will be presenting innovative drive concepts for various applications. Liebherr is continuously developing drive concepts so that the Group is prepared for future requirements and can offer its customers solutions for today and tomorrow.**

Liebherr always actively engages with its customers along every step of the development process. After all, customers know their fields of application and general conditions better than anyone else. When it comes to implementation, Liebherr combines the experience and expectations of its customers with the know-how and testing infrastructure of the Group. This is helped by the fact that the company is also able to pick up and adapt solutions from other projects and product lines for new developments when it works on its latest innovations and solutions. This is also the case with drive technologies.

The choice of the respective drive concept depends on the application profile of the product. For tougher applications with a high annual operating life, such as large-scale earthmoving construction sites or in the mining sector, the use of combustion engines powered by hydrogen or synthetic fuels seems more likely. When the focus is on reducing exhaust and noise emissions, machines with alternative drives are in high demand. Which drive concept is suitable for which application and which machine is a question of economic factors. In addition to that, rapid urbanisation is also ushering in stricter emissions standards for vehicles and machinery used in inner cities.

At Bauma 2019, Liebherr will be presenting solutions such as the new electrically driven truck mixer series ETM, the electrically driven stationary concrete pump, electrically driven material handling machines, the XPower wheel loader with power-split driveline technology, a diesel-electric powered mining truck, a 100-per-cent electric mining excavator and the world's first battery powered rotary drilling rig.

### **The new truck mixer series with an electrical drum drive**

At Bauma 2019, the Liebherr Group is presenting for the first time its truck mixer with an electric drum drive. The first models from the new ETM series are expected to be delivered starting at the third quarter of 2019. This means that Liebherr will be offering its customers a complete range of drum drives in different sizes and even a semi-trailer version.

Battery capacity has been designed to cope with challenging mixed operations and last for the entire working day during normal operation. As a plug-in hybrid, the batteries can be recharged when the truck mixer is being driven or externally via a power plug at a concrete mixing plant, for example. The batteries are usually fully recharged at the end of a shift. Liebherr has come up with a future-proof solution by using a system voltage of 650 V/ DC which is in line with levels employed by automotive manufacturers. Operating costs are equally important for vehicle fleet operators: despite a slight increase in diesel consumption due to the alternator drive, an e-transport mixer can achieve fuel savings of around 30 per cent.

The 70 E electric stationary concrete pump scores very highly with operators and local residents: no exhaust fumes, less noise and lower service costs. Liebherr's 70 E electric stationary concrete pump provides a powerful, zero-emission alternative which is ideal for high-rise pumping and for conveying concrete over long distances. Unlike diesel-powered models, the pump does not produce any emissions and generates considerably less noise. The robust concrete pump is also easy to maintain and can be flexibly positioned.

## **LB 16 unplugged – rotary drilling rig with battery**

At the Liebherr stand, visitors can marvel at the LB 16 unplugged - the world's first large-diameter drilling rig on the market that runs on rechargeable batteries. It's not just powered by alternative electro-hydraulic drive technology; its battery also enables it to be used without a cable (unplugged).

The LB 16 unplugged has no limitations in performance and application compared to the conventional version. Just like diesel-powered machines, the LB 16 can achieve a maximum drilling diameter of 1,500 mm and a drilling depth of 34.5 m.

The battery is designed for a working day of 10-hours. It is charged via a conventional construction site connection (32 A, 63 A). Quick charging is also possible in just 7 hours with a 125-A connection.

## **Electric-powered material handling machines for recycling operations and at ports**

Liebherr is presenting two electric material handling machines at Bauma 2019: the LH 26 M Industry and the LH 110 C Gantry Port. The electric drive concept developed for material handling machines is low-maintenance, quiet and environmentally-friendly, so emissions regulations never need to be a concern.

Liebherr's LH 26 M Industry electric material handling machine is ideal for recycling operations and is an ingenious concept down to the smallest detail. The machine's innovative drive technologies include a 90 kW Liebherr electric motor, providing powerful and dynamic working movements, as well as an additional electric motor for auxiliary equipment. This ensures that power is purposefully distributed to deliver maximum energy efficiency. The LH 26 M has a sophisticated frequency converter system which provides dynamic and sensitive working movements. Another key benefit is the way the system can be easily adapted to work with all power supply networks that are commonly used around the world.

Bauma visitors will also see Liebherr's LH 110 C Port material handling machine for port operations which features an electric transmission. Its impressive features guarantee maximum performance and are setting new standards in terms of cost efficiency: the powerful 300 kW electric engine and the ERC system deliver a total system performance of 478 kW. This, in addition to the machine's fast and dynamic rotational movements, enable up to 1,000 tonnes of material to be handled every hour. The new gantry portal undercarriage ensures that trucks and wagons moving through the harbour area can be quickly and efficiently loaded and unloaded.

### **The XPower wheel loader with tried-and-tested power-split driveline technology fitted as standard**

Liebherr is also presenting three XPower large wheel loaders at Bauma 2019. Liebherr's largest wheel loader, the L 586 XPower®, will be among the vehicles on show. These machines, ranging from the XPower L 550 XPower® large wheel loader to the L 586 XPower®, mark a key milestone in the technological evolution of the Liebherr wheel loader. Liebherr's power-split XPower driveline technology, which is offered as standard, is the core feature of these machines. It combines a hydrostatic drive (which is ideal for short loading cycles) with a mechanical drive, which provides considerable benefits on longer routes. This combination delivers maximum efficiency whatever the application and offers outstanding fuel savings of up to 30 per cent compared with wheel loaders of the same size.

The XPower large wheel loaders have been impressing customers from different industry sectors for over three years, as they are so efficient and reliable. Liebherr's tried-and-tested XPower driveline technology is a fine example of robust design, as it generates its power through the interaction between two different drive paths. The load is therefore distributed between the two drive paths and this greatly extends the service life of the components. Machine operators can work continuously without any downtime and operational safety increases. Through continuous and targeted development and investment, Liebherr has ensured that the axles and other components, such as the hydraulic cylinders, are exceptionally robust. This means that XPower wheel loaders consistently deliver maximum reliability.

### **The MK 88-4.1 zero-emission mobile construction crane**

Liebherr construction cranes are equipped with electric drives, ensuring they not only operate quietly, but also protect the environment. This is especially advantageous when working at night. The new MK 88-4.1 mobile construction crane also includes a 32 amp connection alongside the standard 63 amp version. An intelligent energy management system ensures that the maximum amount of power is always available to operate the crane. This means that the MK 88-4.1 can be powered by electricity even when the mains supply is limited if there are no other options available at the operating site.

Thanks to their electric drives, applications with Liebherr mobile construction cranes are not only low-noise, but also environmentally friendly. This is particularly advantageous during night-time operations. The new MK 88-4.1 mobile construction crane is now equipped with a 32-ampere connection in addition to the usual 63-amp connection. Thanks to an intelligent energy management system, the maximum available power is always used for crane operation. This means that the MK 88-4.1 can be operated with electricity even when the mains power is lower, if the conditions on site do not allow otherwise.

Electric drives are also generally used on rotating tower cranes. The ability to operate quietly and emission-free are important criteria for rotating tower cranes on site in inner city areas.

Electric drives are always used for tower cranes. Quiet and emission-free operation are important criteria for tower cranes when working in city centres.

### **Especially tough operating conditions: diesel-electric mining trucks and electric powered mining excavators**

The benefits of diesel-electric transmissions are most obvious when it comes to high power applications and the very long operating times that are the norm in the mining industry. Liebherr has been producing mining trucks with this drivetrain for around

twenty years and has gained a great deal of useful experience in this area. It has consequently become clear that greater efficiency can be leveraged for driving on upward slopes by using more electrification. Liebherr is building on the experience it has gained manufacturing machines that need to operate for very long periods over exactly the same routes by working with customers (in Austria and Panama, for example) to electrify the routes completely by using overhead lines and current collectors on their diesel-electric mining trucks.

High performance and a very long service life are required for use in mining. This is where diesel-electric drives can make the most of their advantages. Liebherr has been building its mining trucks with this drive train for around twenty years and has gained important experience. It has also become clear that there is still a lot of efficiency potential to be tapped by further electrification on uphill stretches. After dealing with very long periods of operation on the same routes in the mining sector, Liebherr is working with customers in Austria and Panama, for example, to completely electrify these journeys with the help of overhead lines and current collectors on the diesel-electric mining trucks.

The company Eurovias Lausitzer Grauwacke GmbH uses a R 9200 E with an electric transmission and a face shovel attachment. This 210-tonne excavator has a nominal power rating of 850 kW. The R 9200 E is able to achieve a balance here between performance and environmental responsibility by ensuring that people and the environment are not exposed to diesel and noise emissions. The electric engine is also equipped with an air-to-air heat exchanger, a simple, integrated system which reduces maintenance work by up to 25 per cent and reduces machine downtime.

The R 9200 is the only mining excavator in the 200-tonne class to be equipped with a closed-loop swing circuit instead of an open hydraulic circuit. This enables a maximum swing torque to be achieved whilst allowing the oil to flow completely to the hydraulic system which ultimately results in faster cycle times. Furthermore, the electric motor drive ensures that during the loading cycle the hydraulic power is temporarily above the nominal engine rating which further reduces cycle times and increases efficiency.

## **Captions**

liebherr-truck-mixer-etm-1004-za-1.jpg

No compromises on the construction site with Liebherr's ETM series: maximum power, significantly quieter with zero emissions.

liebherr-lb16-unplugged.jpg

The Liebherr LB 16 unplugged is the first "local zero emission" drilling rig on the market.

liebherr-material-handler-lh26m-industry.jpg

Efficient and environmentally-friendly thanks to electric drive technology: the Liebherr LH 26 M Industry.

liebherr-wheel-loader-l586-xpower.jpg

Highly efficient no matter the application: the L 586 XPower® with power-split driveline technology fitted as standard.

liebherr-mobile-construction-cranes-mk88-4.1.jpg

Facelift: The new Liebherr mobile construction crane MK 88-4.1.

liebherr-mining-excavator-r9200-e-grauwacke.jpg

The Liebherr R 9200 E operating in an open-cast mine for the company Lausitzer Grauwacke (Eurovia) in Saxony.

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## **Published by**

Liebherr-International Deutschland GmbH

Biberach an der Riss, Germany

[www.liebherr.com](http://www.liebherr.com)