THE NEXT STEP – THE HYBRID MACHINE

The EU Climate Goals 2030 comprise a comprehensive climate and energy package. Railway administrations such as Deutsche Bahn (German Railway) and Österreichische Bundesbahnen (Austrian Federal Railways) develop strategies for a sustainable network management. We want to help our customers work cost-efficiently and act flexibly under these conditions.

The solution we are offering is a new drive concept: it allows the machine to be powered either via a diesel engine or via an electric motor using the electrical energy of the contact wire. This applies to both, travelling and working. As a result, the local CO₂ emission is nearly zero and in connection with the extensive noise protection measures our customers are enabled to meet the ecological framework conditions for infrastructure maintenance.

Cost-efficiency for the operator. Rising fuel prices, low work shift returns and high staff costs – this is the reality contractors have to face. The hybrid machine offers the operator numerous options to reduce the total costs for the long term: whenever current can be collected from the overhead line, the diesel main engine will be switched off. As a result, fuel consumption and, consequently, time and cost intensive refuelling is reduced. Moreover, a significant extension of the service intervals due to the lower mileage of the diesel engine lowers the costs.

The hybrid drive car. The drive concept of the machine includes a diesel engine similar to those used so far, plus an additional electric motor for power supply via the overhead line. The electric components have been purchased from renowned manufacturers. We did not compromise on quality. The control system has been developed by Plasser & Theurer. This was pioneering work as this was the first track maintenance machine of this output category to be fitted with this drive system.
Economic
- benefits the procurement of awards thanks to ecobonus
- avoids eco penalties
- extends the range of applications in urban areas and tunnels
- lowers the costs for fuel and logistics
- reduces maintenance costs of the drive

Ecologic
- complies with stricter environmental protection requirements
- reduces pollutant emissions
- uses “green” traction current
- emits less noise

Ergonomic
- reduces noise pollution and exhaust emissions
- offers ergonomically optimised and attractive workplaces

More on this topic:
www.plassertheurer.com/aktuelltv-en
Whenever current can be collected from the overhead line, the entire machine can be powered electrically both during work and transfer. When travelling through insulated sections, there is no need to stop the machine or to interrupt the work sequence. A fully automatic control sequence triggering the change of drive starts the diesel engine, regulates the smooth transition between the electronic motor and diesel engine and then switches off the electric drive. As soon as the system notes that current can be collected again, it automatically switches back to electric drive.

**Indirect brake system with energy recovery.** The hybrid drive system enables a braking effect to be achieved due to the moment of the electric motor working as a generator during braking. The electricity generated can be fed back to the grid. If feeding the grid is not possible due to regulations of the railway administration, the energy can be reduced via a braking resistor mounted on the roof. Both scenarios lead to a longer service life of the brakes thanks to less wear.

**Generator set for work breaks.** To ensure ecological operation of the on-board network during standstill, a generator set with a separate diesel engine is mounted on the machine. It supplies the machine’s electrical consumers such as lighting, ventilation, computer etc. with power when current collection from the overhead line is not possible.

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**THE HYBRID DRIVE SYSTEM E³**

The machine is powered either via an electric motor or via a diesel engine. It is driven hydrostatically via one drive shaft each to the pump distributor gear which generates, as in other machines, the hydraulic pressure for all systems, from the drive to the work units.

![Diagram of the hybrid drive system E³](image)
HYBRID DRIVE FOR THREE WELL-PROVEN MACHINES

The first two machines with hybrid drive, the 09-4X Dynamic Tamping Express E³ and the BDS 2000 E³, have been put into operation by Franz Plasser Vermietung von Bahnbaumaschinen GmbH in early August 2015. The third machine, a universal turnout tamping machine, is manufactured for Krebs Gleisbau and will be operated in Switzerland for the first time.

Naturally, our work technology remains unchanged. Therefore, top quality continues to be offered – this time even with a smaller “ecological wheelprint”. It goes without saying that all three machines are suited for line category C2.

Maintaining tracks and turnouts using the new drive concept. The drive unit of the Unimat 09-32/4S Dynamic E³ is positioned in the middle of the machine. This machine will be supplied to Krebs Gleisbau as it has been awarded a contract of Schweizer Bundesbahn (Swiss Federal Railway) thanks to the new hybrid drive concept.

This continuous action machine is suited for both maintenance of tracks and turnouts. ♦

Tamping and ballast management – quiet please! The electric drive in connection with the noise protection measures at the tamping and stabilising units of the 09-4X Dynamic Tamping Express E³ reduces the noise emitted by the machine in operation to a minimum. The BDS 2000 E³ has been designed to work as quietly as possible as well: the inside of the hopper and sweeper units have, for example, been fitted with sound protection mats.

New, ergonomic design of the cabins. All cabins have been redesigned both in terms of ergonomics and colour. The control system Plasser Intelligent Control makes it possible to control all functions via touch screens offering clear menu guides. Only those operating controls that are needed continuously are incorporated in the armrests of the operator’s seat.

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