



Gmeinder Lokomotiven has recently focused its publicity on the new Type DE75 BB locomotive family, incorporating a range of locomotives fitted with two propulsion units, these either both diesels or incorporated in hybrid drivelines (see R 3/16, p. 22), and the prototypes are now being built.

However Gmeinder's InnoTrans exhibit was a modernised three-axle, 10,280 mm long Type **DE60 C HYBRID** shunter, resulting from the comprehensive rebuilding of a Type DE 500C diesel shunter dating from the early 1990s. This was a type also built by Gmeinder, which recently acquired six

of these machines (and 12 more of different types) from BASF, following the latter taking delivery of a batch of 22 new Vossloh-built Type DE18, DE12 and G6 diesel shunters (see R 6/14, pp. 43-44).

Gmeinder's intention is to rebuild all six and offer them as a cheaper option than completely new hybrid shunters. The propulsion system is essentially the same as that of the hybrid version of the Type DE75 BB, combining a 354 kW diesel-generator and a 350 kW Li-Ion battery pack. Maximum power output at wheel rim is 435 kW and starting tractive effort is 200 kN. Top service speed is 60 km/h, while weight in work-



ing order is $67 \pm 3\%$, and the fuel tank has a capacity of 1,900 litres.

The three battery packs were supplied by Hoppecke. These have a combined weight of 1.6 t, offer a nominal voltage of 666 V, and have a current capacity of 138 Ah and hence an energy store of 92 kWh and the energy/weight proportion of 57.5 Wh/kg.

The InnoTrans exhibit had recently been completed, and as a result did not carry any numbering. It has to undergo the complete authorisation procedure for shunting duties before being used for this activity. This authorisation will also

cover the use of the Li-Ion batteries and associated fire protection measures. Li-Ion batteries are relatively new on the rail vehicle scene, but enjoy the advantage over Ni-Cd batteries of having an improved ratio of energy store to weight and a longer lifespan.

Li-Ion-batteries are also REACH-compliant, this being the EU regulation addressing the production and use of chemical substances, and their potential impacts on both human health and the environment. Cadmium in batteries may be banned in the future depending on an assessment of its impact on health.



Photo: Jürg D. Lüthard

The ZAGRO Group of Bad Rappenau-Grombach (north of Stuttgart), which incorporates ZAGRO Bahn- und Baumaschinen, SRT Schörling Rail Tech, Gmeinder Lokomotiven and ZWEIWEIG International, presented several outdoor exhibits, including light duty unmanned rail shunters and road/rail vehicles. The left-hand photo shows a **ZAGRO E-MAXI M short** shunter (on the left), which is battery-powered. It weighs 3,500 kg and is able to haul a load of

150 t on even track. It is also capable of rotating itself on the spot. It is 1,890 mm long, 1,840 mm wide and 1,200 mm high above rail top. It has two mounting points for a coupling bar and is equipped with radio remote control, an on-board battery charger and an electric UIC coupling.

On the right is a **ZAGRO E-MAXI XL** unmanned shunter. This is also battery powered, but on account of its greater size weighs 15,000 kg in work-



Photo: ZAGRO

ing order. It is able to haul a trailing load of between 300 and 700 t on even track. It also rotates itself on the spot. It is 4,250 mm long, 2,150 mm wide, and 1,200 mm high above rail top. It is fitted with radio remote control, a battery charger, a pneumatic coupling and also with a pneumatic brake.

In the left background of this photo is a **Unimog U 423** host truck, which was exhibited here because ZAGRO is in partnership with Daimler AG for the distribution, service and technology of Mercedes-Benz Unimog vehicles.

One of ZAGRO's recent contracts is shown in the right-hand photo. This is a rescue vehicle built for ZKM Gdańsk, its design based on that of the Unimog U 423 host truck. In the ZKM Gdańsk fleet it has the fleet number **7524**. This photo was taken at ZKM Gdańsk's tramway depot on Wita Stwosza street on 27 October 2016. The order for this rescue vehicle was placed on 18 January 2016.

The rescue vehicle is powered by a 169 kW Euro VI diesel engine. Behind the cab is a rescue team cabin, so that in the event of a tram accident, a rescue team of up to six people can be moved to the scene. The Unimog U 423 is equipped with a hydraulic torque converter transmission to increase the torque at the axles for high tractive capacity, enabling it to haul a damaged or stranded tram. It also has a 50 kN electric winch. A tool cabinet housing the necessary equipment to re-rail and recover damaged trams is provided, and is easily accessible from street level via flights of steps.

The Unimog U 423 is a road/rail vehicle, whose rail guidance axles are designed specifically for use on tram tracks. Since bogies are used, it is possible to negotiate very tight radius curves up to 18 m. Top service speed when used on rail is 30 km/h, and when on road 85 km/h.

On 21 December 2016 **Vossloh AG** signed a contract for the sale of the Electrical Systems business unit, which is presented as a discontinued operation, to **Knorr-Bremse Systeme für Schienenfahrzeuge GmbH**, a wholly-owned subsidiary of Knorr-Bremse AG in München. In return, Vossloh AG receives a cash selling price of 72.5 million EUR, including a variable component of 25 million EUR, which is subject to future adjustment should any project not develop according to Vossloh's current expectations. In addition, the buyer has committed to replace all guarantees and sureties that Vossloh had assumed for the Electrical Systems business unit.

The economic transfer to Knorr-Bremse Systeme für Schienenfahrzeuge took effect retroactively on 1 July 2016. Vossloh expects a net cash inflow in the middle double-digit million EUR range when the transaction is completed. The Vossloh AG Supervisory Board has already approved the transaction, though this is still subject to merger control clearances, with completion expected for the first quarter of 2017.