



CASE STUDY



Image: Linsinger

1 | Challenge :

"With HOPPECKE, we have found our ideal partner for this project.

HOPPECKE not only has got solid expertise in the development and production of lithium-ion batteries, but also the necessary certifications for the rail-bound vehicle sector, such as IRIS certification.

For us, one of the decisive factors was that HOPPECKE has many years of extensive experience in the certification of lithium systems."

JÜRGEN BINDER

Technical Director Mobile Rail Milling
LINSINGER Maschinenbau GmbH



Electrification of rail milling trains with the aim of emission-free track maintenance

As the world's leading technology company, the renowned manufacturer of rail milling trains, LINSINGER, headquartered in Laakirchen (Austria) has set itself the goal of being part of the energy transition. For this purpose, LINSINGER has developed the world's first emission-free rail milling train.

Environmentally friendly energy sources are becoming increasingly important in rail transport and not only for passenger transport. With a view to other track maintenance technologies, rail milling is in itself already an environmentally friendly processing technology. At same time, customer requirements for high performance, precision, reliability and safety are pioneering success factors.

To achieve the goal of zero emissions, LINSINGER relies on a fuel cell drive coupled with a sophisticated lithium-ion battery system.

challenge to enable the milling train to operate even in the narrowest tunnel tubes. In order to achieve the smallest possible clearance gauge, two further important challenges had to be solved: The development of a powerful and, above all, small-scale energy storage system.

In its search for a qualified manufacturer and proven expert of lithium-ion energy storage systems, LINSINGER came across HOPPECKE to master the challenges of sustainability as well as environmental friendliness in track maintenance.

Emission-free
due to
ecofriendly
energy sources

Compact design
for
use in the tightest
of environments

**Focus on
quality/ safety**
due to
use in urban areas

Strict regulation
for
exhaust values and
occupational safety



Dominik Huneck
HOPPECKE Rail

"The use of a lithium-ion battery system in combination with innovative fuel cell technology has resulted in an emission-free as well as redundant drive system."

Zero emission
through battery
and fuel cell

Noise reduction
during approach and
milling operation

Cost advantages
due to savings in
operating costs

Sustainability
through optimal
use of energy

2 | Solution: High performance and small size lithium energy storage system

The introduction of the world's first high-performance rail milling machine with both a purely electric traction drive and working units means that the diesel engine is also the last source of emissions to be sidelined.

Rail vehicles with diesel engines account for around 1% of traffic-related soot emissions. In addition, the age of the vehicles and their use over many hours lead to high emission levels, especially in urban areas. A condition that is to be improved with the aim of becoming emission-free.

The innovative energy storage system enables the fuel cells to operate at a steady rate. As soon as the fuel cell produces more energy than is needed for operation, the excess energy is stored. If the energy demand is higher, the battery storage system supplies the additional energy required.

"To make this possible, we worked with LINSINGER to configure a 666 V/ 92 Ah high-voltage lithium system with an energy content of 61 kWh," Dominik Huneck, HOPPECKE project manager, recounts.

The basis of the system is the proven 133 V/ 46 Ah high-power module, which can be connected in series and parallel, enabling voltages of up to 1,000 V and energy contents of up to 220 kWh (with high-energy modules up to 333 kWh) per battery. A climate control system (BTMS) ensures that the battery always operates within the optimum temperature range. This is essential for safety and service life.

Mr. Philipp Haselsteiner, project manager at LINSINGER, has safety first and foremost in mind: "Since the MG11 is mostly used in urban areas and thus frequently in tunnels, we have put the focus on quality and safety. The high-quality lithium-ion cells, the battery management system with its intelligent safety functions, and the innovative emergency smoke cleaning system convinced us that we had found the right partner."

At the same time, the result is remarkable in terms of size. The MG11 Hydro can be transported in a standard 40-foot sea container and can thus be easily "railroaded" anywhere in the world.

"A significant milestone in the development of both companies. It is a new and important benchmark in terms of sustainability as well as environmental friendliness in track maintenance." Jürgen Binder sums up.

Key Benefits

- Environmentally friendly due to emission-free electric drive
- Operational capability even in tight environments
- Cost optimisation through savings in operating costs
- Immediate operational readiness due to battery operation
- Reduced noise pollution during the working process
- Extensive know-how in approval and certification
- Size allows transport in 40-foot containers
- Environmentally friendly, future-oriented energy supply

3 | Products :

- ▶ Lithium energy and performance for all rail applications
- ▶ Full-service contracts for lifetime optimisation
- ▶ Real-time online monitoring portal
- ▶ Individual consulting for optimal battery utilisation



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