Press Release

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Test operations in a mine of the Werra plant

K+S tests electromobility underground

Fertilizer and salt producer K+S is testing the use of electromobility in its German mines. The suitability of the charging infrastructure and safety underground are currently being tested in addition to the everyday suitability and range of the vehicles in a mine at the Werra integrated plant. In the long term, electric vehicles are to replace diesel-powered vehicles in all K+S mines.

“Electric vehicle operation in a mine poses special challenges,” explains Lars Rickfelder, Head of Underground Technology at K+S's Mining central function. Due to general conditions such as high ambient temperatures of up to 50 degrees Celsius, uneven road surfaces, and large inclines, all vehicles must have good off-road capability, which also has an impact on power consumption. Many of the off-road vehicles and pickups are on the road all day in multi-shift operation, covering up to 100 kilometers per shift. They can only ever be charged for short periods in between, and charging facilities cannot be made available everywhere in the mines. “It's comparable to a cab that's on the road around the clock,” says Rickfelder: “Making sure the vehicles are ready to go at all times is not a trivial task, certainly not in a mine.”

The current e-mobility project at the Hattorf-Wintershall mine of the Werra integrated plant consolidates the previous isolated tests of electric vehicles in the German K+S mines. The small electric fleet for tradesmen and area supervisors includes six pick-ups based on a tried-and-tested off-road vehicle. Instead of the diesel engine, an automotive supplier has installed a high-voltage battery, the necessary charging electronics, and an electric motor. According to the manufacturer, the unit has a

maximum output of just under 120 hp and a range of around 110 kilometers. A standard all-electric van for eight passengers is also in use.

The end of the diesel engine is coming

There is currently no standard electric replacement for the diesel-powered all-terrain vehicles and pick-ups that have been used as access vehicles in the mines to date. In recent years, models with low-emission diesel engines have been purchased to reduce emissions. In the meantime, however, the first manufacturers have announced that they will no longer sell their off-road vehicles with diesel engines from 2023. “Due to the ban on combustion engines decided by the EU, vehicles with diesel engines will no longer be available in the long term anyway - the switch to electric vehicles must also be made in the mines, and we must prepare this well,” says Rickfelder. In addition to the suitability of the vehicles for everyday use and their range, important aspects include a suitable charging infrastructure and safety in the mine.

New challenge for fire protection

“The operation of electric vehicles also poses new challenges for the mine rescue teams,” reports Patrick Kniest, Head of Mine Rescue and Fire Protection at the Hattorf-Wintershall mine. Although the risk of fire in electric vehicles is fundamentally lower than in cars with combustion engines, the fire behavior differs. The adapted fire protection concept therefore provides for the mine fire brigade to prepare for a possible operation with burning electric vehicles through exercises and with special equipment. “We have analyzed everything in detail and are well prepared for a possible operation,” says Kniest.

Intelligent charging technology

“Another focus of the trial operation is the charging infrastructure,” says Sebastian Hühne, Head of Technical Staff at the Hattorf-Wintershall mine, who is supporting the project. A separate 400-volt charging network was set up specifically to enable the power-hungry batteries to be charged quickly. Since the mine vehicles are on the move during the shift, the only time left to charge the batteries is during the shift change. This is feasible, as experience to date has shown, although the challenge will increase with more than 300 battery cars in the mine in the long term: “Then we have to use and

distribute the available energy as effectively as possible," says Hühne. The intelligent charging technology used already allows the charging processes at the current twelve charging boxes to be monitored, controlled, and statistically analyzed by computer.

Another aspect of the introduction of e-mobility in the mine is the training of employees. At present, the vehicle manufacturer is still taking care of all the necessary work. "In the long term, of course, the e-vehicles will be maintained and repaired by our own employees. For this purpose, the colleagues have to be trained accordingly," says Hühne.

About K+S and the Werra integrated plant

We make an important contribution to society: We enable farmers securing the world's food supply. Our products keep numerous industries running. We enrich consumers' daily lives and ensure safety in winter. With around 11,000 employees, production sites on two continents, and a global distribution network, we are a reliable partner for our customers. At the same time, we are realigning ourselves: We are focusing even more strongly than before on fertilizers and specialties. We are becoming leaner, more cost-efficient, more digital, and more performance-oriented. On a solid financial basis, we are tapping into new markets and business models. We are committed to our responsibility towards society and the environment in all regions in which we operate. Learn more about K+S at www.kpluss.com.

The Werra integrated potash plant, with its sites at Hattorf and Wintershall in Hesse as well as Unterbreizbach and Merkers in Thuringia, is the largest site of K+S Minerals and Agriculture GmbH. The Werra potash plant produces not only fertilizers but also intermediate products for a wide range of technical and industrial applications as well as for the pharmaceutical, food, and animal feed industries. It employs almost 4400 people, including 300 trainees. It is therefore an important employer and training company in the triangle of towns between Bad Hersfeld, Bad Salzungen, and Eisenach. The plant is also an important customer for local small and medium-sized businesses and significantly contributes to value creation in the region. This makes it a key component in the economic and demographic development of the East Hesse/West Thuringia region.

Your contact person

Press:
Marcus Janz
Phone: +49 561 9301-1254
marcus.janz@k-plus-s.com