2024

Best of VDMA Mining & Minerals

Driving Innovation and International Cooperation

Automation, Digitalization and Interoperability

Decarbonization for the Future

MINING MEDIA INTERNATIONAL

A supplement to *E&MJ*, *Coal Age* and *Equipo Minero*

In cooperation with VDMA Mining & Minerals

VDMA
Mining & Minerals

Foreword:

Welcome to Best of VDMA Mining & Minerals!

In an era defined by the urgent need for sustainable development and environmental responsibility, the mining industry stands at a pivotal juncture. German mining technology, renowned for its precision, innovation, and commitment to excellence, is poised to play a crucial role in the global quest for decarbonization. As we navigate the complex landscape of energy transition, the contributions of German engineering and technological advancements in mining and minerals are more vital than ever.

VDMA Mining & Minerals represents the pinnacle of German and European engineering prowess in the field of extraction and processing of raw materials. Its members, encompassing the brightest minds and most innovative companies in the field, are at the forefront of developing solutions that not only enhance efficiency and productivity but also significantly reduce the environmental impact of mining operations. This confluence of innovation and responsibility is the cornerstone of the industry's transformation towards a more sustainable future.

Central to this transformative journey is the European Union's Critical Raw Materials Act, a legislative framework that underscores the strategic importance of securing a sustainable supply of critical raw materials essential for the EU's green and digital transitions. The Act emphasizes reducing dependency on non-EU countries, promoting recycling, and fostering sustainable mining practices. German mining technology, with its emphasis on high efficiency, precision, and environmental compatibility, is ideally suited to meet these objectives. It enables the extraction and processing of raw materials with minimal environmental footprint, thus aligning perfectly with the EU's ambitious decarbonization goals.

Moreover, the VDMA's commitment to sustainability extends beyond technology. It involves a holistic approach that includes training and upskilling the workforce, fostering international cooperation, and driving policy advocacy to support green mining initiatives. German companies are not only providing cutting-edge equipment but also leading the charge in implementing digital solutions such as IoT and AI to optimize mining operations, reduce waste, and improve safety standards.

Another core issue of our work is the development of interoperability between machines and plants of different manufacturers in the mining environment. Therefore, we define in lots of different working groups companion specifications for the OPC UA interface. Both mining companies and equipment manufacturers work together in our committees in order to create a common machine language for the mine of tomorrow.

Glückauf!
Dr. Michael Schulte Strathaus
President VDMA Mining & Minerals

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Driving Innovation and International Cooperation

By Christoph Danner

By analyzing economic trends, organizing strategic delegation trips, participating in international trade fairs such as bauma 2025, and contributing to the implementation of the European Critical Raw Materials Act, VDMA Mining & Minerals supports its members in addressing industry challenges and seizing new opportunities.

The association and its approximately 150 member companies, including several European firms, have reported a positive economic outlook for the mining and mineral processing industry. Reflecting on the first quarter of 2024 and looking ahead to the coming months, the board members of the association have drawn a favorable picture. This optimistic sentiment is supported by a new VDMA-wide market and economic survey, which shows promising results in comparison to other industry associations.

A strong influx of orders at the beginning of the year provides a basis for optimism, although the second quarter began somewhat cautiously. A significant trend observed is the revival of new machinery business in the coal mining sectors of India and China. For hard rock mining and mineral processing, markets in the US, Latin America, Australia, Uzbekistan, Indonesia, and Oman are seen as promising with a shift toward services and spare parts.

The VDMA board is also preparing for the upcoming industry meeting in November. Key topics for the event in Essen on November 21 include the geopolitical situation post-U.S. elections, the impact of the supply chain law on small and medium-sized enterprises, and current technological challenges in the customer industry.

Essential Resources for Climate Neutrality

Raw materials are crucial for the transition to climate neutrality, especially lithium and copper, which are indispensable for the decarbonization of industry and mobility. On a trip organized by VDMA Mining in collaboration with the AHK Chile and coordinated by Iris Wunderlich, representatives from Joest, Steinert, Castalytics, Becker Mining Systems, Andritz Separation, and TTM (a Chilean distributor of various German brands) visited leading Chilean mining companies and sites.

Highlights of the trip included visiting the Exponor trade fair, a significant platform for the exchange and presentation of the latest mining technologies, and site visits to lithium extraction at SQM in the Atacama Desert salt flats and lithium processing in Antofagasta. The itinerary also included tours of the Centinela copper mine of Antofagasta Minerals in Calama and the CEMIN copper processing plant about 80 kilometers north of Santiago in the 5th region.

A group of VDMA Mining & Minerals members visits Chilean mining sites.

In Colombia, the government is working to reduce dependence on coal mining and promote investment in hard rock mining for the extraction of critical raw materials. A list of 17 strategic raw materials was published in November 2023 to simplify their extraction. This new policy has created momentum in the market, with Colombia being positively discussed in recent months by the VDMA Mining Steering Committee for Latin America.

Strengthening German Canadian Cooperation

In Canada, a close collaboration has developed over the years between MICA (Mining Innovation Commercialization Accelerator), the Canadian German Chamber of Industry and Commerce, and VDMA Mining. A recent joint German Canadian trip aimed to further strengthen these ties. The trip began at the CIM Convention & EXPO in Vancouver, offering the opportunity for pre-arranged B2B meetings. The second stop was Montreal, where a symposium allowed German suppliers to introduce themselves, exchange ideas with Canadian mining market participants, and foster connections. The program also included visits to market participants, institutes, and manufacturers of mining equipment.

Mining Hackathon 2024: A Resounding Success

The Mining Hackathon 2024, supported by the Advanced Mining Technology Group of RWTH Aachen and the DMT Group, was an impressive event for participating students and industry challengers. For the first time, students from RWTH Aachen, Ruhr-University Bochum, Technical University Clausthal, Hochschule Bochum, and University of Duisburg-Essen participat-

ed. All groups delivered outstanding results, showcasing their potential for future mining challenges. The jury awarded first place to the Castalytics GmbH team, with ANDRITZ and Maschinenfabrik Köppern GmbH & Co. KG sharing second place, and Becker Mining Systems AG securing third place. The fourth place was awarded to the team from HAVER & BOECKER OHG. The winners were celebrated at the Mining Forum in Berlin, an unforgettable experience for the students.

bauma 2025

Looking ahead, the bauma Forum 2025 promises an engaging program from April 7 to 11, featuring five main themes over five days. Tuesday, April 8, will focus entirely on mining and processing technology under the theme "Mining Challenge – Securing Raw Material Supply, Automation, ESG." Discussions will address securing raw material supplies through political support in third countries and innovative thinking in domestic raw material extraction. Ensuring environmentally friendly mining practices, redesigning and renaturing landscapes, and incorporating automated and autonomous processes for efficiency and safety will be key topics. ESG criteria (Environmental, Social, Governance) will also be highlighted, emphasizing ethical principles in securing raw material supplies.

The Growing Importance of Mining in Europe

With the introduction of the European Critical Raw Materials Act, mining is gaining increasing importance in the European context. In January 2024, CECE Mining was established as a new entity within the Committee for European Construction Equipment, which VDMA Mining & Minerals is part of. CECE Mining aims to represent its member associations and mining equipment manufacturers to a wide range of stakeholders, from European institutions to other industry federations, particularly those representing the mining industry.

The goals of CECE Mining include participating in the debate around the EU Critical Raw Materials Act and providing recommendations to European and national authorities to ensure implementation in the best interest of its members. Additionally, CECE Mining will monitor EU regulatory initiatives specific to the mining equipment and technology industry and engage in advocacy to share the industry's perspective with policymakers.

Mining equipment and technology are essential components of the mining value chain. The sector is a key economic driver for the EU. In 2022, the combined value of EU-27 mining equipment exports was close to €8 billion, according to VDMA.

The VDMA Mining & Minerals association and its member companies are navigating a dynamic landscape with confidence, driven by strong economic indicators, strategic international collaborations, and a commitment to innovation and sustainability. The upcoming events and initiatives promise to further solidify the association's role in shaping the future of the global mining industry.

Christoph Danner is the deputy managing director for VDMA Mining & Minerals.

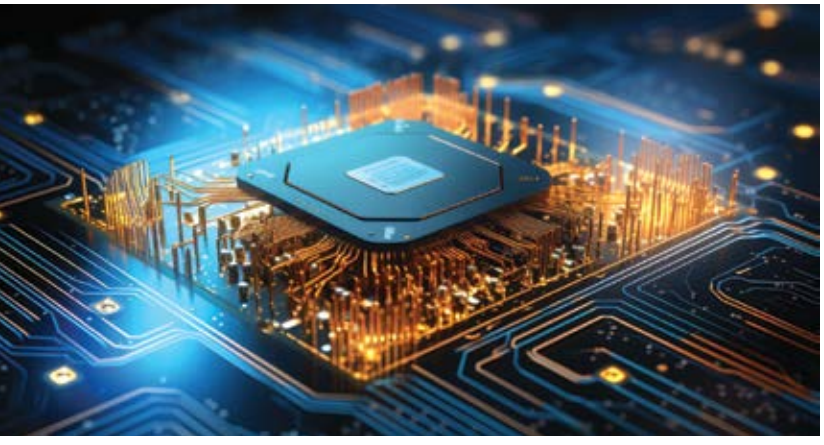
Smart Mining Relies on Automation, Digitalization and Interoperability

By Jörn Lehmann

Smart mining is not a product that can simply be purchased. It's a vision of how mining can meet the challenges of the future. Reducing the environmental impact, increasing productivity requirements and raising social acceptance are the biggest challenges that operators, suppliers and system providers face. Approaches to the digitalization of machines and processes offer potential to meet existing and future challenges. Interoperability and automation are fundamental methods and prerequisites.

Mining operators clearly articulate that the topic of interoperability is currently the main challenge in automation. Connecting machines, systems and devices in automation projects involves a great deal of effort due to the lack of interfaces and protocols. This is exacerbated by the fact that the systems and machines are purchased from different suppliers at various times. The interoperability of the diverse systems requires a standard to ensure the comprehensive data exchange that is needed for cross-vendor automation and process optimization.However, these data cannot only be used to optimize processes, but also offer the opportunity to increase transparency, e.g. in the value chains. This was once again confirmed by the mine operators at the information event on "Digitalization – Interoperability."

The manufacturers within VDMA Mining & Minerals have agreed on an Open Platform Communication – Unified Architecture (OPC UA) as the communication standard. This standard is characterized by its platform independence, manufacturer neutrality and Industry 4.0 architecture and is already being used in the manufacturing industry. OPC UA is also described as a standard in the field of IEC standardization in the IEC 62541 series. The decision to use this standard was taken in workshops and meetings with experts from VDMA Mining & Minerals. It has been shown that it is already being used in individual projects, but that its full potential is not yet being utilized.



The manufacturers within VDMA Mining & Minerals have agreed on an Open Platform Communication – Unified Architecture (OPC UA) as the communication standard.

The international VDMA working group chaired by Sunny Schoone, global sales expert and portfolio manager for digitalization solutions at Innomotics, has set itself the task of describing the communication between the machines involved and respectively with the higher-level systems to map the information required for automation and optimization. The group is supported by the Institute for Advanced Mining Technologies (AMT) at RWTH Aachen University.

The working group published the first Companion Specifications (including the information models) at bauma 2022 and presented them to trade visitors during the exhibition. This is a significant step closer to the goal of developing a manufacturer-independent, platform-independent Industry 4.0 standard based on the existing, standardized OPC UA key technology for mining. It enables the integration of machines and systems with each other, right through to the realisation of 'plug and produce,' paving the way for automation and digitalization in mining. The work continues; specialized groups are currently working on specifications for belt conveyor systems and processing technology.

Another specialist group has been established together with SENAI, which is made up of VDMA member companies and mining operators. The aim is to develop further use cases that will be published in the OPC UA Companion Specifications Mining. These activities represent an essential milestone for smart mining. The further results will be presented to the trade visitors again at bauma 2025.

The reduction of the CO_2 footprint and the associated electrification in mining is another aspect of smart mining. Here, both operators and providers are required to discuss and select possible solutions together. At present, however, there is still significant uncertainty as to which solution models (battery-powered vehicles, fuel cells, hydrogen combustion engines or the use of e-fuels (synthetic fuels)) will prevail in the future. Regardless of this, manufacturers are already working on standards to ensure the safe operation of machines. Here, communication between machines and with higher-level systems plays an important role in monitoring and controlling energy requirements.

Barrier-free communication between the individual machines, systems and devices is required to use the potential of digitalization. The work to create a common language in mining forms the basis for this.

Jörn Lehmann is manager standardization for VDMA Mining & Minerals.

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Liebherr Looks Toward a Decarbonized Future

Fortescue Metals Group is working with Liebherr to develop the first emissions-free autonomous fleet of haul trucks for its iron ore mines.

Fortescue has become a green beacon for decarbonization in the mining sector. They have been very active in electric- and hydrogen-powered equipment. The company developed an electrolyzer to generate green hydrogen and now it is partnering with Liebherr on future repower technologies that will eventually be made available to the entire mining industry.

A few months ago, Fortescue announced it had mined more than 1 million metric tons with an electrically powered Liebherr R 9400 excavator. “This was a big change for a company that traditionally operated diesel-powered excavators,” said Dr. Jörg Lukowski, executive vice president, sales and marketing for Liebherr Mining. “In addition to the equipment and related infrastructure, it was also a big change in the mind-set for the people to become familiar with electric-powered machines. Fortescue now has an off-the-grid, hydrogen-powered drive solution which provides electricity for the excavator.”

More recently, Fortescue and Liebherr announced a partnership to jointly develop and validate a fully integrated autonomous haulage solution (AHS). The new AHS, which is being developed, tested and vali-dated in partnership with Liebherr at Fortescue’s iron ore operations, integrates a fleet management system (FMS), onboard autonomy kit for the T 264 truck, and a high-precision machine guidance system for loading equipment. The FMS is designed to optimize fleet utilization and maximize productivity, while ensuring efficient consumption of fuel and energy, helping to reduce carbon emissions.

Fortescue also reported that it is testing a hydrogen-powered Liebherr T 264 haul truck at a site in Western Australia. The haul truck has a 1.6-megawatt/hour battery, developed by Fortescue ZERO, and 500 kilowatts of fuel cells. The prototype can store more than 380 kg of liquid hydrogen.

Liebherr signed a partnership to deliver 120 T 264 haul trucks with Fortescue ZERO battery-electric drive trains integrated into them. “At the end of the day, it’s a product which can be offered to the market after we have tested it with Fortescue,” Lukowski said. “The good thing for us as an OEM is that we can say we have a technical solution created with a partner that is currently operating on site.” Liebherr and Fortescue want to make that technology available for other mining companies.

“At the moment, we are in the process of carrying out tests and finalizing some design elements,” Lukowski said. “The time schedule, however, is quite aggressive. After the introduction of the T 264s onto their mine sites, we will begin retrofitting the existing diesel-powered trucks. From this point onwards, all deliveries from the factory for this operation will be battery technology.”

Truck fleets at the mines are aging as some mining companies are unsure about the next move. “What we are telling them is that they can buy a diesel-powered Liebherr truck today, which is a proven truck, and we can commit to modify it to battery-electric if and when the mine makes that decision,” Lukowski said. “Liebherr is also of course working on other technologies, but we feel that battery-electric, to a certain extent, has an accepted level of maturity.”

Lukowski agrees that there is no single solution for the decarbonization of haul trucks. “Internally, our research and development work indicated theoretically that there could be as many as 50 combinations

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of solutions that also include hybrid systems and the combustion of other fuels," Lukowski said.

Whatever technology the mines decide, it must be modular and allow other technologies to be integrated into the machine to be successful, Lukowski explained. The electric excavators are a prime example. They could operate using a trailing cable or a combustion engine burning alternative fuels.

"If these machines are given the right environment to work, the mines find that they are super productive because of a higher hydraulic power available compared to diesel engines, combined with excellent reliability and less maintenance required," Lukowski said.

In March 2024, Fortescue's first R 9400E moved its one millionth ton of material. (Photo: Fortescue)

"We are gradually converting our range of excavators to generation eight (G8)," said Grégory Schuh, product marketing manager for Liebherr Mining. "The first model that we launched was the R 9600 G8 in 2021 and then the second, the R 9300 G8, was launched last year.

"G8 means all the latest technologies have been fitted to these excavators, providing them with improved onsite performance as well as compatibility with automation, digital services, and zero emission solutions," Schuh said. "G8 onboard electronics are for instance capable of managing alternative energies, by providing the computing power needed for the algorithms required for hybridization.

"G8 also means we are doing more with less," Schuh said. "Our G8 machines produce more than the previous models while burning less diesel fuel, which would enable any miner to significantly reduce their emissions with a fleet of diesel machines. As an example, our new R 9300 G8 produces 5% more, but with 15% less fuel. In terms of fuel efficiency, we are 25% better than the previous model. That's huge."

The same is true for the R 9600 G8, Schuh explained. "We performed some production studies recently in Australia where we measured fuel efficiency to be 40% better than the R 996B, the previous model," Schuh said. "On that size of machine, the fuel savings are calculated in hundreds of thousand liters, and emissions reductions in hundreds of tonnes every year, which is substantial." This trend will continue when the R 9800 G8 becomes available over the next few years.

Liebherr was able to make such a big leap in efficiency by optimizing the weight of the attachment. “We have also developed a proprietary system, Liebherr Power Efficiency, which has an impact on the rate of the engine depending on the phase of work,” Schuh said. “We are decreasing the rate of the engine, which reduces the fuel burn. In some cases, we can measure up to 20% less fuel burn thanks to this proprietary system.”

Liebherr recently integrated its first D98 12-cylinder engine in the R 9400 excavator. “This integration also allowed us to reduce the fuel consumption and to enhance the efficiency of the model because it’s the latest technology engine,” Schuh said. “And this is our strategy to fit our entire range with Liebherr engine in the future. These Liebherr engines are also able to burn HVO and up to 30% of biodiesel.”

The main advantage for the mines is that the use of these engines makes Liebherr a one-stop shop, Schuh explained. “During some tests in Australia, a Liebherr D98 diesel engine was disassembled after 20,000 hours of use, and it was still in really good shape,” Schuh said. “It is a bigger engine with greater displacement, and it can work at a lower rate and therefore burn less fuel with the same power and with more torque than the other engines.”

While all these technical advances are great, Lukowski explained that it’s the people that make these programs successful, saying it’s critical that they embrace the transition to a decarbonized future, which in some cases means learning new skills.

Operators can see better by adjusting head lamps to the conditions.

Intelligent Lamps Improve Safety and Productivity

Effective work lighting is crucial for safety and productivity in mining operations. With difficult working conditions in mind, the experts in lighting and electronics for the off-highway industry at FORVIA HELLA have developed the RokLUME 280N SMART Work Lamps. It allows operators to adjust the light color to be adjusted depending on the environment to maximize visibility. Three colors are available: white-green, white-amber and white only. Green or amber light is used when visibility is very limited, e.g. high dust levels or various weather events. The colored light penetrates dust, rain, snow and fog better than conventional white light. The improved visibility reduces the risk of accidents and relieves the strain on workers’ eyes. Another advantage is that the color temperature can be continuously adjusted from warm white to cool white. Warm white light minimizes eye strain and fatigue in reflective environments, while cool white light is perfect for clear vision during night-time work in good weather conditions. The dimming function allows the work lamps to function economically as daytime running lights, which reduces power consumption and CO_2 emissions.

HBT Leverages Coal Mining Expertise to Broaden Its Horizon

Since it emerged in February 2023, Hauhinco Bergbau Technology (HBT) has acquired several companies that strengthen its position as an equipment manufacturer and an integrated solution provider for mining and tunneling. Headquartered in Lünen, Germany, the HBT group of companies specialize in high-performance longwall mining systems, and room-and-pillar and roadway development equipment, supported by advanced automation technologies and electrical engineering, backed by a global team of experts.

HBT was formed from two predecessor companies, Hauhinco and DBT, who trace their origins to Germany's underground coal mining sector. Based in Sprockhövel, Hauhinco has served the coal mining industry for more than 100 years. Its line of high-pressure pumps is used to maintain the pressure on powered roof supports otherwise known as longwall shields. The other predecessor, Deutsche Bergbau Technik (DBT), was acquired by Bucyrus before it was acquired by Caterpillar. When Caterpillar spun off its line of underground coal mining equipment and technology, it selected Hauhinco to takeover its line of longwall mining equipment.

Today, HBT exports its high-performance longwall mining equipment to all major mining markets worldwide. Its longwall systems and components are controlled and supported by intelligent automation technologies. The company's customized equipment solutions for longwall mining include high-horsepower shearers; automated plow systems; armored face conveyors (AFC); beam stage loaders (BSL); drive systems, including gearboxes, motors, and drive connections; hydraulic roof support legs and cylinders; programmable controls; high-pressure pump stations and hydraulic valves.

In April 2023, HBT acquired automation specialist Exprotec GmbH (formerly Bartec), which allowed the company to better support its customers with advanced flameproof (Ex d) power distribution and electrical engineering. Beyond coal mining, these systems can also supply power to permanently installed equipment, in tunnels or mines, or in hazardous areas such as gas fields or on offshore installations.

HBT purchased 50% of the shares in Advantec, a German roadheader manufacturer in June 2023. Advantec has five roadheader models, designed for a wide range of geology. At the heart of the product family is the Advantec Tunnel Digging Roadheader with a weight of more than 100 tons and a compressive strength of more than 110 megaPacals.

The following month, HBT acquired an Australia-based coal equipment company, Waratah Engineering, from Questas Group. Waratah is well known for remanufacturing of longwall roof supports, plus overhauls of continuous miners and roadheaders, as well as producing its own equipment such as the Waracar shuttle car and Warabolter. The company's facilities are located near Newcastle in New South Wales.

In March 2024, HBT took over Breuer Motoren GmbH & Co. KG. The Bochum, Germany-based mechanical engineering company is a globally recognized supplier of drive and motor solutions. Breuer has been supplying both mining and general industry with high quality products for more than 50 years and the oil and gas drilling industry for more than 15 years. HBT is now able to offer its customers complete drive solutions for longwall systems, including electric motors and frequency inverters, from a single source.

HBT exports longwall technology to coal operators worldwide.

HBT's controlled soft start drives revolutionized longwall mining.

The acquisition also supports HBT's efforts to open new markets and regions outside the mining sector. Breuer's strong position in the oil, gas, and geothermal drilling industry and in the e-mobility sector is of particular interest for the future strategic alignment of the HBT Group. Breuer Motoren has been developing and producing battery-electric and/or fuel cell-powered high-voltage drive solutions in the field of electric driving for many years. HBT said it would retain the Breuer Motoren brand.

HBT Australia announced plans to partner with TotalEnergies Marketing Australia to provide resource companies with access to a single solution provider for all their onsite tunnelling, mining fluid, and lubricant requirements, including the Longwall HFA fluid (marketed as HBT Corsave). Through the collaboration, both companies will combine their expertise and expand their global reach, providing the resource sector with a turnkey solution for their extraction needs.

Further expanding its foothold in Australia, HBT acquired Pempek Systems Pty. Ltd., located near Sydney. Pempek is a leading global supplier of equipment control, telemetry, hydraulic control, and roof bolting solutions for mining applications. The Pempek product range complements HBT's line of longwall systems, room and pillar equipment and roadheaders. The product range includes software control environments, PLC controls, motor controls, electronic hydraulic controls, remote controls, telemetry systems and human-machine interfaces, automation for roof bolting and flameproof products for applications in potentially explosive atmospheres.

Today, the reach of the HBT group of companies extends well beyond longwall mining. Its Electrical Engineering and Automation divisions now offer power distribution centers, compact stations, frequency converters, mining motors and automation systems. With expertise in coal, it also focuses on solutions for demanding electrical engineering challenges for other heavy industries, like tunneling, raw materials, and oil and gas production.

HBT purchased a stake in Advantec, a German roadheader manufacturer last year, giving it access to tunneling equipment.

Paus Designs Equipment for the Mines

Hermann Paus Maschinenfabrik GmbH specializes in ancillary equipment for underground mining operations. The company routinely designs and manufactures equipment for specific applications. The new Paus Multi Tool Carrier, the P-MTC 10, is a classic example of their craftmanship. It offers greater flexibility for underground mines working with high backs. In addition to being a tool carrier, the P-MTC 10 has a telescoping boom with a 3.7-ton-capacity payload that extends 9.2 m and swivels 30° to each side.

Using a Universa 50 base, Paus created an idler handler for the Oyu Tolgoi mine in Mongolia.

The machine can be equipped with a range of front and rear attachments for a wide range of jobs. Typical applications include aerial work with a man basket, material handling and maintenance work, but it can also be equipped with a tire handler and an ANFO charger.

"It's a more robust version of the Paus TSL 853, which was well established for smaller gallery sizes," said Managing Director Franz-Josef Paus. "We used the TSL 853 as a base and then made it a much stronger machine."

The machine can be maneuvered from the basket. All functions, including tramming, can be controlled and monitored from the platform, eliminating the need for a second person in the cabin. Two people can work safely from the basket. Safety is further enhanced by inclination monitoring, safety-limited speeds and redundant sensors.

The P-MTC 10's tire handler can grab the tire from the side and take it away like a telescopic loader would, Paus explained, but this machine is smaller and articulated, which makes it much more maneuverable. Paus will display the P-MTC 10 with a tire handler at the MINExpo show in Las Vegas. "After the show, it will be placed into service at a mine in Canada," Paus said.

Paus recently designed and made a lower-profile scaler for a German potash mine, PScale 10-T LP. Like the company's PScale 8 and 10 models, it has a 20° tiltable cabin and a hydrostatic drive that allows

it to move quickly throughout the mine. The difference is its height: 1.90 m.

"We modified the entire machine and moved the cabin to the side," Paus said. "There is not a big market for this type of machine, but a customer at a Potash mine needed one and we are always ready for a challenge. They have limited height, and they wanted a mechanical scaler."

Paus also developed an idler handler for the Oyu Tolgoi mine in Mongolia. "We added a few special attachments to our Universa 50 base machine that would allow it to lift the belting to a point where crews could safely replace conveyor hardware," Paus said. "This is a project that we jointly developed with Rio Tinto. They say it saves them millions of dollars because they do not have to unload the belts before they change all the rollers."

Eickhoff Celebrates 160 Years

In 2024, Eickhoff Bergbautechnik in Bochum, Germany, is looking back on 160 years of success as a leading supplier in the global mining industry.

To mark the anniversary, the company confirmed and underlined its long-term strategy: Following the "Last Man Serving" guideline, Eickhoff will continue serving the international mining industry with leading technology, machines and services in the long term.

Against this background, significant investments are being made in the product range. Key areas of focus are the further development of shearer loader automation. In autumn 2023, Eickhoff was able to set another milestone with its SL750 in Australia when, for the first time in the world, a shearer loader operated fully automatically for more than 30 days. Beyond this significant technical achievement, the focus in the software area is set on boundary layer detection, management systems, on-board diagnostics and performance evaluation.

The Eickhoff shearer loader product portfolio will be gradually expanded in the coming years to include new machine types for all cutting heights and performance segments.

The company's continuous miner market segment is set to see a generational change in 2024 and 2025: Eickhoff will launch a newly developed continuous miner, the CM2E, which, in addition to a new cutter head and electric traction gears, offers state-of-the-art electronics, new software and a completely new remote control — all developed in close cooperation with core customers worldwide.

Following the CM2E, Eickhoff's first large continuous miner will be presented in 2025.

The basis of the worldwide success is the global network of Eickhoff's lifecycle management subsidiaries, which provide close customer support around the clock.

The products will continue to be manufactured in Bochum, Germany, where Eickhoff has its own foundry and also manufactures all essential components such as housings, gears and electronics itself.

Silver Mine Relies on Innovative Putzmeister Technology

The Sindesar Khurd mine in Rajasthan, India, which is owned and operated by Hindustan Zinc Ltd. (HZL), produces silver, lead and zinc using the long-hole, open-stoping method with paste backfill. A high-performance HSP 25.200 HP dual piston pump from Putzmeister in Aichtal, Germany, plays a pivotal role in this success of this operation.

Putzmeister is well known for concrete pumping systems and the dual-piston, hydraulic seat-valve pump (HSP) is central to the entire mining process. This powerful pump has 560-mm delivery cylinders driven by an HA 2XXL hydraulic power unit with a total output of 2,500 kW. It is capable of conveying up to 240 m^3/h of fine-grained, cementitious backfill with a solid concentration of 78% (The slump of the paste is 175 mm).

Backfilling technology improves safety in the mine by stabilizing the underground mine workings. Backfill is pumped from a paste plant down a 900-m shaft and then it travels various distances underground. With a maximum delivery pressure of 90 bar, this system delivers backfill very efficiently. The pump can be safely operated at a pressure of up to 110 bar at a lower output.

The pump is equipped with the Putzmeister Constant Flow (PCF) system, which protects the DN 200 pipeline and its fasteners. It extends the life of the pipeline and allows the use of a pipe with thinner wall thickness. The technology also reduces water hammer and the associated noise emissions. The HSP with PCF control system is well-suited for cemented backfill applications.

Spanish Mountain Partners with ANDRITZ

Spanish Mountain Gold Ltd., a Canadian mining and exploration company, has partnered with international technology group ANDRITZ and BC Hydro (the province's utility company) to reduce the carbon intensity of its proposed gold mine near Williams Lake in British Columbia.

With the goal of building the most sustainable gold mine in Canada, Spanish Mountain will use ANDRITZ's simulation software for process optimization, energy management, and operator training.

ANDRITZ's IDEAS simulation software will enable Spanish Mountain to analyze energy consumption for greenfield operations, optimize process flowsheets, and predict power demand accurately. This proactive approach is crucial for balancing long-term supply and demand curves effectively. Similarly, it can be used to accurately support water management programs.

In addition, Spanish Mountain envisions using the IDEAS simulation software to train local operators, supporting employment in the region. Trainees can learn the operation using a digital twin ahead of workforce recruitment and once employed at an operation can continuously improve how processes are controlled.

By harnessing simulation technology, Spanish Mountain aims to achieve sustainable gold mining while creating opportunities for local communities through skills development and employment.

Fluid Couplings Promote Sustainability

With Sustainable T, Voith has now refined its range of hydrodynamic couplings with the focus on sustainability.

"We are already thinking about the future today, because we are building especially durable products that are perfectly tailored to the long service lives of our customers' equipment," said Michael Hilka, product manager hydrodynamic couplings at Voith. "This means that we use only environmentally compatible materials wherever possible."

One example of a functional improvement is the use of the fusible plug optimized and patented by Voith. This innovation has resulted in savings on soldering material consumption of up to 70% compared to competitive products. The response behavior of the screw has been improved, and Voith has ceased to use soldering materials containing substances such as lead or cadmium, which are classified as hazardous to health.

With 560-mm cylinders driven by a 2,500 kW hydraulic power unit, the HSP 25.200 HP is capable of conveying up to 240 m^3/h of cementitious backfill.

As part of Sustainable T, new and more sustainable operating media are also being used. “Our constant-fill fluid couplings are designed so that customers can also use selected operating media that are rapidly biodegradable,” Hilka said. Voith, therefore, offers the option of using an alternative to the mineral oil that has been commonly used to date.

Innomotics Partners on the First Digital Mine

Innomotics, a Siemens Business, has partnered with Anglo American, one of the world’s leading mining companies, to develop a digital mining solution for the Quellaveco copper mine in Peru. Innomotics provided a suite of Siemens technologies, to help Anglo American engineer, monitor, manage and run the mining operations from the earliest stages of design through commissioning and into production.

Commissioned in 2022, Quellaveco is the largest greenfield copper mine developed by Anglo American. By deploying new technologies such as autonomous trucks, automated drilling and remote operation, Anglo put its FutureSmart Mining approach into action.

Anglo American’s Quellaveco digital mine is based on Siemens plant cycle management platforms, which guarantees the optimal collaboration, continuity, and consistency of all the disciplines involved in plant engineering and operation. The system accomplishes this by consolidating data from a variety of sources. Automation data can be read out of the process control system and imported to COMOS to be graphically displayed, consolidated, and made available for further engineering and vice versa. COMOS uses this data to support the creation of the plant’s digital representation, a fast and reliable migration, and updates to the PCS7 process control system — all through one single solution.

Anglo can observe and measure the whole operation in real time from the mine pit through mineral processing, logistics and to the port where copper concentrate is stockpiled, loaded, and shipped. Working from a remote integrated operations center, operators can quickly spot problems or inefficiencies and coordinate to take remedial action immediately. Using the plant cycle management platform, Innomotics has integrated engineering data to create a unique data source for schematics from piping and instrumentation diagrams and data sheets to 3D models. Using concepts such as smart data and smart documentation

Data from different engineering phases are combined, linked, contextualized and made available for the operation phase.

The Innomotics suite of technologies helped Anglo engineer, monitor, manage and run the mining operations at Quellaveco from the earliest stages of design through commissioning and into production.

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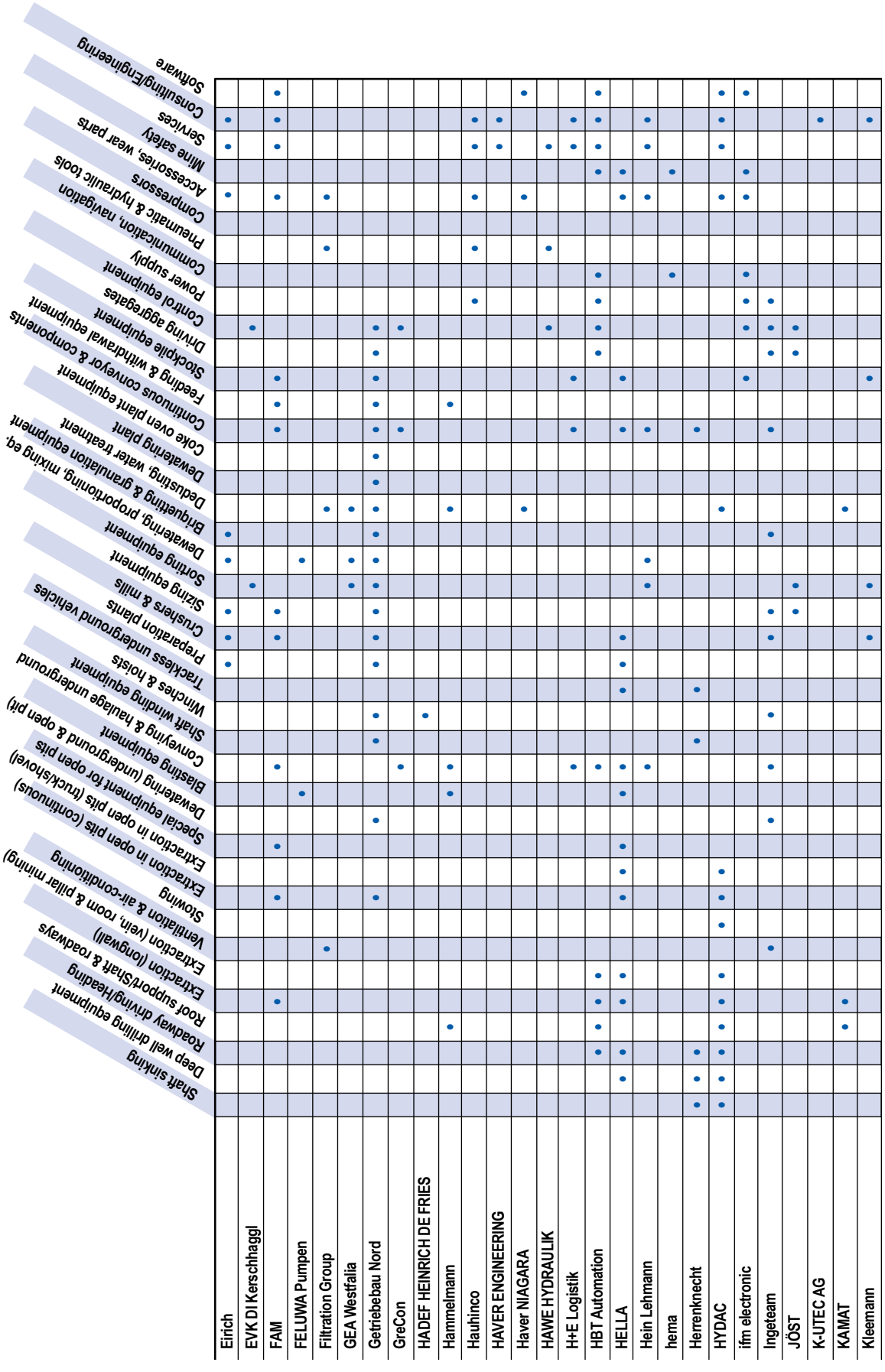
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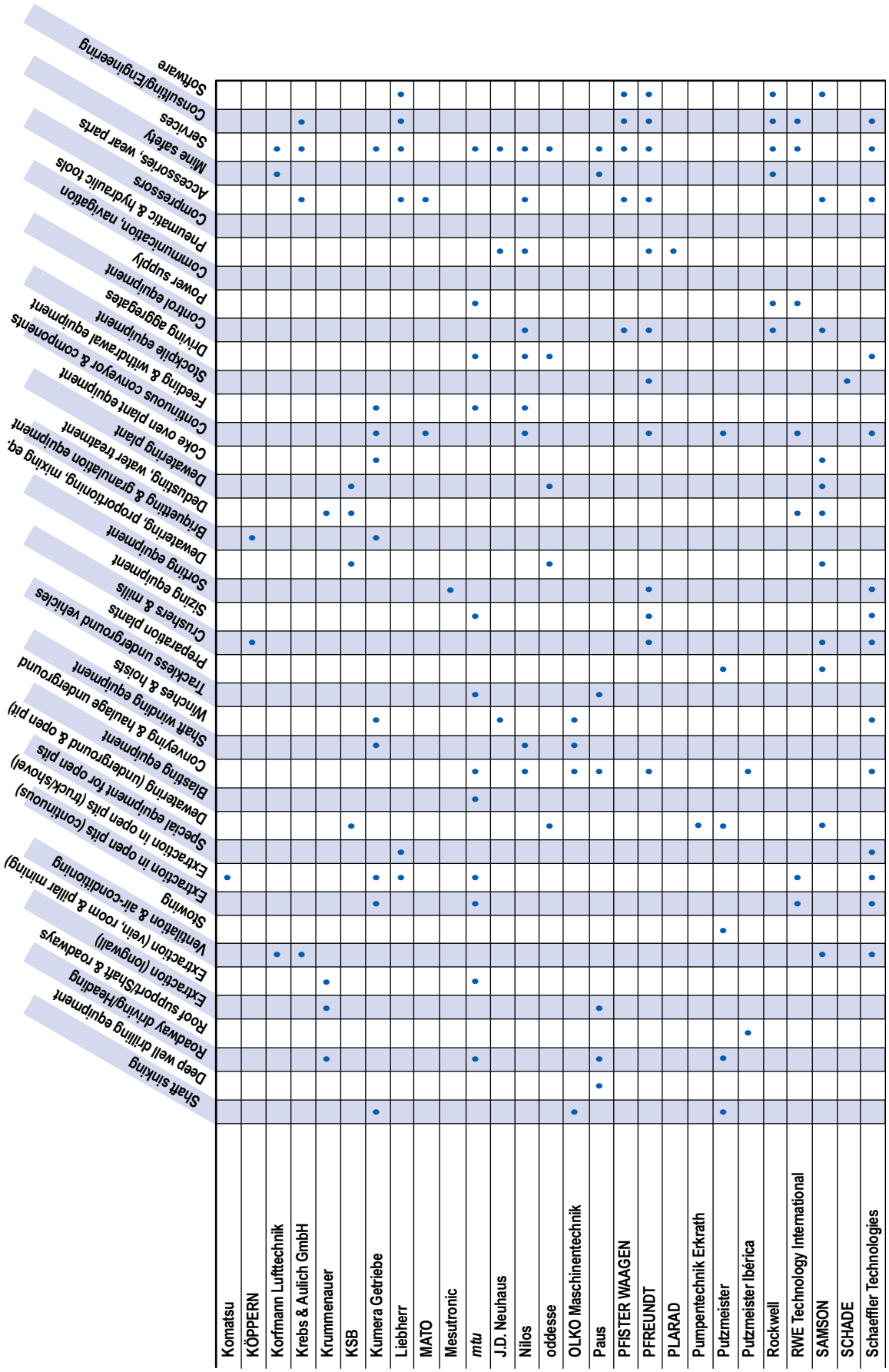

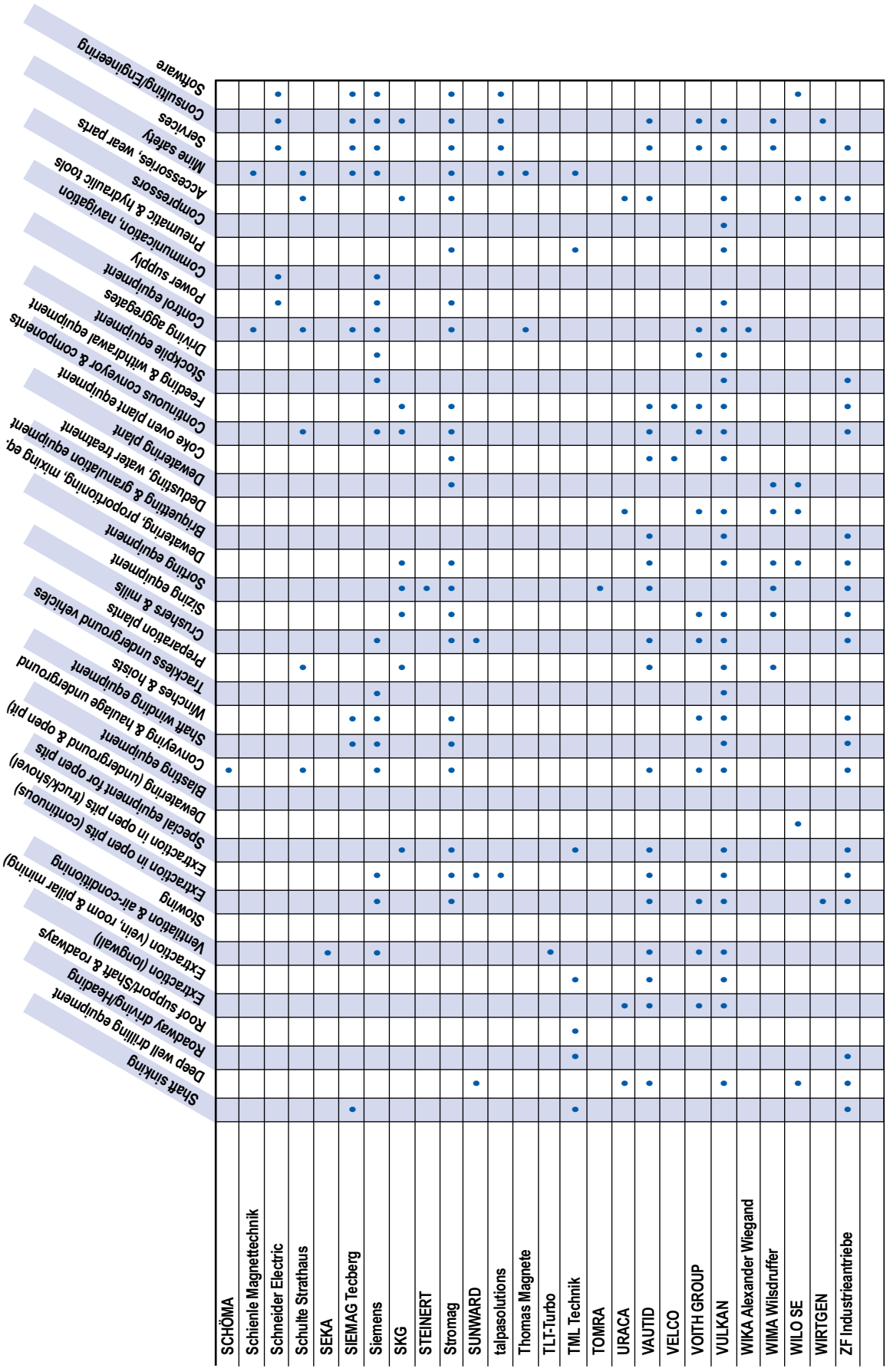
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