

# Mining & Construction

A magazine from Epiroc

miningandconstruction.com

INSIDE

## The Future Issue 01-2023

### FACE TO FACE

Tackling the future together

Codelco and Epiroc join forces to achieve milestones in Chile

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Digital twin to break new ground

Epiroc leads project to fully automate underground mining

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Living the dream

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[ Our Customers ]

# Battery pioneers

Battery electric loader gaining praise at Grupo Peñoles

08-13

# We accelerate the transformation

**D**EAR CUSTOMERS, the future is approaching fast. Take for example Epiroc's ongoing work with Roy Hill, an iron ore mine in Australia. Together with automation specialist ASI Mining, we are converting almost one hundred manually operated mine trucks to fully autonomous for Roy Hill. This will create the world's largest single autonomous mine, strengthening both safety and productivity.

**NOT LONG AGO** a fully autonomous mine was not much more than a dream of a few visionaries. Now it is reality. And this is only one of many examples of how the mining and construction industries are changing fast. We are seeing rapid development not only within automation but also in areas such as electrification, which reduces emissions, and digitalization, which makes operations more efficient. The work environ-

ment also keeps improving. For example, more and more operators are remotely controlling their machines from a safe distance away from dangerous conditions. Electric vehicles are not only slashing emissions but also reducing noise, vibration and heat, creating better work conditions.

**THE WORLD IS** going through a green transformation to fight devastating climate change. But to enable this transformation, the world needs plenty of metals and minerals for clean-energy technologies such as electric cars, solar panels and wind turbines.

We are accelerating this transformation, and we are doing it in a responsible way. Epiroc's sustainability goals for 2030 include halving our emissions, both in our own operations and when customers use our products.

Read more about the future in this issue. ✕

Epiroc is a 150-year-old start-up; a dynamic new company built on long and proven expertise and experience from the mining and construction industry.



## On my radar

### The moon

Epiroc announced recently that we will contribute technology and solutions for space's commercial lunar missions. This will be exciting to follow.

### Global parental leave policy

Epiroc launched a new parental leave policy granting a minimum of 12 weeks of paid leave for all new parents across the global organization. This will support inclusion and diversity.

Enjoy the magazine, and stay safe!

**Helena Hedblom**  
Epiroc President and CEO



## About Epiroc

**Epiroc** is a leading productivity partner for the mining and infrastructure industries. With cutting-edge technology, Epiroc develops and produces innovative drill rigs and rock excavation and construction equipment and provides world-class service and consumables. The company was founded in Stockholm, Sweden, and has passionate people supporting and collaborating with customers in around 150 countries.

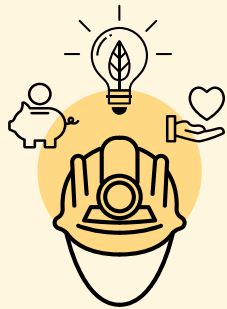
# Epiroc Group – get to know us better

Our innovations

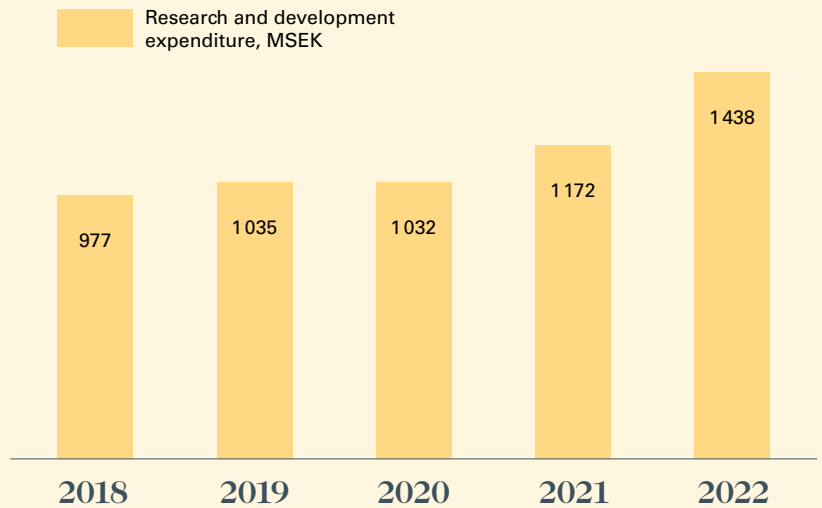
Industries we serve

R&D expenditure

Our solutions aim to solve our customers' key issues – including requirements to reduce operating costs, increase productivity, increase utilization of equipment, reduce environmental impact, and enhance health and safety conditions.



- **Mining and quarrying**  
Underground mining, surface mining, exploration, quarrying, well drilling.
- **Infrastructure**  
Underground civil engineering, surface civil engineering and urban development, deconstruction, recycling.



To remain a technology leader, Epiroc dares to think new when it comes to innovation. We promote an innovative culture, and we are investing more than ever.

## The Group in numbers



18 000

- Almost 18 000 employees.
- Customers in around 150 countries.
- 150 years of experience.
- Revenue in 2022: SEK 49.7 billion.

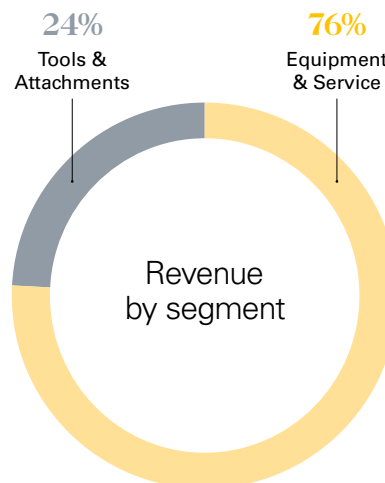
## Divisions and reporting segments Equipment & Service / Tools & Attachments

### Tools & Attachments

Dedicated to rock-drilling tools and hydraulic attachment tools used for rock excavation, mining, construction, demolition and recycling. Also provides related services.

### Digital Solutions

Offers solutions that drive customers' digital transformation. Provides a dynamic range of technology-agnostic digital solutions that improve safety, productivity and sustainability.



### Surface

Dedicated to rock-drilling equipment for use in surface mining, exploration, construction and quarries, as well as water well applications.

### Underground

Dedicated to a wide range of underground mining and tunneling equipment.

### Parts & Services

Dedicated to parts and services aimed at maximizing customers' productivity.

[FEATURE]  
**FUTURE**  
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The future is nigh.

Preparing for it involves not only understanding where trends are headed, but also knowing where we stand today.

## 16 | FACE TO FACE **Uniting to stay ahead**

Chilean mining giant Codelco is preparing for the next half century of copper production. An alliance with Epiroc will help the company tackle the challenges that arise.

## 22 | INNER WORKINGS **Next step in automation**

Incorporating the face drilling phase is crucial to fully automate the underground mining process. A new, Epiroc-headed project involving digital twins might be just what is needed.

## 52 | FROM THE LAB **Drill Tracker launched**

Traditionally, drill hole outcome is logged on a piece of paper. Thanks to Drill Tracker, a cloud-based solution, this information is logged directly in the operator's phone or tablet.



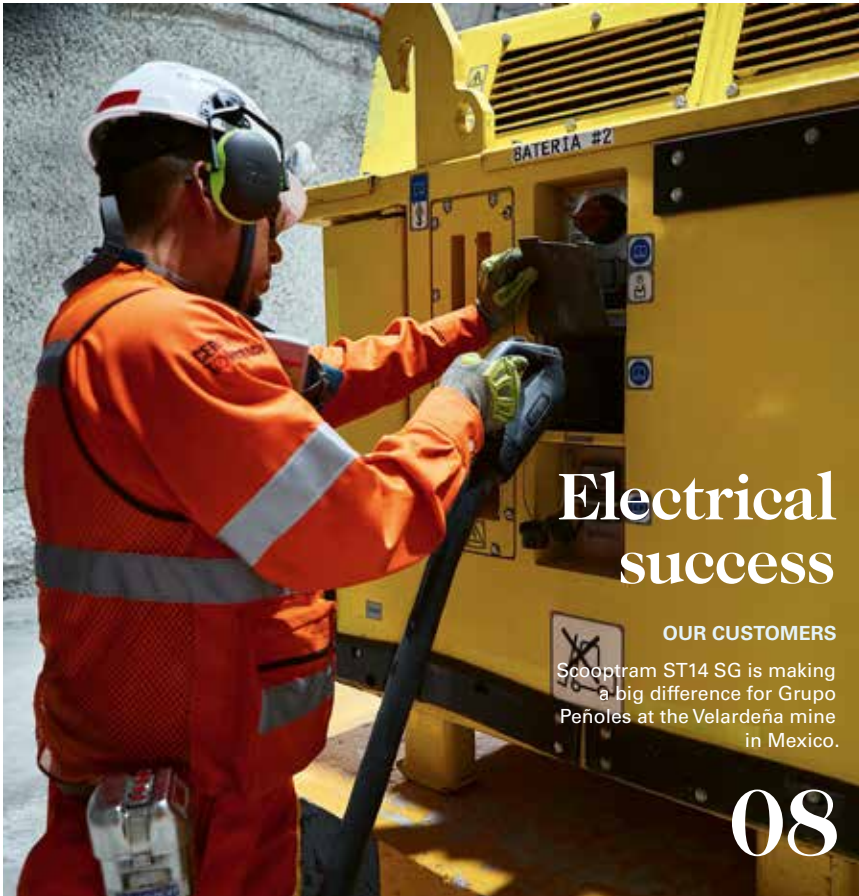
### ON THE COVER

The northern Mexican state of Durango has served as the visual representation of Mexico in dozens of Hollywood movies. These days, the Velardeña mine, operated by Peñoles, is home to one of the global mining industry's foremost technologies: Scooptram ST14 SG.



The International Mining and Resources Conference (IMARC), which will be held October 31–November 2, 2023, will bring together more than 8 000 decision makers, mining leaders, policy makers, investors, innovators and educators. The event will take place at the International Convention Centre in Sydney.

[www.imarcglobal.com](http://www.imarcglobal.com)



SEBRON SNYDER

## Electrical success

### OUR CUSTOMERS

Scooptram ST14 SG is making a big difference for Grupo Peñoles at the Velardeña mine in Mexico.

08



EMIL NORDIN

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**Mining & Construction** is published by Epiroc. The magazine focuses on the company's know-how, products and methods used for mining and construction worldwide.

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# EPIROC IN BRIEF

## EPIROC ADDS SIX COMPANIES TO THE GROUP

Since October 2022 and through March 31, 2023, Epiroc has made no less than six acquisitions, strengthening its surface, underground mining, and construction offerings.

In February, Australia-based CR and South African Mernok Elektronik became members of the Group. CR operates globally, delivering not only physical products but also digital solutions such as the real-time GET loss detection system GET Trakka and the Titan 3330 payload management system. Mernok Elektronik, headquartered in Pretoria, South Africa, designs and produces proximity detection technologies and collision avoidance systems of the highest level (EMESRT Level 9) applicable for either a single machine or an entire mixed fleet of machines, regardless of manufacturer or equipment type. Mernok Elektronik's customers are located primarily in Africa.



CR, headquartered in Brisbane, has developed a real-time GET loss detection system, GET Trakka, and a payload management system, Titan 3330. The solutions strengthen safety and productivity and prevent expensive delays in mining operations.

During the last few months of 2022, Australian companies Remote Control Technologies, Radlink (53% ownership), and Geoscan were acquired, along with US-based Wain-Roy. Remote Control Technologies, known as RCT, is headquartered in Perth, Australia, with customers in more than 70 countries. It provides automation and remote-control solutions applicable for either a single machine or an entire mixed fleet of machines, regardless of manufacturer or equipment type.

Radlink, headquartered in Perth, de-

signs, delivers and integrates wireless data and voice communication networks and supporting infrastructure to surface and underground mines throughout Australia.

Geoscan, also based in Perth, has a presence in Australia, Latin America, North America, Europe, and Africa and provides digital geological imaging solutions to mining companies.

Wain-Roy is a manufacturer of excavator attachments for the construction industry and has a manufacturing site in Kronenwetter, Wisconsin, USA. ✕

## Epiroc accelerates the transformation of the industry

**▶ ACCELERATE THE TRANSFORMATION,**  
Epiroc's new brand positioning statement, highlights the focus on driving sustainable development in the mining and construction industries. This long-term commitment reflects Epiroc's determination to support a positive image of the industries that play a crucial role in building a sustainable society.

Together with customers, employees, investors, and society, Epiroc is promoting sustainable practices through innovative thinking and cutting-edge technology in automation, digitalization, and electrification. Fundamental to this is also driving development in areas critical for achieving sustainable transformation, such as inclusion and diversity.

**More** [www.epirocgroup.com/en/accelerate-the-transformation](http://www.epirocgroup.com/en/accelerate-the-transformation)





FIGURE



42 475 100  
METERS

## Autonomous drills reach milestone

Epiroc drill rigs are increasingly operated autonomously. Our Pit Viper surface drill rigs have now drilled holes totaling more than 42 million meters, exceeding the world's circumference of 40.1 million meters.

The societal benefits generated so far are significant, including a reduction in CO<sub>2</sub>e emissions of more than 100 000 metric tons. This is basically the equivalent of planting a new forest the size of the Swedish capital, Stockholm.

## Pit Viper range fully electrified

**IN LINE WITH** Epiroc's strategy to enable more sustainable operations for our customers, the entire range of Pit Viper drill rigs – such as the Pit Viper 351E (pictured) – is now also available as electric. This means that customers can choose a rig version that runs on electricity via cable instead of a diesel version. The same alternative is available for DM30 and DML, which are part of the Drill Master series. The first electric Pit Viper was launched in 2002.

*Epiroc has ambitious plans to help advance the mining and construction industry for future generations.*

## What is your biggest Epiroc-related hope?



**Eduardo Caiado Lima**  
Regional Business Development Manager, Brazil

"My biggest Epiroc-related hope is for Epiroc to be recognized by customers as the right partner for their rock-drilling demands, not only because we have the best products, but also because we provide the best customer experience."



**Kishore Jeebodh**  
Regional Business Development Manager, South Africa

"I hope that we can influence and accelerate the adoption of zero-emission and automated technology for a safer, more efficient and sustainable working environment for customers, colleagues and the communities in which we work."



**Karin Cox**  
Vice President Brand & Communication, Sweden

"I hope, and believe, that we will keep developing a truly diverse organization, represented by the variety of people we see in society at large. I think this will truly lead the company to being in the forefront of innovation and industry development."

### PROJECT NEWS



#### HIGHLIGHT

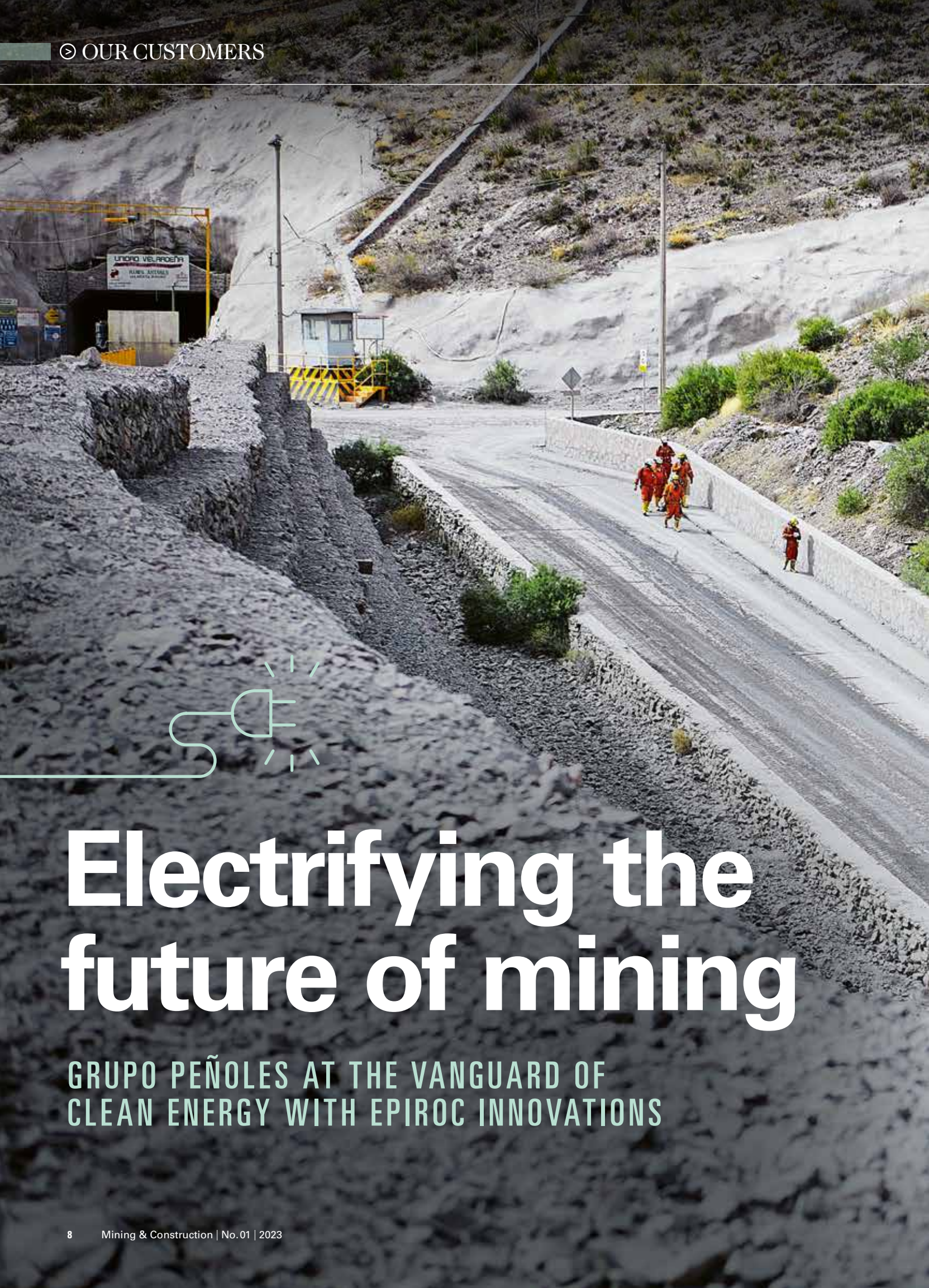
The strong aluminum beam is extremely resistant to bending and torsional stresses.

## Expanding the feed offering

**EPIROC'S FEED ASSEMBLIES** cover a full range, from small drills to heavy-duty drill rigs. Along this same philosophy and inspired by the plug-and-play concept, we are now expanding our offering to include additional models that aim for optimal product life, safe

operations, reduced downtime and a streamlined assembly and ordering process. The availability of feed assemblies on a part number boosts service exchange programs by offering the quickest lead time and ordering flexibility.

**More** [epiroc.com/replacementpartsandkits](http://epiroc.com/replacementpartsandkits)



# Electrifying the future of mining

GRUPO PEÑALES AT THE VANGUARD OF CLEAN ENERGY WITH EPIROC INNOVATIONS





[On Location]  
Mexico

Velardeña was a ghost town in Mexico's Durango state until Grupo Peñoles opened a zinc mine that transformed the site. Now, thanks to Scooptram ST14 SG – Epiroc's battery-driven electric loader – Velardeña is home to technology that aims to transform the global mining industry.





Eduardo García Vaquera of Grupo Peñoles attaches an Epiroc crane to a Scooptram ST14 SG located within the Velardeña mine in northern Mexico.

**T**HE NORTHERN MEXICAN state of Durango looks a lot like the wild west.

With its arid, dusty landscape, dotted with cacti that fan out like thorny green hands, and a backdrop of broad, sloping gray, green and purple mountains, Durango has been known for decades as the enduring image of what was once frontier life in Hollywood films. Since the 1950s, the sparsely populated state has served as the visual representation of Mexico in dozens of Hollywood movies, including westerns such as *The Magnificent Seven*, *The Good, the Bad and the Ugly* and *The Unforgiven*, which were filmed there and earned it the nickname MovieLand.

Visitors to the village of Velardeña, which has palm-lined streets and a

view of a jagged, dry mountain range in the distance, are struck by the sense of stepping back in time. Just over ten years ago, before the mining conglomerate Grupo Peñoles opened one of its flagship zinc mines here in 2013, Velardeña was a ghost town that had been almost entirely abandoned by its residents.

Now, thanks to Epiroc engineers, this tiny town is home to one of the global mining industry's foremost technologies: the battery-driven electric loader Scooptram ST14 SG, previously named Scooptram ST14 Battery.

The loader, which was introduced at the Velardeña mine in the spring of 2022, has been lauded by Peñoles employees, and not least the operators, who say the new technology provides



**Luis Humberto Vazquez**  
Director, Peñoles

a cleaner, cooler, quieter and more efficient experience to their day-to-day operations, which are often performed under challenging conditions such as intense heat, noxious gases and deafening noise.

“We believe that the use of batteries, instead of diesel, is the future of mining,” said **Luis Humberto Vazquez**, the director of the mines at Peñoles and one of the company's highest ranking executives, when Mining & Construction magazine sat down with him in Torreón, a town only a short distance from the Velardeña mine.

“We are convinced that the use of batteries will continue to evolve to make the industry more efficient and better optimize operations while reducing our environmental impact.”

**D**EEP INSIDE THE Fantasma mine shaft at the Velardeña complex, the rumble of mammoth machinery, such as loaders and underground haul and dump trucks, reverberates like thunder in the narrow drifts. While the temperature is moderate in the ventilated cavern that houses a Scooptram ST14 SG and two batteries from Epiroc, it rises the deeper miners descend into the mine.

The Fantasma mine – which means ghost in Spanish – includes a maze of tunnels burrowed into the side of a mountain some 1 450 meters above sea level, and there is a steady flow of trucks and machinery entering the shaft to extract zinc, the primary metal produced at Velardeña, as well as copper and lead. Historically, loaders, trucks and other types of machinery that enter the mine have used diesel, but in 2022 Peñoles paired up with Epiroc to introduce a clean power option – Scooptram ST14 SG. The results were apparent immediately.

“I’m not exposed to as much noise or as many toxic gases as I am when operating a diesel-fueled truck,” **Eduardo García Vaquera**, a Peñoles operator, said of Scooptram ST14 SG. “It makes for a much more comfortable and clean work experience with far less heat and no emissions of toxic gases.”

Grupo Peñoles – the world’s biggest silver producer and one of Mexico’s most emblematic and storied institutions – and its sister company Fresnillo “always seek to be at the forefront of changes in the industry,” said Luis Humberto. He has more than 40 years of experience as a miner, and says that both he and Peñoles understand the challenges of the mining industry and are always looking to improve worker security and health and reduce the hefty ventilation costs associated with the liberation of trapped diesel fumes.

Thus, implementing a Scooptram ST14 SG, which is the first battery-driven electric loader of its kind to be implemented in mining operations in Latin America, was an easy decision

## Industrias Peñoles

- Founded in the state of Durango in 1887, Peñoles is one of the world’s biggest silver producers and one of Mexico’s most storied companies.
- Peñoles is a top global producer of refined zinc and sodium sulfate.
- Latin America’s leader in production of refined gold and lead.
- Group subsidiary Fresnillo plc is publicly traded on the London and Mexican stock exchanges.
- Peñoles is part of Grupo Bal, a private consortium of independent Mexican companies overseen by the Bailleres family.



The Epiroc charging posts within Grupo Peñoles’s Velardeña mine serve as power refueling stations for the electric Scooptram ST14 SG.



**Eduardo García Vaquera**  
Operator,  
Peñoles



**José Rivero**  
Maintenance  
Planning Advisor,  
Peñoles

at Velardeña, where Peñoles employs around 1 350 people – about half the population of the village – and produces nine metric tons of zinc on a daily basis, according to Vázquez.

To date, maintenance workers and operators of the Scooptram ST14 SG, a 14-metric ton capacity underground loader that is an impressive 11 meters long, rave about the improvements of the new loader in comparison to the diesel loaders that were used before. They say that Scooptram ST14 SG provides an easier and smoother driving experience and the elevated cab is comfortable, roomy and provides much better visibility, particularly when taking sharp turns in narrow and dark mine caverns.

“If I had to choose between one or the other, I’d choose the battery loader one hundred percent of the time,” said



“It has improved security, productivity and reliability and reduced our costs”

**José Rivero**  
Maintenance Planning Advisor, Peñoles

Vaquera, who has been a Scooptram operator for three years. “When driving a diesel loader, you experience a lot of vibration, but with a battery-driven electric loader, you feel nothing.”

**V**AQUERA AND JOSÉ RIVERO, Peñoles’s maintenance planning advisor at the Velardeña mine, agree that changing a battery on Scooptram ST14 SG – instead of having to refill a tank with diesel – has brought immediate improvements to efficiency and the speed of operations with-

in the mine.

In the cavern designated for Scooptram ST14 SG, there is a wide parking slip for the loader in the center of the chamber. This slip is flanked on each side of the cave by two yellow-and-black striped platforms custom-fitted for the loader’s batteries. Beyond each platform are two electric charging sta-

tions similar to those you might see for electric automobiles, and a thin, sleek overhead crane system that stretches the width of the chamber and is used to transport the batteries.

When it is time to replace a battery, Vaquera controls the slim red overhead Epiroc crane by remote control, clasping the short, compact yellow-and-gray ST14 battery, which is about 2.5 meters wide, and transporting it from the loader to the platform. The process takes just minutes, and Rivero, who has worked for Peñoles for 33 years, says the battery has streamlined their daily work at the mine.

“It’s improved security, productivity and reliability and reduced our costs,” Rivero said, adding that each of the two Epiroc batteries offers a charge of more than four hours. “There is a lot less noise and far fewer defects compared to a diesel loader and, in my role, the electric battery requires far less maintenance and upkeep.”



### Velardeña mine

- Opened operations in 2013 and is one of Grupo Peñoles’s flagship mines. Employs around 1350 people and produces nine tons of metals, including zinc, copper and lead, a day.
- The opening of Velardeña revitalized the local town, which was largely a ghost town prior to 2013. Grupo Peñoles has paved roads, built new health clinics, put up street lights and assured adequate water supply for residents.

### Peñoles and Epiroc

**GRUPO PEÑOLAS HAS** a long-standing relationship with Epiroc, which provides equipment, technology, advising services and support to a number of the company’s mines across Mexico and Latin America. There are two Epiroc Scooptram ST14 SG loaders on site at Velardeña as well as a Scooptram ST14 loader, and a Minetruck MT42 SG, previously named MT42 Battery, will soon arrive.





José Luis Pedroza Osorio from Grupo Peñoles explains the network of shafts and monitoring systems at the company's Tizapa mine in central Mexico.

## FIVE KEYS TO SUCCESS

<p><b>1</b> Teamwork</p> <p><i>Members of the Epiroc team are on site at the Velardeña mine at all times and are available to assist the Peñoles Scooptram ST14 SG operators and maintenance team and provide support for any technical questions or issues, should such arise.</i></p>	<p><b>2</b> Ease of use</p> <p><i>The battery, which latches onto the rear of the battery-electric Scooptram ST14 SG underground loader, is operated entirely by remote control and can be transported from the truck to its custom-fit charging station in less than ten minutes.</i></p>	<p><b>3</b> Cleaner, quieter, cooler</p> <p><i>The battery-electric solution of the Scooptram ST14 SG underground loader reduces carbon emissions, noise and temperatures for operators, who enjoy safer and cleaner working conditions.</i></p>	<p><b>4</b> Better visibility</p> <p><i>The Epiroc Scooptram ST14 SG has a spacious off-center operator's cabin with front and side windows and an intelligent control system that features numerous smart functions. Operators say the cab provides much better visibility and torque.</i></p>	<p><b>5</b> Cutting-edge technology</p> <p><i>The implementation of Scooptram ST14 SG is a first for Peñoles, and the company will soon welcome Epiroc's Mine-truck MT42 SG at Tizapa, which underlines the company's commitment to reducing its carbon footprint.</i></p>
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The SmartROC D65 rig has all the features Tata Steel needs, including online performance information, to ensure a safer work environment at the Noamundi mine.



### SmartROC D65

- Main application areas:  
Open pit mining and selective mining
- Drilling method:  
Down-the-hole
- Hammer size:  
4", 5", 6", 7"
- Hole diameter:  
110 mm (4 1/16") – 229 mm (9")
- Maximum hole depth  
with XL feed: 56 m

# Safety beyond the surface

» Built to face the toughest of conditions, Epiroc’s SmartROC D65 rig and the BenchREMOTE operator station have been intelligently enabling safe operations and enhanced productivity and ensuring accuracy and precision at Tata Steel’s Noamundi mine in India.

**T**ATA STEEL, ONE OF the top steel manufacturers in the world, produces about 30 million metric tons of iron ore a year from its ore mines and quarries division (OMQ), consisting of four mines: Noamundi, Katamati, Joda East and Khondbond. In order to enhance operations, Tata Steel recently added six SmartROC D65 MK II rigs to its fleet at the Noamundi mine. This surface drill rig delivers high-quality blast holes with accuracy and precision and is loaded with smart features such as automated drilling and rod handling.

Additionally, Tata Steel purchased two BenchREMOTE operator stations that enable the operator to handle not one but up to three rigs in parallel. This ensures much safer operation since the operator is seated on the BenchREMOTE, 100 meters away from the rig.

**Atul Kumar Bhatnagar**, the general manager of Ore Mines & Quarries, explains how the additions have worked for Tata Steel.

### Why was the SmartROC D65 rig considered in the first place?

“We constantly aim to enhance equipment reliability, availability and productivity, based on which we evaluate equipment selection. SmartROC D65 enhances digitalization in mining operations and can be extended to remote operations. This was one of the key features that we considered to have a long-term sustainable mining plant.”

### How would you measure the scale of improvement compared to the rigs used earlier?

“The SmartROC D65 rigs have delivered on all parameters. We have achieved great results in drilling efficiency, quality and cost of drilling.”

### How about the automation features?

“This rig has all the features we need to ensure a safer work environment, which is very important to us. Also, the performance information available online in real time makes it a delight for both the maintenance engineer and the operators. It helps in improving effectiveness of operations.”

### How does BenchREMOTE affect safety matters?

“The feature helps us in operating the machine from a remote, safer place, so there are obvious gains. BenchREMOTE ensures that the operator is not exposed to the hazards near the drilling.”

### How has support from Epiroc been so far?

“We have been working with Epiroc for almost 30 years, and the relationship is growing stronger with each year. Epiroc has always been open to our concerns to ensure safe operations and has tried to incorporate the same approach into the machines.”

### How do you view the Tata Steel-Epiroc relationship going forward?

“We foresee continuous engagement. We will continue to discuss the new challenges we face in mining, and I am sure we will be provided with the best solutions available.” ✕



**Atul Kumar Bhatnagar**  
General Manager,  
Ore Mines & Quarries



[On Location]  
India

More [epiroc.com/smartroc-d65](https://epiroc.com/smartroc-d65)



# Reimagining the future of

## **Codelco and Epiroc thinking new together**

»→ Epiroc has formed a new alliance with Chile's Codelco to jointly develop solutions for the challenges the world's largest copper producer is facing at its biggest mines.



[On Location]  
**Chile**

**GONZALO  
RAMÍREZ  
TROXLER**

Corporate Innovation Director for Decarbonization of Processes at Codelco, based in Santiago, Chile





# ning the f mining



**C**ODELCO AND EPIROC HAVE formed a new alliance to put their heads together and come up with the best ways to tackle the numerous challenges the Chilean company is facing at its giant mining operations. As it invests for another half a century of production, the state-owned company is looking for Epiroc’s input to reduce its environmental impact, automate its operations and mitigate the dangers involved in underground mining. Mining & Construction sat down with Codelco’s **Gonzalo Ramírez Troxler**, Corporate Innovation Director for Decarbonization of Processes, and Epiroc’s **Lars Bergkvist**, Customer Success Manager, to discuss how the new partnership could pave the way for the future of mining.

**GONZALO RAMIREZ:** “We approached Epiroc to explain the challenges we were facing in our mines and invite them to brainstorm together. Epiroc has a very interesting portfolio of products in automation, electrification and digitalization, etc. We have been partners a long time in the sense that we buy and use your products, but now we wanted to think about the future together.”



**LARS BERGKVIST**  
Customer Success Manager at Epiroc’s Underground division, based in Örebro, Sweden



**Which challenges were you thinking about specifically?**

**GR:** “Well, we are looking to fulfil certain milestones in the future in terms of sustainability, and that means electrification. We also want our people out of the risky areas, so automation also. A specific challenge for Codelco is that we want to mine the deeper areas of our mines, which is very challenging because of the geological constraints. So, we want to go a bit beyond that and think together with Epiroc about what the Codelco of the future will look like. How can we align Epiroc’s R&D roadmap with our R&D needs?”

**How can Epiroc help?**

**LARS BERGVIST:** “Codelco has quite an aggressive roadmap to electrify its fleet by 2030, and we believe we are really at the forefront in that area. So, we are in the initial phase of trialling a fully electrical LHD (load, haul, dump) loader at El Teniente. Once we start to see some results, we will be able to discuss the way forward. This is very different from the standard model, where you place an order and get the delivery date and the machine appears. But our investments in automation, electrification and information management require that we understand more about the whole process and how to support change management and implementation. We want to be more and more involved in that part.”

**Do you normally work with clients like this?**

**LB:** “Not with everyone. There’s a select group of customers with whom we have strategic partnerships. The Memorandum of Understanding we signed with Codelco provides the guiding principles on where to go. And we really like the approach. This partnership can lead to many collaborative projects.”

**GR:** “We began the very early conversations a year ago by sharing information. That’s the first step. Where are you? Where do you want to be? What are your needs? And from your side, what do you have to offer, in the short, medium,

**In Focus: Codelco-Chile**

Chile’s Corporación Nacional del Cobre (Codelco) is the world’s largest producer of copper, and its El Teniente mine is the world’s largest underground copper mine. After more than a century of continuous operations, Codelco is now investing billions of dollars to ex-

tend the life of the mine by another fifty years or more.

- 16000 direct employees
- Created through the nationalization of US-owned copper mines in 1971.
- EBITDA: US\$10.4 billion (2021)

**More** [www.codelco.com](http://www.codelco.com)

<  
The fully battery electric Scooptram ST14 SG loader, previously called Scooptram ST14 Battery, is being trialled at Codelco's El Teniente mine in Chile.

and long term? We have already made progress on some specific projects, such as the testing of the LHD loader. That's a very short-term project, but we are exploring how to build from there or develop new projects involving different areas of Codelco and seeing where there's a match. Our expectation is to have a rich portfolio of projects that covers the short, medium, and long term."

**LB:** "A really important point is the depth of the relationship between Codelco and Epiroc. Long before the MoU, a lot of trust had built up on both sides. And that relationship led to an understanding that our values and vision were aligned in terms of safety and sustainability. But when you do a project like this together, you really stress-test the relationship as well. Can we supply the parts? How do we handle equipment failing? You are putting a lot of trust in us, so you really need to understand how we will ensure that things run smoothly."

#### *Does this mark a big change in the way Codelco innovates?*

**GR:** "Yes, Codelco has been a very innovative company in the mining business for many years. But before we were very closed and tried to do everything in-house. We would approach the market much later, often to find someone to build what we had already designed. Today we go out with needs, not with fixed solutions, and our main task is to activate the ecosystem to help find solutions for these needs."

#### *Where do you see the partnership going beyond the aforementioned LHD trial?*

**LB:** "The five key focus areas in the MoU are sustainability, deep mining, electrification, information management and automation. We see that we can be involved in all five. The question is what sort of involvement. Where do we find the synergies? Businesses often talk about finding win-win solutions, but this really is a case of us being better together, right? You influence us, and we can influence you. Sometimes we take it for granted that we have all these products, and our customers know everything about them. Epiroc has many solutions that can solve your problems, but maybe we can be better at showing what benefits and values they can bring to a customer like Codelco. In general, with technology, when you move from one level to another, things get more expensive. But you can't just look at the item price or cost per ton. You have to put them into the big picture." ×



**Gonzalo Ramirez Troxler**  
Corporate Innovation  
Director, Codelco



**Lars Bergkvist**  
Customer Success  
Manager, Epiroc



## KEYS TO A SUCCESSFUL PARTNERSHIP

Taking their decades-old relationship to the next stage, Codelco and Epiroc have agreed to collaborate to develop solutions for a range of challenges at Codelco's mine operations.

### Spirit of collaboration

✓ Codelco and Epiroc are entering this partnership with the intention to share information and ideas openly in the hopes of reaching better solutions together for the challenges that Codelco is facing.

### Trust

✓ The two companies feel that they are able to embark on this shared journey because of the high levels of trust that have been built up between individuals and teams over decades of working together.

### Shared values

✓ This trust exists thanks in large part to the values that both companies share, including a strong emphasis on keeping employees safe and healthy and the imperative of making mining a sustainable business.

### Transparency

✓ Their ability to identify and resolve problems efficiently is only possible if there are fluid communications between not only the two companies but also all the members of the teams involved in the partnership.

More [epiroc.com/innovation-and-technology](https://epiroc.com/innovation-and-technology)

# AROUND THE WORLD IN BRIEF



SHUTTERSTOCK

The landmark UN High Seas Treaty will protect international ocean waters that lie outside of any country's jurisdiction.

## High Seas Treaty agreed by the UN

► **ON MARCH 4**, after two weeks of tough negotiations at the UN headquarter in New York, UN member states finally agreed on a treaty to protect the high seas. The agreement reached by delegates of the Intergovernmental Conference on Marine Biodiversity of Areas Beyond National Jurisdiction, better known by its acronym BBNJ, is the culmination of UN-facilitated talks that began in 2004.

Already being referred to as the High Seas

Treaty, the legal framework places 30 per cent of the world's oceans into protected areas, puts more money into marine conservation, and covers access to and use of marine genetic resources. "This action is a victory for multilateralism and for global efforts to counter the destructive trends facing ocean health, now and for generations to come," said United Nations Secretary-General António Guterres in a statement issued by his spokesperson.

## BHP boss urges governments to stand up for mining

► **BHP CEO MIKE HENRY**, speaking at the Future Minerals Forum in Riyadh, called for governments to stand up for mining in the face of negative public opinion, *Mining Journal* reports. Henry warned that the growing need for metals and minerals had not translated into enough public support. "Governments need to be talking about just how important the industry is and be clear about the opportunity mining presents," said Henry, also calling for consistent ESG standards across jurisdictions.



EPIROC



**Leif Boström**

Senior Vice President  
LKAB Special Products  
Business Area

## How will REE deposit serve Europe?

**LKAB has identified a large deposit of rare earth metals in Kiruna. Please elaborate.**

"It pertains to the Per Geijer deposit located next to our major iron ore mine. Our extended exploration found more than 500 million tons of iron-rich mineral resources. It also found that the ore contains high concentrations of apatite, or phosphate ore. In addition, there are more than one million tons of rare earth oxides (REO)."

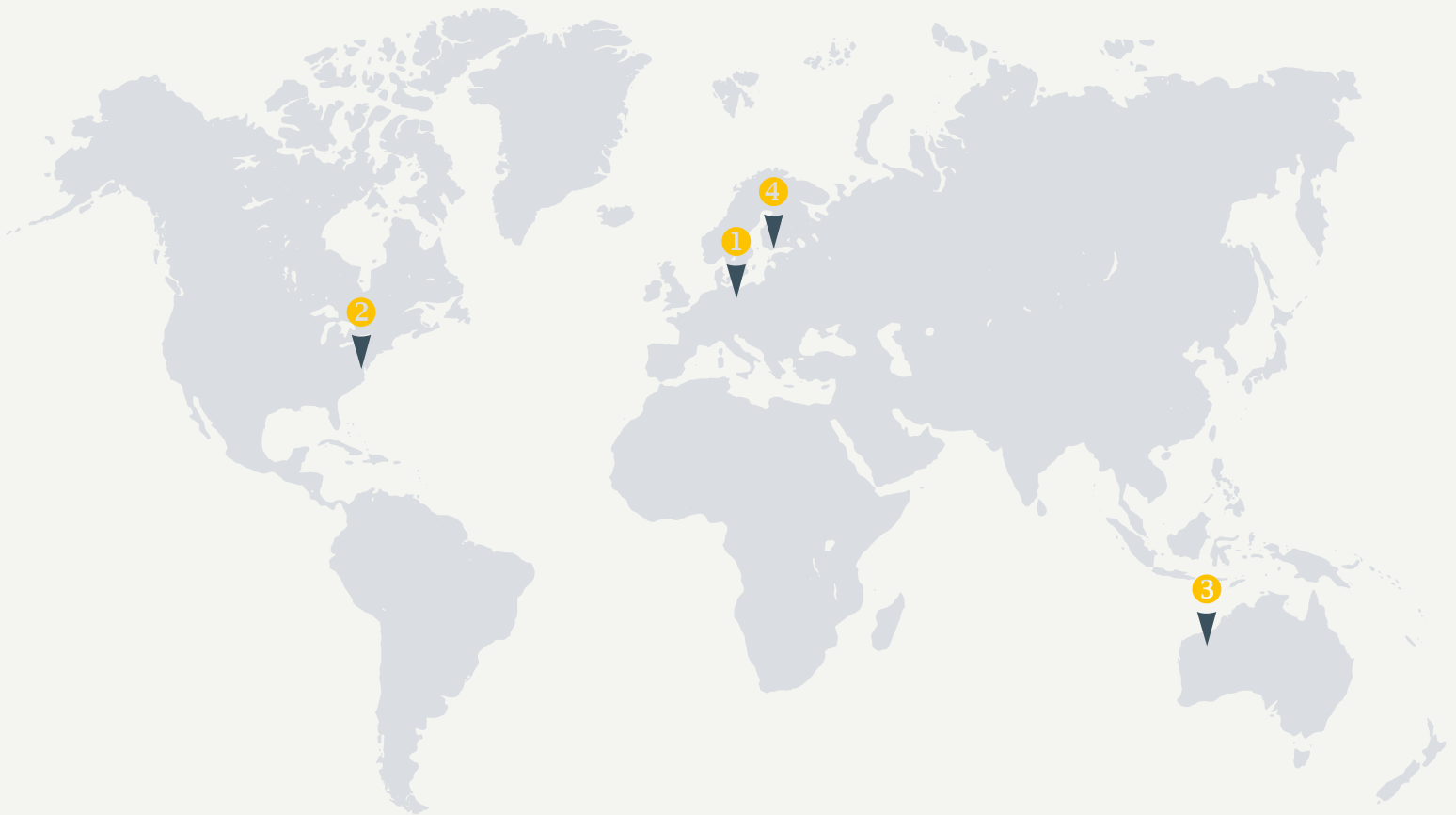
**What is the prospective significance of this?**

"Phosphate is one of three nutrients in the mineral fertilizers needed to grow food. Earth metals are needed for producing rare earth elements (REE), mainly used for permanent magnets. In turn, these magnets are needed for electric motors, wind turbines and smartphones – for all electricity-related tech development, actually. Not to mention that it would be highly valuable to the EU to have production here in Europe."

**What's next?**

"We intend to bore further into the deposit and make an investigation site. We need to go deeper if we're to get the full picture, but before we know whether it may constitute a new mine, we need to get an environmental permit. Earlier projects have shown that it can take ten years or more to get a mine up and running, but it is naturally an advantage that the deposit is close to an existing mine."

**More** [www.bit.ly/LKAB-REE](http://www.bit.ly/LKAB-REE)



# Pinpointed

## 1 German road expansion program proposed Berlin, Germany

➤ Road freight is expected to grow on Germany's road system, requiring an expansion of the network, *World Highways* reports. According to the Federal Transport Ministry, road freight grew 34% for 2021 and hit 5.7 billion metric tons compared to the 4.37 billion metric tons for 2019. To deal with this huge jump in road freight, the Federal Transport Ministry sees the need to expand the road network with new roads and bridges. Also, existing routes and structures would have to be widened and strengthened.

## 2 Battery passport launched by Global Battery Alliance Alexandria, USA

➤ The organization for a sustainable battery value chain organization, Global Battery Alliance (GBA), which is based in Alexandria, VA, has launched a proof of concept for a Battery Passport to track a mineral's source. The launch took place at the WEF Annual Meeting in Davos, and the GBA said the prototype passport – which includes example data from Audi and Tesla – establishes a “digital twin” of a physical battery that conveys information about its manufacturing process and material provenance.

## 3 Mining towns prepare for the age of automation Newman, Australia

➤ Just weeks after Roy Hill announced its plan to become the world's biggest automated mine, towns across the Pilbara region in Western Australia are preparing for more operations to follow suit. Shire of East Pilbara president Anthony Middleton said his council understood the need for automation, but there were concerns about what it would mean for smaller towns such as Newman, despite Roy Hill putting a plan in place to re-train workers, offering re-skilling programs and new roles to its truck drivers.

## 4 Finland tightens mining law as demand for minerals surges Helsinki, Finland

➤ The Sokli mine reserve in northern Finland could produce nearly 10% of the demand for rare earth elements in Europe, *Mining & Quarry World* reports. Finland's Parliament has passed an overhaul of its mining law to better protect the environment and safeguard national production of minerals amid surging demand. The new bill gives

greater control to local residents in permitting of new mining areas, aims to increase sustainability in the industry and evens the playing field for companies. Stricter regulation and higher fees are expected to help weed out unreliable operators and benefit those who comply with the rules, the government has estimated.



SHUTTERSTOCK

A SIMULATION CLASSROOM FOR

# FACE DRILLING

**WE** **HAVE NOT YET** reached our goal of a fully automated underground mining process; there are still several crucial challenges to resolve. One of the trickier obstacles is making face drilling fully autonomous. A collaborative project between Epiroc, Boliden, Algoryx and Örebro University that is scheduled to run until 2025 can hopefully come up with a working solution.

Face drilling is already partly automated, with rigs following digital drill plans. In practice, however, the face is seldom immaculate. It is often necessary for the operator to adjust the drill plan manually to compensate for various types of obstacles.

“The success of the blast is very much dependent on the quality of the drilling. We are

trying to figure out if an autonomous system can achieve results that are comparable with or better than those of experienced operators,” says **Oskar Lundberg**, Global Innovation Manager at Epiroc Underground division.

Autonomy in the face drilling phase – which is referred to in the project as *adaptive automation* – will be a major step toward fully autonomous mining.

“This is very important to us at Boliden. Our primary goal with this project is to be able to remove people from the face, which is one of the least safe areas in a mine since the rock has not been secured. To accomplish this goal, we have to transfer the operator know-how to the rig,” says **Michael Andersson**, a senior engineer at Mining Technology at Boliden.

The idea is to equip a Boomer face drill rig with a laser scanner and an AI system to scan and analyze the face before adjusting and applying the



[On Location]  
Sweden

»»» To tackle the problem of autonomous face drilling, Epiroc is leading a project that will use a digital twin – a simulated testing environment for machine learning. Results are expected by 2025.

drill plan. To teach the system to identify potential problems, the project constructs a simulated environment for training the system – a classroom, so to speak – after which the system graduates to an actual, physical mine for the final tests. This will allow the system to run the thousands of scenarios that are necessary for the trial-and-error process of machine learning.

To build the digital twin, an actual Boliden mine tunnel is scanned using a laser, and the environment is then rendered in the Unity game engine. A large number of slightly randomized environments, including obstacles, are also generated to provide different training scenarios. A digitalized version of the rig is inserted into the simulated environment, and a physics engine ensures that all forces affecting the rig are as close to reality as possible. A simulated laser scanner, with the same functionality as a real one, is added to the simulated rig.



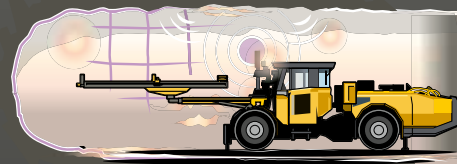
## LEARN MORE // SIMULATION

# The learning process

RUNNING THE THOUSANDS of scenarios necessary for machine learning would not be possible without simulation technology.

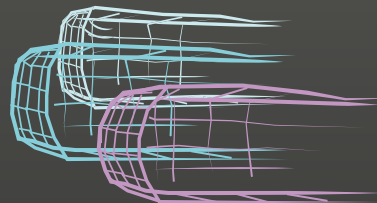
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**Scanning**  
A mine tunnel is mapped using a laser scanner, resulting in a point cloud.



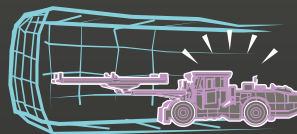
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**Digitalization**  
The point cloud is rendered in the Unity engine. Several variations are created.



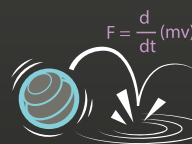
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**Simulation**  
A simulated Boomer based on CAD is inserted into the digitalized environment.



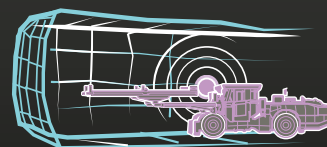
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**Physics**  
Forces, like friction, torque and weight, are applied through a physics engine.



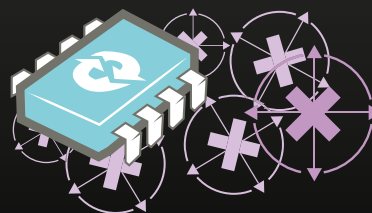
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**Scenarios**  
The finished simulation is run through a large number of drilling scenarios.



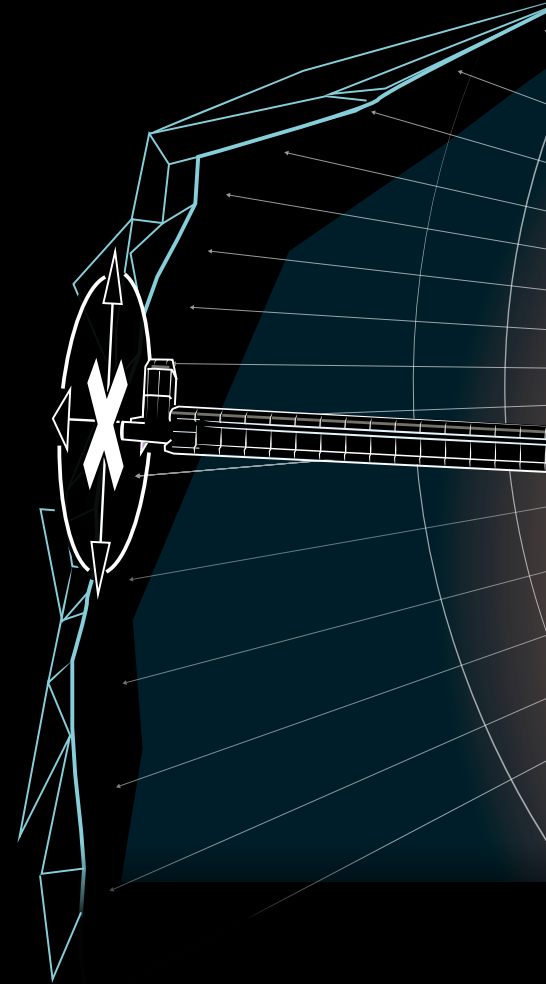
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**Learning**  
The AI system uses machine learning to improve its drilling performance.





Edris Fatah, Software Test Developer, and Thomas BejefalkThörn, Global R&D Manager, are part of the Epiroc team that will help take automation to another level.



By laser scanning the face, it will be possible to adjust the drill plan, without operator participation, before drilling.



**Oskar Lundberg**  
Global Innovation  
Manager, Epiroc

From the system's point of view, it is vital that the simulated environment resemble an actual mine as closely as possible. The digital twin does not have to look exactly like a mine but it has to scan like one. When the simulated laser scans the simulated environment, this generates a point cloud, which the system then analyzes to look for potential problems and adjust the drill plan.



**Michael Andersson**  
Senior Engineer,  
Mining Technology,  
Boliden

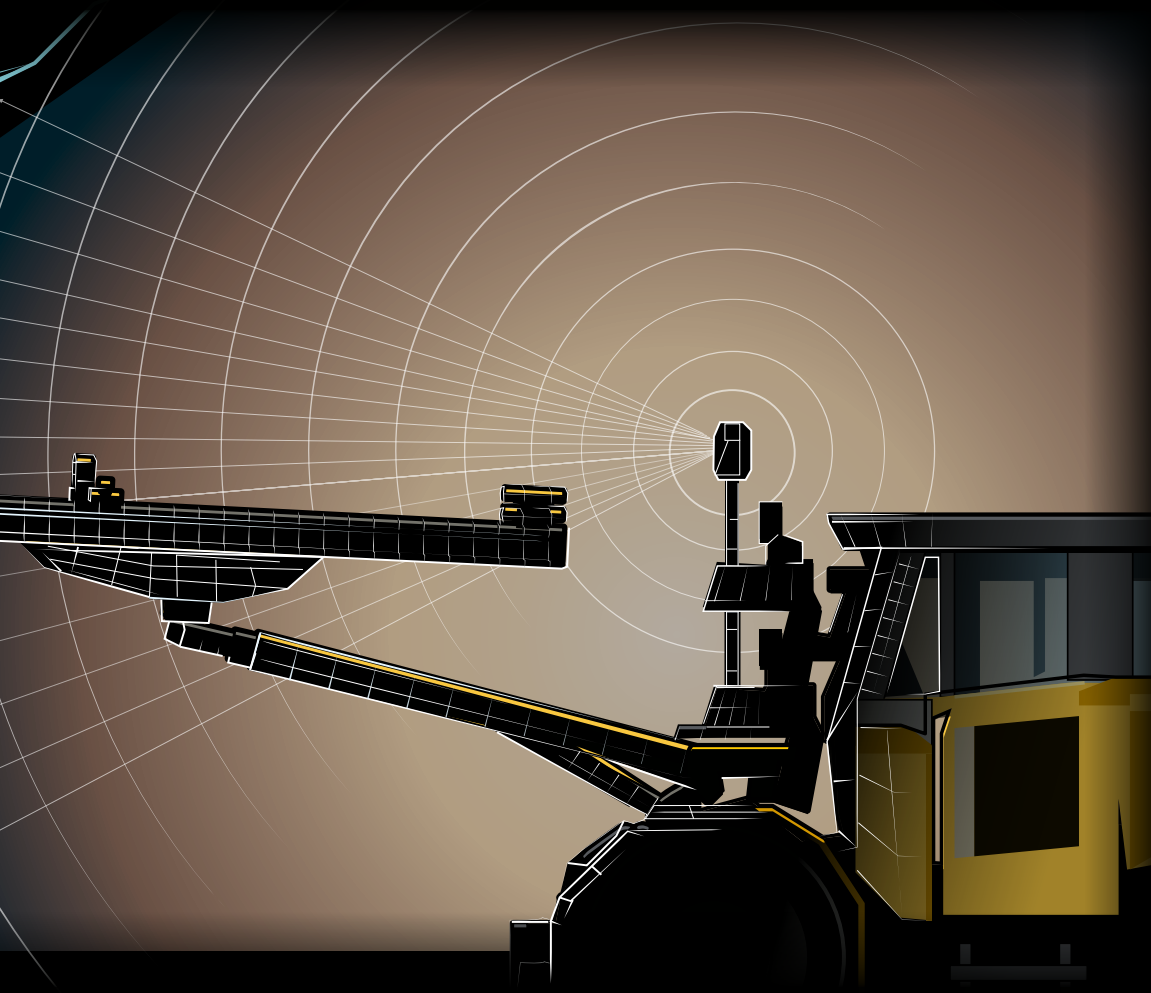
Another area that can benefit from machine learning is the autonomous control of the two booms on the rig; they need to learn how to move freely and precisely without colliding with either each other or the rock. After running and analyzing different scenarios a few thousand times, the system should be ready for testing in an actual mine.

“Using a simulation is a much safer and quicker way to accomplish the task – we simply cannot shut down a mine for the weeks or months necessary to train the system. This will hopefully enable us to greatly reduce the need for physical testing and also simulate scenarios that would be hard to set up in real life,” says Lundberg. ✕

## Adaptive automation project

The project is a collaboration between equal partners Epiroc, Boliden, Algorix and Örebro University and aims to enable autonomous face drilling. Epiroc leads and coordinates the project and also contributes machinery, manpower and expertise. End customer Boliden contributes operations and environment knowledge, testing and demonstration sites, as well as the evaluation of solutions. Algorix provides software development, simulation expertise and AGX Dynamics, i.e., the physics engine, and Örebro University is researching and developing the recognition and machine learning algorithms.





## Autonomy in action

If the adaptive automation project accomplishes the goals it has set out to reach, a finished solution might come to look something like this. A Boomer rig, equipped with a laser scanner and an AI system, is positioned for drilling. It scans the face, doing a local analysis of the topography and potential problems. The digital drill plan is adjusted to compensate for any obstacles before proceeding with the actual drilling. Unlike today, the adjustment will not require any operator participation.

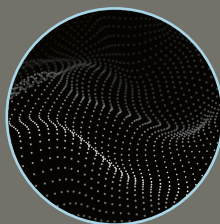
# Adaptive automation

The goal is to increase safety by minimizing human presence at the face. This requires expert AI systems to stand in for operator knowledge.

## Unity engine

Unity is a cross-platform game engine first released in 2005. The engine can be used to create both 3D and 2D games as well as interactive simulations and other experiences. Unity has been adopted by the film, automotive, architecture, engineering, construction, and military industries, among others.

## Key technologies



### Laser Scanner

Quickly takes a large number of distance measurements to surrounding objects.



### Game Engine

The Unity engine is used to build a 3D simulation of the mine and drill rig.



### Physics Engine

Applies physical forces like torque, weight and friction to the simulation.

F E A T U R E

# FUTURE

One thing about the future: it's on its way, whether we like it or not. We are faced with the choice of trying to understand and anticipate it using our best predictions or simply ignoring it and continuing to do business as usual while hoping for the best. But ready or not, here it comes.

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A future-ready company is quick on its feet and resolute after changing trajectory. Nike has taken the lead in the sportswear industry race by being nimble and making smart use of the digital opportunities.

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SHUTTERSTOCK, BJÖRN ÖBERG, EMIL NORDIN





# Piercing the haze



We move through the present, gazing piercingly into the future in an attempt to penetrate the haze. Sometimes we catch a glimpse, discern a few features. But spotting the best road is staggeringly difficult. How can we find out where we are headed?

**T O PARAPHRASE PRUSSIAN** Field Marshal von Moltke: no plan survives contact with future reality. Still, in many cases, it is possible to make accurate predictions. Assumptions about the future are necessary to prepare functional strategies. An understanding of the future – or rather, possible futures – aids in the search for practical ways to achieve competitive advantages.

The futurists of today prognosticate not with crystal balls or tarot decks but using a structured process that has considerably higher accuracy.

“First, you have to select a subject area, limit the scope to futures that will affect you, and choose a timespan. After that, we basically estimate probabilities for several possible futures and narrow it down to a few probable ones. Then you can select strategic approaches for these futures,” says **Heléne Olsson**, Director Global Industry Innovation at Kairos Future.

Her company continuously watches and analyzes trends, learning from everything from big data and AI to think tanks, and it can also perform customized analyses of specific subjects. Even though the company uses mathematical tools in the prediction process, simply painting a future in numbers is seldom enough.

“We also use qualitative research methods and storytelling to help visualize the future. You have to describe concrete scenarios and explain how different variables have an impact,” says Olsson.

The results are often remarkably accurate. For example, Kairos Future was early in predicting the rising importance of cell phones and the IT explosion – scenarios few others agreed with.

“Sometimes, futures are hard to accept. You can very well ignore coming trends and instead adapt after the fact, but there is a great deal of risk involved with this tactic. When you can visualize the future, and accept it, you can also influence it in a constructive way,” she adds.

**O NE OF THE MOST** ambitious projects to constructively influence our future is the Paris Agreement and the related Sustainable Development Goals for 2030. However, some areas are lagging behind, for example when it comes to CO<sub>2</sub> emissions.

“Some regions are doing very well in respect to some goals, for example regarding food security, responsible con-



**Heléne Olsson**  
Director Global  
Industry Innovation,  
Kairos Future



**Salvatore Aricò**  
CEO, International  
Science Council

sumption and production within developing countries. There are interesting developments elsewhere as well,” says **Salvatore Aricò**, CEO of the International Science Council (ISC).

Setting his sights further than 2030, he predicts that a long-term sustainable world will consist of three key ingredients.

“There will be increased participation from society in the political debate, with the public discussing decisions with policymakers. There will also be universal

access to basic benefits, like education. And the third ingredient is that there will be an understanding of how cultural values affect development. The cultural barriers are the last to come down,” says Aricò.

Science and technology will be tools that guide humanity toward a sustainable world.

“Science can be an important actor, but it needs to evolve to work within a larger system. Science is not only about research; it’s also about funding and training new scientists through education. Technology needs to deliver several solutions for energy and the climate, but we will not be able to





# “When you can visualize the future, you can also influence it in a constructive way”

**Heléne Olsson**

Director Global Industry Innovation, Kairos Future



complete the necessary shift using tech alone. The solutions need to be more profound and involve stakeholders at all levels,” says Aricò.

**S**O, WHAT IS CONSIDERED a good future? This is a question for philosophers, like **Anders Sandberg**, a senior research fellow at the Future of Humanity Institute, Oxford.

“Is the survival of life itself valued highest, or is it life with minimal suffering? And do we have a moral right to spread and take over the galaxy? These are questions to consider,” says Sandberg.

An opinion most of us share, though, is that not only the people living today, but also future generations, have intrinsic rights and value.

“Many of us see society as a great, common project. We care about future people, and we want humanity to not only continue, but also thrive. So, we should strive to strengthen the odds of the survival of our civilization,” says Sandberg.

He notes that we are living in a pivotal period in history. There are signs that indicate that choices we make over the next few decades will shape human society for centuries or even millennia to come.

“For the first time in history, the whole world is connected by global networks. We are also in a process of transition regarding energy and ecosystem services that is resulting in massive social change. And, thirdly, we



**Anders Sandberg**  
Senior research fellow, Future of Humanity Institute, Oxford

are developing very powerful technologies in the form of AI, biotech and nanotech, which could cause fundamental shifts. Yes, the sky is the limit, but it can also go very, very wrong,” says Sandberg.

It is crucial that we do not squander our opportunities, he says. To ensure a bright future, we have to resolve potentially civilization-ending threats, like nuclear conflicts and climate change.

“Humanity has an enormous potential; if we coordinate our efforts better, this will change the game. We have an exciting century ahead of us. If we survive and we make the right decisions, we may have a very bright future to look forward to,” concludes Sandberg. ✕

## THINKING AHEAD

### Longtermism – the bigger picture

**LONGTERMISM HAS BEEN** defined by philosopher William MacAskill as “the view that positively influencing the longterm future is a key moral priority of our time.” This view is based on the assumption that humans living today are vastly outnumbered by all humans that potentially will ever live; also, that future human beings matter morally just as much as people

living today. Improving the long-term future can be done in two ways: ensuring civilization’s survival and changing civilization’s trajectory to make it better.

Critics of longtermism point to the risk of deprioritizing more immediate issues and to our historically bad record of predicting the impact of our actions over long time horizons.





[On Location]  
Sweden

# Accelerating the transformation





## “The mining industry is undergoing fundamental change”

**Helena Hedblom**  
CEO, Epiroc

»→ The mining and construction industry is changing rapidly. Epiroc is not only changing with it but wants to drive development. Insightful analyses, smart product development and strategic acquisitions will contribute to a more sustainable society.

### **INNOVATION. COMMITMENT. MOVING FORWARD.**

These are some of the values that employees encounter every morning at Epiroc's headquarters in Sickla, just south-east of central Stockholm. The wall opposite the coffee machines in the foyer is a reminder for them and for all visitors; Epiroc has its eyes firmly on the horizon.

Or as CEO **Helena Hedblom** puts it:

“The mining industry is undergoing fundamental change. It's becoming increasingly safe, productive and sustainable, and it's great to be part of that journey. Epiroc is in a good position to accelerate

this transformation.”

**THE FACT THAT** Hedblom expresses herself this way is no coincidence. *Accelerate the transformation*

is at the core of Epiroc's new positioning message. The world needs metals and minerals for the energy transition and we need cities that can support a growing population in a sustainable way. To succeed, we need to speed up the shift towards a more sustainable mining and construction industry.

The link to the UN's Sustainable Development Goals may seem obvious, but is well-founded. Epiroc's Strategy function continuously monitors for short-, medium- and long-term trends to keep track of where the industry is headed – or *should* be headed.

“We need to know what our customers will need before they realize it themselves. Based on this, Epiroc builds strategies at both Group and Divisional level,” says **Martin Hjerpe**, Senior Vice President Supply Chain and Strategy.





**Helena Hedblom**  
CEO,  
Epiroc

In order to make customers more efficient and productive – and at the same time more sustainable – electrification, automation and digitalization are three focus areas, now and in the future. Since technology development is very fast and competition is fierce – both from traditional players and from companies that have recently started offering productivity solutions to mining customers – Epiroc thinks in partly new ways in order to remain at the forefront.



**Martin Hjerpe**  
Senior Vice President  
Supply Chain and  
Strategy, Epiroc

“There’s no point in having all technology development in-house,” says Hjerpe. “We are happy to enter into partnerships or technology development projects with other players, and sometimes we acquire smaller companies with cutting-edge expertise.”

Since becoming its own company on January 1, 2018, Epiroc has made 26 acquisitions at the time of writing. Among other things, Epiroc has acquired expertise on converting machines from diesel to battery-electric operation, and from manual operation to automation. Companies with data integration, electrical infrastructure, communications, connectivity and situational awareness as a specialty are also visible in the acquisitions.

“Basically, it’s about optimizing operations for the customer,” says Hedblom. When it comes to digitalization, the major challenge is to connect the processes, from exploration drilling all the way to the processing plant.

**EPIROC’S CURRENT AND LONG-TERM** work is clearly linked to sustainability. The Group’s 2030 sustainability targets within the areas of people and planet are in line with the Paris Agreement and

the UN 2030 Agenda for Sustainable Development. Epiroc has also had its climate goals validated by the Science Based Targets initiative (SBTi).

“We have set aggressive targets, both for our own emissions and Scope 3 emissions, which are caused when our products are used,” says **Camilla Goldbeck-Löwe**, Vice President Sustainability.

“The targets for Scope 3 emissions, in particular, are very ambitious, as we have no direct control over them, and electrification is an important prerequisite there, just like automation and digitalization. As far as our planet’s goals are concerned, we are also working to make the most of fossil-free steel in our products, and to enable our customers to extract metals and minerals with the least possible water consumption, as many mines are located in places where there is a shortage of water.”

**EPIROC IS TAKING** a very pragmatic approach to electrification. For **Erik Svedlund**, Global Marketing Manager Electrification, it is a means of achieving zero emissions and a sustainable world.

“The powertrain of the future will be electric, but how we get energy for it will vary depending on the application and product. Electricity via cable or fuel cells can be an alternative, but of course we work most with battery solutions,” he says.

For customers, the transition to electric is enormous, taking the whole element of service and aftermarket into the equation. Epiroc therefore tries to lower the barrier, mitigate risks and lessen any concerns through the Batteries as a Service offering, which means that the customer pays for Epiroc to provide energy storage in the



## Q&A



**Nadim Penser, Senior Vice President Brand & Communication, Human Resources, SHEQ, Stockholm, Sweden**

*Attracting and keeping individuals who will help form successful teams are key for taking a company forward. Epiroc is no exception.*

**Q** What kind of competence is the most important when Epiroc plans for the medium- and long-term future?

**A** “In general terms, we are looking for three power skills: curiosity, learning agility and collaboration. In an ever-changing world, the pace of change is accelerating, so it is Epiroc’s duty to always look around the corner. We want people who are positive, curious and not afraid of change. They need to be open minded, to acquire new skills to solve problems, and to interact with other people.”

**Q** What’s key for attracting and keeping that kind of individual?

**A** “First off, knowing our brand and what resonates with our target groups. We then have to convey our story in an authentic and attractive way that really resonates. Epiroc is built on innovation and collaboration, and we have very strong basic values, including sustainability. We are purpose driven, and we are looking for people who also want to make the world a better place. Our industry is the place to be if you want to make a difference.”

**Q** What about upskilling and re-skilling?

**A** “We see and work on two dimensions. First, to have clear programs and learning paths for our employees in order to increase specific skills that are needed for the future – for instance, concerning digitalization. Second, the most effective learning comes from doing things together. Here, it is increasingly about defining specific improvement opportunities or problems to be solved and then gathering people from different parts of the company to collaborate.”

**Q** What’s the incentive for the people you want at Epiroc?

**A** “Purpose is enormously important. People want to make a tangible difference. They want to learn and develop in collaboration with other people. At Epiroc, you can do that in a safe environment that is built on innovation.”

**More** [epirocgroup.com/careers](https://epirocgroup.com/careers)

Epiroc has set ambitious emission targets, in particular regarding Scope 3 emissions, explains Camilla Goldbeck-Löwe, Vice President Sustainability.



↑ Epiroc has made 26 acquisitions, and counting, since becoming its own company. Senior Vice President Supply Chain and Strategy Martin Hjerpe and CEO Helena Hedblom are happy with how acquisitions help the company progress.



form of a battery and all ancillary services.

“The service is a major reason why electrification has had such a breakthrough, and is also an important driving force internally. The offering places high demands on us to develop our skills,” says Svedlund.

He takes a positive view of the future in terms of both technology development and the opportunity to get more customers to electrify their fleets.

“Technology is evolving at a furious pace, and there’s still a lot to work on. We are already producing battery machines that beat diesel-powered machines in all areas except one, the running time, and we will surpass them there as well – even if it will take some time.”

Svedlund continues:

“For surface mining and construction there are slightly different needs, challenges and solutions. We already have a complete range of cable-electric



**Camilla Goldbeck-Löwe**  
Vice President Sustainability, Epiroc



**Erik Svedlund**  
Global Marketing Manager Electrification, Epiroc

large blasthole – Pit Viper and DrillMaster – rigs, with a large number of drills in operation in all continents. For the smaller rigs used in mining and quarrying, we have presented rig solutions with a combination of battery and cable, which allows for the flexibility needed in those applications.”

**WHEN HEDBLOM LOOKS FORWARD** in both the short- and long-term, she repeats that it is important to continue to be at the forefront of technology – “innovation is part of our DNA” – and that conditions improve the more outward-looking you are, and the more you also look at soft values.

“It’s partly about acquiring or collaborating with other companies that develop solutions, and partly about making change journeys together with our customers,” she says. “We want to offer solutions that help them optimize their



**Walt Halipchuk**

Director Sustainable Business Development, Copper Mountain Mining Corporation, Canada

## Why switch to electric?

**Why have you chosen to invest in an electric Pit Viper?**

“The investment aligns with Copper Mountain’s greenhouse gas reduction strategy and will further reduce drilling operating costs. The rig will be replacing our original diesel-powered Pit Viper rig, which was purchased 22 years ago. That rig has surpassed all expectations and has over 130 000 operating hours while still working at over 91.4% availability.”

**How do you plan to implement the electric Pit Viper into your operations?**

“The Pit Viper 351 will reduce operating costs due to the reduction of 1 250 000 liters of diesel consumption. The annual cost savings from switching from diesel to electric power will be about \$1.6 million per year. The new rig will reduce annual emissions by approximately 2 000 metric tons CO<sub>2</sub>e.”

**How do you view the collaboration with Epiroc in terms of sustainability?**

“Our chief operating officer, Don Strickland, has a saying when we talk about production improvement plans: ‘like-minded people can achieve great things by working collaboratively together.’ Epiroc has proven to be a like-minded partner with respect to sharing our vision of advancing sustainable mining in a hard rock open pit environment.” ✕

More [www.cumtn.com](http://www.cumtn.com)

operations, and I strongly believe in long-term partnerships. So it’s important to share the same vision, and for people to trust technology and get the most out of it, we as a supplier must also be aware of the need for change management.”

Another thing that needs to change is the image of the mining industry. To make the green transition possible, more metals and minerals need to be produced – and new mines and young, sharp minds are needed.

“There’s still a picture of the mining industry as dangerous and low-tech,” says Hedblom. “In this respect, the entire industry has a responsibility to ensure that both decision-makers and ordinary people know what it is actually like – and that everyone sees the link to our shared sustainability challenges. If you want to be involved in influencing the future, our industry offers a fantastic opportunity.” ✕

A clear focus on all aspects of sustainability puts Epiroc in a good position to attract new talent, something Camilla Goldbeck-Löwe, Vice President Sustainability, and Nadim Penser, Senior Vice President Brand & Communication, Human Resources, SHEQ, view as an important success factor going forward.

☑ Christian Tarras Ericsson  
📷 Shutterstock

## The athletic and flexible sportswear company

# Swooshing to the future

**IN THE COMPETITIVE** realm of business, the company that is best equipped for the future will have the greatest chance of prosperity.

If there is one thing that we can be certain of, it is that the future will surprise us. To be resilient in the face of change, you will have to be robust yet flexible; with a clear plan, but with the agility to pivot. The more uncertain the world becomes, the more important it is for companies to be ready for the future.

A common trait among many successful companies in recent years has been their ability to quickly rethink. These companies are open to experimentation, and when evidence tells them to pivot, they do – committing fully to the new

course. A good example is Nike, which has kept up with changing market demands and behavior.

Today, apparel consumers have dynamic preferences. They want to be able to order personalized goods online and have them shipped home without delay. This is only possible by digitalizing the entire supply chain and coordinating logistics with external partners.

In Nike's case, it employs a digital, direct-to-consumer and data-driven approach. For example, it has adapted to fickle consumer demands by analyzing behavior data 24/7, which has resulted in local-level predictions of where to apply markdowns and promotions

while moving inventory between parts of the country or continent. The goal is to enable the customer to always find what they are looking for at any given moment, wherever they may happen to be.

Another interesting strategy that Nike applies is blurring the boundary between the online world and the physical world. Physical stores are connected to the online experience, and customers can use the Nike mobile app in stores to gain access to limited release items, fun facts and reward schemes. ✕

### In Focus: Nike

**THE COMPANY WAS** founded in Oregon in 1964 under the name Blue Ribbon Sports and originally was a distributor for a brand of Japanese running shoes. It launched its own line of footwear in 1971 and in conjunc-

tion with this introduced both the name Nike and the famous Swoosh logo. The well-known slogan Just Do It was coined for a 1988 ad campaign. Today, Nike produces a wide range of sports equipment and apparel,

from functional items like shoes, jerseys, shorts, cleats and baselayers to sports-themed fashionwear. It also sponsors track and field athletes as well as football teams, tennis players, golfers and basketball players.

**More** [about.nike.com/en/company](https://about.nike.com/en/company)

By digitalizing the entire supply chain and coordinating logistics with external partners, Nike has made it possible for consumers to order personalized goods online and have them shipped home without delay.



# SURVEY TAKING ON THE FUTURE

Want more input on this theme?  
Three people from different  
fields offer their insights to  
help paint a broader picture.

☑ Gustaf Höök

01

What are the main long-term challenges for the mining and construction industry?

02

How should these challenges be met?



**Rohitesh Dhawan**

President and Chief Executive Officer ICMM, UK



**Sebnem Düzgün**

Professor and Associate Department Head, Colorado School of Mines, USA



**Pascal Peduzzi**

Director GRID-Geneva, UN Environment Programme, Switzerland

**01** "THE CENTRAL CHALLENGE is how to meet growing demand while making a net positive social and economic contribution. The world needs significantly greater natural resources in order to urbanize and decarbonize, but these commodities will need to be produced with not just neutral social and environmental impacts, but also net positive contributions. It is in the nature of mining and construction for some level of social and environmental disturbance to be inevitable – but a social license to operate will be contingent on creating net benefits overall."

**02** "FIRST, DEFINE A net positive vision at both the industry and the company level. Second, make it everyone's job to deliver on that commitment using KPIs and other performance tools, in addition to embedding it in the company's values and culture. Finally, be transparent and consistent in disclosing our impacts, both good and bad."

**01** "SIGNIFICANT CHALLENGES include environmental, social and corporate governance (ESG) practices, technology, and the value chain. Social license to operate, a skilled and adequate workforce, and transitioning to a net-zero carbon industry, water, tailings, and waste management are the main ESG challenges. Digital transformation, adoption of AI, and autonomy are the technology challenges. The main value chain challenge is handling the mineral-intensive energy transition via transparent and resilient mineral supply chains."

**02** "EFFECTIVE EQUITY initiatives in business and innovation are vital, as is cultivating a digitally savvy workforce. Digital transformation and carbon neutrality need transformative research. As supply chain transparency and resiliency have become more significant social issues, the industry has an excellent opportunity to communicate its best practices when addressing ESG-related issues."

**01** "ONE OF THE main challenges for the mining industry will be to manage the mine tailings. Over time, the ore resource becomes scarce, and the decrease of ore rate increases the amount of material placed in tailings. For the construction industry, the challenge will be to find sustainable sources of sand and gravels without impacting the environment."

**02** "THE UNIVERSITY OF GENEVA and the University of Queensland found an interesting solution. In some cases, it is possible to co-generate ore (e.g., iron) and building material, thus avoiding or reducing the production of tailings. For the mining industry, this reduces the costs of tailings maintenance and also allows for additional revenues through the sale of building material. For the construction industry, it reduces the need to create new quarries to extract building material."

More [www.icmm.com](http://www.icmm.com)



Predicting the future is notoriously difficult. Here is an alternate timeline of the world, curated from less-than-perfect prophecies in movies and television.

**Space: 1999**  
(1975)

The millennium ends on an inauspicious note when the nuclear waste stockpile on the moon explodes, careening our lunar companion wildly through the galaxy. We have lost contact with the research colony Moonbase Alpha and can only hope that they will survive the ordeal.



1999



**Death Race: 2000**  
(1975)

In the totalitarian United Provinces of America, the Transcontinental Road Race is held annually to placate the masses and cull the population by running over pedestrians. This year, national champion Frankenstein finally manages to kill Mr. President by ramming his podium.

2000

**2001: A Space Odyssey**  
(1968)

Following the excavation of a mysterious monolith sending a signal into the solar system, Discovery is sent on a mission to Jupiter to investigate. Unfortunately, it seems increasingly likely that the onboard AI has ... glitched, cutting off contact with the crew.



2001



**I Am Legend**  
(2007)

Humanity becomes all but extinct due to a pandemic caused by a genetically modified measles virus. The majority of the survivors turn into carnivorous bloodsuckers, but a few brave humans struggle on. In New York City, a man and his dog try to find a vaccine.

2012

**Back to the Future Part II**  
(1989)

The world has turned into a technological cornucopia, offering flying cars, Mr. Fusion engines, health rejuvenation, robot news reporters and dog walkers, smart jackets, self-lacing shoes, super binoculars, dust repellent paper ... and, yeah, hoverboards.



2015



**Blade Runner**  
(1982)

By this year, we not only have colonized Mars – we also have life-like androids, called replicants, working off-planet. Earth itself, meanwhile, has gone through an ecological disaster, with acid rain pouring down over bloated cities. The flying cars are still with us, though.

2019

**Soylent Green**  
(1973)

In an over-populated world, drained of natural resources and ravaged by climate change, with unemployment rates topping 50 percent, the masses of humanity are fed by the immense Soylent Corporation. Spoiler alert: Soylent Green is recycled and processed Homo sapiens organics.



2022

**Next issue**  
[Feature]

The powertrain of the future will be electric, enabling zero-emission operations. Read more about electrification in next issue's Feature.

# MY WORK: DRILL MASTER

Epiroc's greatest asset is our employees. We take pride in offering them an outlet for their creativity in order to provide the best possible value to our customers.

✉ Gustaf Höök  
📷 Andreas Hylthén

## “Drill rigs became a passion of mine”

»— **Andrea Bosio** fell in love with motors and machinery at a young age. He now spends his time living his dream, traveling the world as a drill master for Epiroc. Complex drill rigs never cease to amaze him.

“I was brought up in the countryside close to Turin, the city that spawned Fiat Automobiles, so perhaps it was no coincidence that I became enamored with motors and vehicles, be it cars, bikes or tractors. After graduating with a degree in mechanical industrial engineering, I started working at Atlas Copco in Italy as a service engineer/product specialist. Drill rigs soon became a passion of mine. They are very special to me, not least because they have a lot of systems that need to work together to get the machine in proper drilling condition. Drill rigs, SmartROC rigs in particular, are complex, and I consider them to be the heart of any mining operation.

**I PROCEEDED TO** travel the world as a product specialist for Atlas Copco/Epiroc Stonetec drilling equipment, and in mid-2018 I was pleased to be able to progress in my career and become a drill master, which entailed moving to Örebro, Sweden. Management saw my passion, and I am so thankful for this opportunity. I spend 200+ days a year on the road working closely with our customers.



### ANDREA BOSIO

**Age:** 32  
**Job:** Drill Master, based in Örebro, Sweden  
**Joined the company:** 2010  
**Best part of the job:** “I love traveling the world, helping mining and quarrying customers optimize their productivity, efficiency and drilling applications.”

The role includes advising customers on site or remotely, being involved in drill-rig research and development, supporting start-ups and commissioning of surface drill rigs at mining sites, holding drilling and technical training courses for colleagues or customers, supporting the implementation of automations for our drill rigs on site... the list just goes on.

**I LOVE TO SEE** how our surface drill rigs adapt. We have machines working at an altitude of 5 000 meters and at sea level. These conditions are very different and can present challenges. Sometimes I pick things up on how we can improve our machines, and I send these ideas back to our R&D department in Örebro – for example, developing new software or hardware options for the machines. Teamwork is very important; it forms the base from which we can develop our drill rigs.

When I'm not working, I really enjoy visiting my family in Italy and spending time at the shore in Liguria or some other coastal region. Swimming, windsurfing, kitesurfing, diving...I love it all.” ✕



Andrea Bosio thinks that the key to doing great work is to love what you do and always do your best with passion. "If you choose a job you love, you will never have to work a day in your life," he says.

# Safety first

»»» The Magdalena Mine, where Inersa is doing the exploration work, is Spain's largest metallic mine. It is also where you will find the first Diamec Smart 6M in Europe.

1

## THE CHALLENGE

**T**HE MAGDALENA MINE, which opened in 2014, is located in the Iberian Pyrite Belt in the municipality of Almonaster la Real. It is considered the largest mine in Spain and to have one of the highest concentrations of sulfides in the world. Inersa, the main contractor, has been carrying out exploration work with Epiroc equipment since the mine opened. Underground exploration work is done via two access ramps through primary and secondary chambers. The



**Eva Hernandez**  
Business Line  
Manager, Epiroc

accesses and the characteristics of the terrain pose challenges for the team.

“It is difficult to tram and position safely at the desired pace. Therefore, Inersa needed to find a solution that would make it possible to be faster and more agile without compromising security and efficiency,” says **Eva Hernandez**, Business Line Manager Surface, Epiroc Iberia, adding:

“Thanks to Epiroc’s longstanding relationship with Inersa, we wanted to find a way forward together.”

2

## THE SOLUTION

**E**PIROC SUGGESTED Diamec Smart 6M, a strong mobile version of the successful Diamec rig. The solution fits well with Inersa’s innovative vision.

“I would say this model meets the customer’s requirements. They had also heard about the positive results of the Diamec Smart 6M rig in Australia and realized that the investment would be worthwhile. Inersa is the first company in Europe to work with this model and the first to receive a CE-certified model,” says Hernandez.

**THE MOBILITY OF THE RIG** and the fast set-up were key selling points for Inersa with Diamec Smart 6M. The classic skid-mounted Diamec rigs already feature an advanced design, but Diamec Smart 6M further enhances this by

complementing the design with significant advances in mobility. The rig is based with the popular Boomer S2 carrier, which has well-proven efficiency. The time lost between holes is reduced thanks to fast and safe positioning.

“Safety always comes first in mining operations, but it’s clear that the work can be a lot more efficient with an automatic drilling process, and the rig makes the process of positioning much faster. Improved efficiency also saves money,” explains Hernandez.

Diamec Smart 6M is equipped with the advanced Rig Control System, enabling automation. Drilling parameters are set and monitored from the touch screen on the control panel. Automated features, such as AutoDrill, can drastically improve bit life compared to manual drilling.



↑  
The Diamec Smart 6M is a strong mobile version of the successful Diamec rig. It has helped Inersa’s operations become safer, faster, and more cost-effective.

3

## THE RESULT

**T**HE KICK-OFF FOR the equipment at the Magdalena Mine was held in March 2021 for the large team of professionals and technical staff from both Inersa and Epiroc whose attention to detail ensured that the project progressed flawlessly. The exploration team has been operating its new rig for about two years, and team members are very satisfied with the results. Inersa has not only the high efficiency of a Diamec core drill, but also the mobility and stability of a carrier designed for underground use. Thanks to Diamec Smart 6M, Inersa has made the work safer, faster, and more cost-effective. The rig also enhances this flexible design by adding mobility. It is a lot easier to position – even at the most difficult of angles. The articulated carrier allows it to bend around difficult contours whilst the highly maneuverable boom allows the drill to be positioned in exactly the desired location.

“Inersa could quickly confirm that the exploration work is now faster, safer, and more profitable. Productivity has increased significantly. For us, it feels great that all expectations have been met and even exceeded. We look forward to continuing our cooperation,” says Hernandez. ✕

More [epiroc.com/diamecsmart6M](https://epiroc.com/diamecsmart6M)



Successful CSR project in India

# EDUCATION — THE KEY FOR THE FUTURE

»»» Not all children are able to attend school. Thanks to Epiroc, 9000 children in India have received school kits to increase the possibility.

**E**PIROC INDIA HAS taken action to show that it believes education is key for future generations. Its CSR work focuses largely on supporting schools and students through scholarships and infrastructure projects, for example, to create a better learning environment and provide other education-related facilities. **Dhanaji Puri** is

a corporate social responsibility officer at Epiroc and has worked with many projects related to education.

“For Epiroc, this is a way of giving back to society. It feels great to make a difference and be able to improve the quality of life for many families,” says Puri.

**EPIROCHAS LAUNCHED** seven programs to carry out CSR activities in India. Each



**Dhanaji Puri**  
Corporate Social Responsibility Officer, Epiroc

program focuses on one objective, for example the Vidya Sahayog Program for education. Under this program, Epiroc runs an activity called the Epiroc School Kit Program.

“The aim is to support unprivileged children from rural and unprivileged parts of India whose families can’t afford a proper education. Many of these children can’t attend school with dignity,” explains Puri.

He continues: “More than a hundred employees at different units and customer centers participated in the activity. The first step was to visit and select schools on the basis of local community backgrounds and students’ family backgrounds.”

**AFTER CHOOSING THE SCHOOLS,** Epiroc placed the purchase order for the

## 🌟 THE SCHOOL KIT PROGRAM AT A GLANCE

<p><b>1</b></p> <p>A complete school kit</p> <p><i>The kit included a school bag, notebooks, a pouch, a pencil box, an eraser, a scale, a pencil sharpener, a ballpoint pen, a compass box, a sketch book, and crayons.</i></p>	<p><b>2</b></p> <p>100+ employees involved</p> <p><i>Epiroc in India has formed CSR teams at each Epiroc location. More than 100 employees volunteered to participate in this activity.</i></p>	<p><b>3</b></p> <p>A country-wide activity</p> <p><i>The activity was a country-wide initiative, and Epiroc distributed school kits in all eight regions of India where the company is located, including Pune, Nashik and Bangalore.</i></p>	<p><b>4</b></p> <p>9000 happy children</p> <p><i>The contents of the school kits targeted children in two age groups: 6–9 and 10–15.</i></p>
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Thanks to the Vidya Sahayog Program for education, 9000 children in India have received school kits that include notebooks, a sketch book and a compass box.

Epiroc has selected nine relevant UN Sustainable Development Goals, connecting them to the company's own goals. In each issue, we highlight one of them.



## DARING TO THINK NEW

»→ The global Sustainable Development Goals (SDG) formulated by the UN guide our sustainability work. We take a closer look at how Epiroc approaches Goal 8.

school kits. Basically, it included everything the students would need for the school day. “For example, notebooks, a sketch book and a compass box. We made two kits based on the standard classes offered at school and the children’s ages.”

CSR team members and additional Epiroc employees volunteered to deliver the kits to the children between June and August, when the school semester had started. “To see the joy and smiles on the children’s faces was lovely. They were really thankful, and it was so fulfilling for everyone involved in this activity,” says Puri.

**EPIROC WILL CONTINUE** this activity every year at different schools, and the company has decided that the schools where the kits have already been distributed will be able to rejoin the program after two years.

“This has been a great success, not least for the children who received the kits. We look forward to this year’s activity,” concludes Puri. ✕

**EPIROC’S VISION** and beliefs are mirrored in SDG Goal 8 – *Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.*

“Our vision is *Dare to think new*,” says Senior Vice President Brand & Communication, Human Resources, SHEQ, **Nadim Penser**. “Epiroc wants to drive the productivity and sustainability transformation in our industry and, by doing so, promote sustainable economic growth.”

To achieve this vision, the recruitment strategy is to hire people who want to contribute and grow in their respective roles.

“We want to create an empowerment-oriented work environment that places the individual firmly in the center. We also believe that inclusion built on diversity – be it gender, nationality, ethnicity or religion – contributes to creativity, which is key for an innovative company that wants to develop new technologies and new business models,” says Penser.

Being a good corporate citizen extends



**Nadim Penser**  
SVP Brand & Communication, Human Resources, SHEQ, Epiroc

to trying to encourage change where needed. For instance, Epiroc supported the non-governmental organization Women in Mining Resource Mongolia (WMRM) in its work to make it possible for women to work underground.

More recently, the company has joined a UN-driven, public-private development partnership (PPDP) to stimulate technical and vocational education and training (TVET) reform in the Democratic Republic of the Congo (DRC). The partnership will promote youths’ access to qualified employment in the country’s heavy-duty equipment sector.

“The project will support two vocational training centers with upgraded facilities, training equipment and tools, as well as modernized curricula,” explains Penser. ✕

**More** [www.epirocgroup.com/un-sustainable-goals](http://www.epirocgroup.com/un-sustainable-goals)

# BLAST FROM THE PAST

## YEAR 1999

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Innovative products and a wide array of customers: Epiroc is a new company with a long and rich history dating all the way back to 1873. In each issue of Mining & Construction, we look into the review mirror for a glimpse of the past.

☑ Gustaf Höök  
📷 Shutterstock

The Kyzylkum (*red sand* in the Turkic languages) Desert is located in Central Asia between the confluent rivers Amu Darya and Syr Darya and features ancient fortresses such as this.







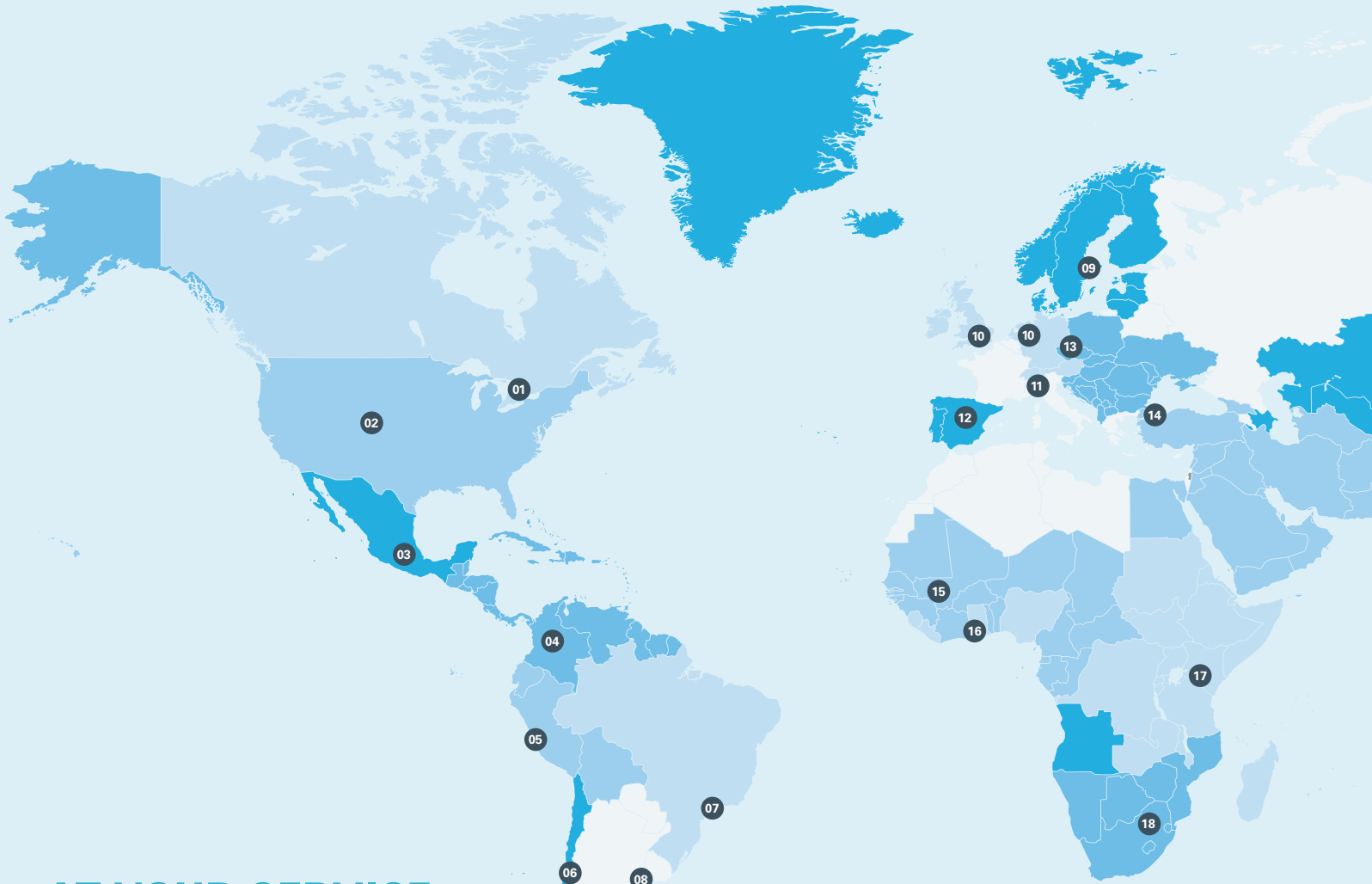
## Portfolio: Kyzylkum Desert

For more than one thousand years, the Silk Road has facilitated economic, cultural, political, and religious interaction between the East and the West. It actually consisted of several routes, forming an intricate web both on land and at sea, that connected Asia and Europe and gave birth to fabled cities such as Samarkand.

During the 1990s, foreign investment flowed into Uzbekistan after the country declared its independence from the USSR. A key contributor to the economy was, and still is, the Navoi Mining and Metallurgy Company (JSC NMMC), which mines several sites in the Kyzylkum (Red Sand) Desert, including the Muruntau open-pit gold mine that is the biggest in the world of its kind. In the late 1990s, JSC NMMC purchased an Atlas Copco ROC 848 crawler rig and several ROC 860 units to boost productivity. Nikolai Sladkov, then manager of the JSC NMMC mining department, praised the performance: “The high mobility of the new rigs gives more time for drilling,” he said.

JSC NMMC is now one of the top-four gold producers globally, having morphed into an industrial cluster that has mastered the full production cycle: from geological exploration of reserves in the subsoil to mining, processing of ore and obtaining finished products.

**More** [www.bit.ly/Kyzylkum](http://www.bit.ly/Kyzylkum)



# AT YOUR SERVICE

## Closer than you might think

**OUR CUSTOMERS ARE** located all over the world, and so are we. There is always an Epiroc office to turn to, making us truly local. At the same time, we are a global enterprise with worldwide resources. We have 26 Customer Centers

supporting and collaborating with customers in more than 150 countries. In each one, there are one or more Service Centers. All this supports our goal: Count on us to listen, collaborate and deliver the right solutions for you.

01 Canada  
Toronto

02 USA  
Denver

03 Mexico  
Mexico City

04 CVCA  
Bogota

05 Andes  
Lima

06 Chile  
Santiago

07 Brazil  
São Paulo

08 Argentina  
Buenos Aires

09 Nordics  
& Baltics  
Stockholm

10 Europe West  
Essen/Hemel Hempstead

11 Southern Europe  
& Northern Africa  
Milan

12 Iberia  
Madrid

13 Central Europe  
Prague

14 Turkey &  
Middle East  
Istanbul

15 Mali &  
Burkina Faso  
Bamako

16 Ghana  
Obuasi

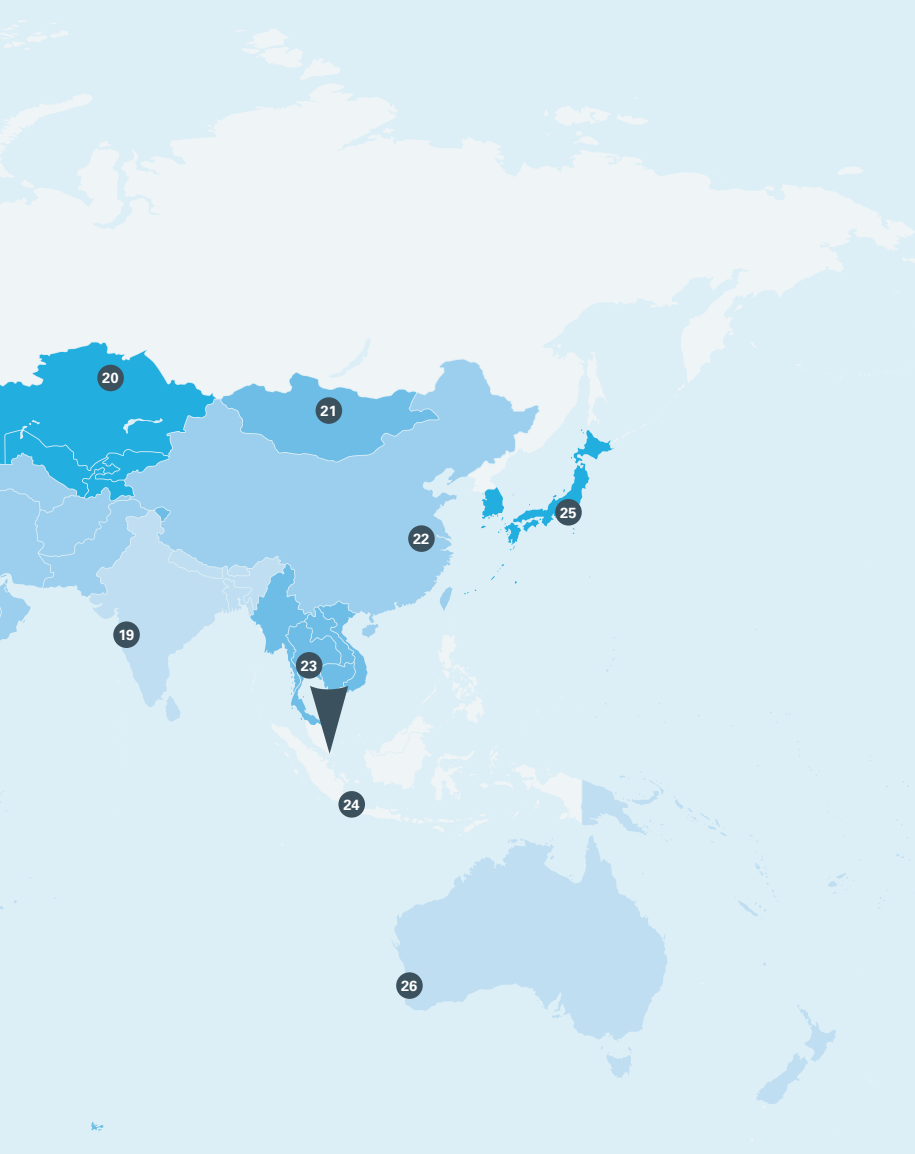
17 Eastern  
Africa  
Nairobi

18 Southern  
Africa  
Johannesburg

19 India  
Pune

20 Central Asia  
Nur-Sultan

21 Mongolia  
Ulaanbaatar



22 Greater China  
Nanjing

23 Southeast Asia  
(North)  
Bangkok

24 Southeast Asia  
(South)  
Jakarta

25 South Korea  
& Japan  
Tokyo

26 Australia  
Perth

Find Epiroc  
in your country:

[www.epiroc.com](http://www.epiroc.com)



[In focus]  
**Singapore, Southeast Asia**

## Hello there! What's happening in Singapore?

A NEW REGIONAL DISTRIBUTION CENTER (RDC) opened in Singapore at the beginning of 2023. According to **Sri Pillay**, Regional Supply Chain Manager at Epiroc Asia Pacific, Epiroc's goal is for the distribution center to improve its service to customers.



**Sri Pillay**  
Regional Supply Chain Manager,  
Epiroc Asia Pacific

*What does the new RDC mean for Epiroc?*

“It means a lot, especially in terms of making each region more self-sufficient and sustainable. There are plans to develop this region in many aspects, and here in Singapore we are taking the first step. We can work more efficiently and reduce the number of shipments between countries.”

*In what way will it improve service to your customers?*

“We can reduce lead times and increase the availability of both spare parts and consumables. You could say that we will have faster moving items and a broader product portfolio in the region. This means more reliable service. Higher availability and non-stop items will play an important role for our customers.”

*So, what is the next step?*

“When we are assured that the RDC is operating as planned, we will expand it to also be a Global Distribution Center (GDC) for APAC-sourced parts to all DCs globally. If the sourcing area is going to grow in this region, we need to have a distribution center that can handle this growth. Developing a supply chain in Asia that has regional people in all the supporting functions is another important goal going forward.” ✕



# Digitized quality assurance of drill holes

» Forget pen and paper – there is a better way of logging drill holes for proper quality assurance. With Drill Tracker, information becomes available to everyone involved in real time. Customer Experience Manager **Niklas Forsberg** elaborates.

**W**hat is Drill Tracker?  
 “Drill Tracker is a cloud-based solution that improves the quality of the drilling process and empowers the operators with digital drill plan sheets. The actual drill hole outcome is logged directly in their phone or tablet, and the information becomes available to anyone who needs to know the progress or the outcome in real time. We developed this tool together with our customer Boliden, and we are now ready to offer more of our customers this add-on through the My Epiroc platform.”

**How does this solution make it easier for Epiroc customers?**

“The digital drill plan sheets facilitate communication between drill rig operators and the blasters. Traditionally, drill hole outcome is logged on a piece of paper. By digitizing this step, you get all



**Niklas Forsberg**  
 Customer Experience Manager, Epiroc

data and deviations registered in one place, signed and ready. By using Drill Tracker, the drillers can focus on their actual job instead of chasing a piece of paper. Everyone in the team can follow the process, and the production planners benefit from being able to see whether the machines will be available on time or not.”

**What were the major development challenges?**

“Because Drill Tracker is used in areas of the mine where connectivity is poor, we had to create a solution that worked great even offline. We also wanted it to be easy to get started. It’s actually no more difficult than downloading an app, creating an account and uploading the drill plan – and you’re up and running.” ✕

## Drill Tracker in brief:

- Digital drill plan sheets and updates in the palm of your hand
- Increased quality assurance for your drilling process
- Real-time overview of the drilling progress
- Easy to use cloud-based app as an add-on to the My Epiroc platform
- Works great offline
- Compatible with Android, iOS, Windows and MacOS
- Launched 2021 for Boliden. In 2023, the solution was released for other customers

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