Mining & Construction

A magazine from Epiroc

miningandconstruction.com

INSIDE

The Diversity Issue
01–2020

[Orientation]

All on board

Natural, complex, and necessary for good business, diversity is increasingly important in the modern age.
Pages 28–31

More diverse – more sustainable

DEAR CUSTOMERS, these are extraordinary times for the world. The COVID-19 pandemic has affected us all deeply. I hope you and your loved ones are doing well.

Our top priority since the start of the pandemic has been to secure the health of our colleagues, families, customers and business partners. Another top priority has been – and is – to keep serving your operations as well as possible. Our organization is working hard to ensure that you get the service and support, and the spare parts, consumables, tools and other products you need for your business.

The mining and construction industries have definitely been hit hard. Many mines and construction sites have been temporarily closed. Global transport logistics are also suffering, with slower shipments of goods. We are fully aware that many of you are facing difficulties. Let me assure you: we are doing our utmost to support your operations.

MEANWHILE, OUR FOCUS ON innovation continues. Inventing solutions that make your operations more productive, environmentally friendly and safer is our passion. Our package of digital solutions, 6th Sense, is one example. Another is our battery electric equipment, which is reducing emissions and noise while boosting productivity.

We recently launched our new sustainability goals for 2030, where we have set a clear objective to halve our emissions and double the number of women in operating roles. We are convinced a diverse workforce is a key to success. Diversity is also the theme in this issue, so make sure to check those features out. ×

On my radar

The global economy
Is the world facing a U, V or L-shaped recovery, or something else? The level of uncertainty is very high, and we are keeping a close eye on developments.

The aftermarket
In these difficult times, especially, it's in the aftermarket that we can make the biggest difference, day-to-day, for our customers.

Stay safe!

Helena Hedblom
Epiroc President and CEO

Epiroc is a 145+ year old start-up; a dynamic new company, built on long and proven expertise and experience from the mining and construction industry.

Epiroc

About Epiroc

Epiroc is a leading productivity partner for the mining and infrastructure industries. With ground-breaking technology, Epiroc develops and produces innovative drill rigs, 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 more than 150 countries.

Epiroc Group – get to know us better

Our innovations

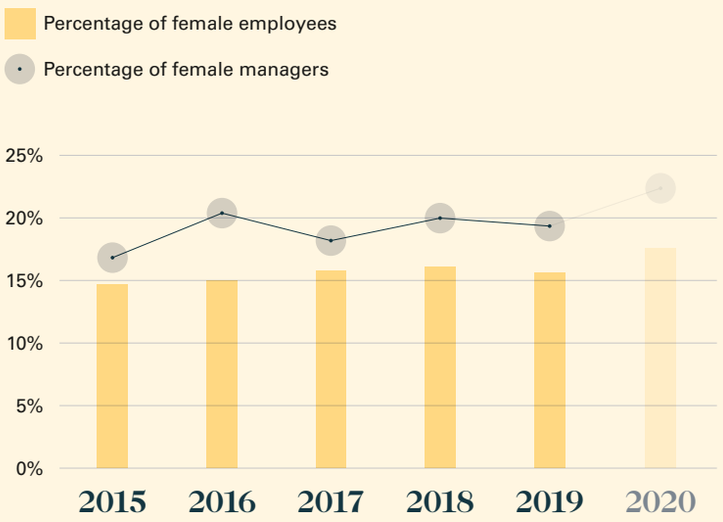
Our solutions aim to solve our customers' key issues – including requirements to reduce operating costs, increase productivity, increase utilization of equipment, reduce environmental impact, and enhance health and safety conditions.

Industries we serve

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

Female employees and managers

Increasing the share of female employees and managers is a priority goal.



The Group in numbers

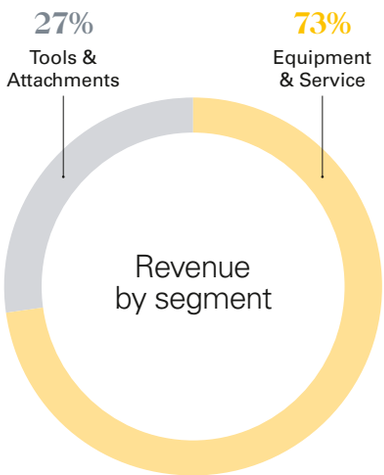
14 000

- About 14 000 employees
- Customers in more than 150 countries
- 145+ years of experience
- Revenue in 2019: SEK 40.8 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

Technology & Digital
Dedicated to technology solutions, and drives the automation and interoperability expansions for Epiroc's divisions



Surface
Dedicated to rock drilling equipment for use in surface mining, exploration, construction and quarries, as well as water well and oil and gas 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

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[Feature]

Diversity

All the evidence points in one direction: embracing diversity – including all, excluding none – is vital in business.

Pages 26–41

ANDREAS VARRO

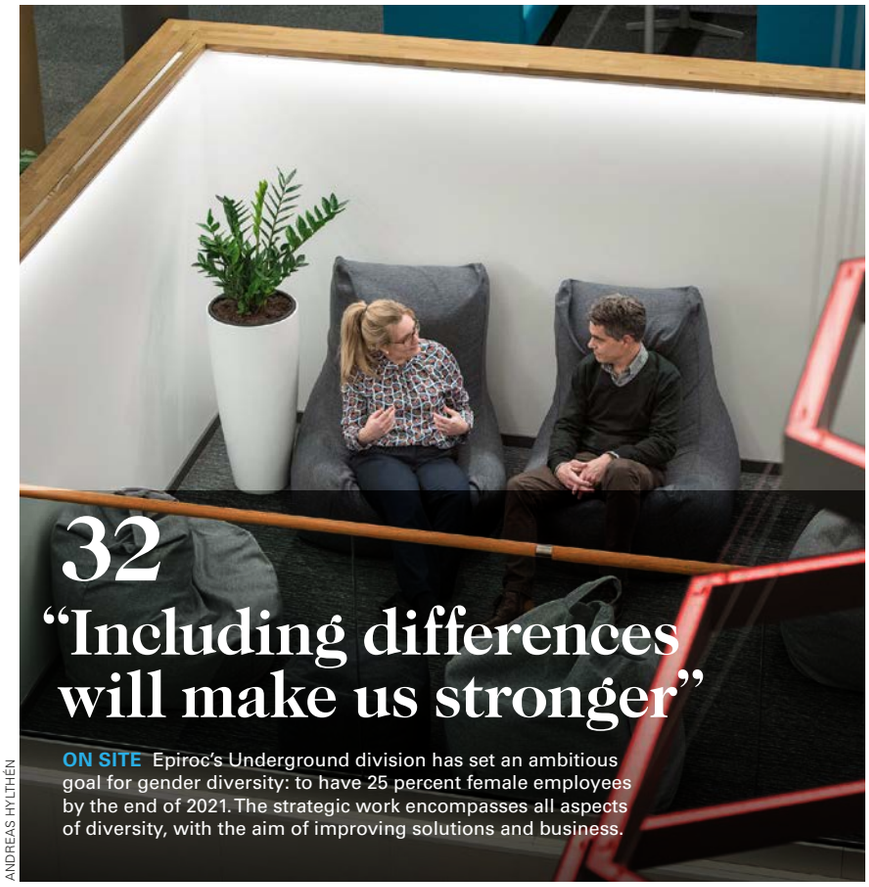
ON THE COVER

Diversity is on the rise, and it's easy to understand why. It's the right thing morally, it leads to better business and it will only get more important. By drawing from a large pool of people, you run a lower risk of missing out on talent.

SHUTTERSTOCK

THE ELECTRIC MINE CONFERENCE is the world's only global mine electrification event. The next gathering will take place on November 16–17 at the Radisson Blu Waterfront Hotel in Stockholm, Sweden. Attendees will be leaders in the mine electrification space, and the program offers a platform for mining companies, OEMs, service providers and research institutes.

theelectricmine.com



ANDREAS HYLTHÉN

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"Including differences will make us stronger"

ON SITE Epiroc's Underground division has set an ambitious goal for gender diversity: to have 25 percent female employees by the end of 2021. The strategic work encompasses all aspects of diversity, with the aim of improving solutions and business.

JAMES OATWAY

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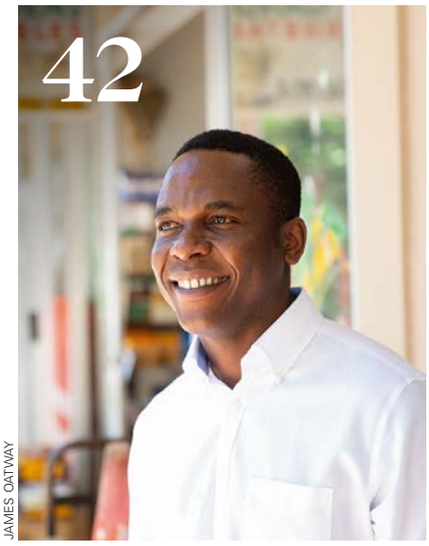
SCOTT ELLENBECKER

08



JAMES OATWAY

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Selected highlights

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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Printed by
Prinfo Welins, Sweden 2020

Website
miningandconstruction.com

Safety first

Epiroc is committed to complying with or exceeding all global and local rules and regulations on personal safety. However, some photographs in this magazine may show circumstances that are beyond our control. All users of Epiroc equipment are urged to think of safety first and always use proper ear, eye, head and other protection as required to minimize the risk of personal injury.

EPIROC IN BRIEF

PowerROC T35 facilitating service in tough conditions

The PowerROC T35 tophammer rig helps the Rapid City Realty and Development Corporation achieve great things in Eastern Rizal in the Philippines.

The PowerROC T35 tophammer drill rig is developed and optimized for construction work and quarrying applications requiring simple flexibility in positioning. Those traits come in handy for the Rapid City Realty and Development Corporation, a progressive quarry operator in the Philippines with operations at four quarries located in Eastern Rizal.

A fleet of four PowerROC T35 rigs are at work producing 162 000 tons of blasted rock per month. However, the highly fractured ground conditions and abrasive materials – basalt, pozzolan and silica – make the work challenging for both operators and equipment. The rigs, which are equipped with COP 1840 rock drills and Secoroc T45 rods, drill for approximately five hours per day.

Despite tough conditions, straight holes are the norm with only occasional deviation and each rig has the capacity to drill about 810 meters per shift. The drill bits are also supplied by Epiroc and have an average life length of 1 750 meters.

APART FROM THE robustness of the PowerROC T35 and its ability to get the job done safely and efficiently, the availability of service and maintenance in this remote region was a big factor in choosing the equipment. **Edson Lee**, Coordinator at Rapid, says: "Previously, the operators were using cabinless drill rigs and that made the job very hard for them as they were exposed to direct heat and the dusty environment."

A support team consisting of two technicians – one field service technician and one service engineer – is permanently stationed in the area and keeps the equipment performing to expectations. The team visits every rig six times a week. Each day during normal operations, they proactively monitor the condition of the rigs according to an audit checklist. They also perform PMS (planned maintenance) and repairs if necessary. Monthly reports are compiled to keep the owner informed of the condition of the rigs.

THE DESIGN OF the PowerROC T35 makes maintenance work easier. For example, the rig has a minimum of electrical components, and all components are quickly accessible behind side panels for easy troubleshooting.

Roy Hill goes autonomous thanks to Epiroc and ASI Mining

EPIROC, IN PARTNERSHIP with automation specialist ASI Mining, will convert Roy Hill's haul trucks from manned to autonomous use. The solution will be used for the company's iron ore mining operations in Western Australia and will have the ability to expand to other mining vehicle types and manufacturers. Epiroc and ASI Mining will also be working closely with Roy Hill and its partners Hitachi and Wenco on truck conversion and integration of the Wenco fleet management system.

TCO supervisory agreement – new way to improve fleet maintenance

IMPROVING FLEET maintenance and lowering total cost of ownership for customers are key goals for Epiroc. With the TCO supervisory agreement, a common project between the customer and Epiroc, new steps are being taken in this field. The initial focus is on mapping the current parts consumption and performance to set the road map for improving running cost and total cost of ownership. The program involves reliability engineering to develop individual maintenance plans.

Product news and innovation stories
(choose country and click Media): **epiroc.com**

Epiroc corporate press releases
(click Media): **epirocgroup.com**

Epiroc introduces new blasthole drill rig

EPIROC HAS introduced the DM30 II SP (Single Pass) rotary blasthole drill for quarrying and small mining operations. The crawler-mounted, hydraulic tophead-drive rig offers faster hole-to-hole drilling and a lower cost per ton through single-pass capability. The DM30 II SP is built off the same platform as the Epiroc DM45 and DML blasthole drill rigs and can achieve a clean hole depth of 11 meters (36 feet) for single-pass applications.

FIGURE

9

languages

My Epiroc with new shopping experience

MY EPIROC gives Epiroc customers instant fleet overview. It's available in nine languages, with Portuguese and Czech being the latest additions. A new shopping experience has also been added to the app, giving customers in select regions easy access to spare parts and consumables.

PROJECT NEWS

New automated SmartROC D65 in Australia

Mineral Resources (MRL) is the first company in Australia to have the new generation **SmartROC D65** drill rig up and running. The updated SmartROC D65 has the intelligence and power to consistently and efficiently drill high-quality blast holes with accuracy and precision. And it is loaded with smart features such as automated drilling and rod handling.

XLF

The Extra Long Feed (XLF) of the SmartROC D65 comes in handy at MRL's Yilgarn Operations, where it is used to drill 8 meter single pass holes and up to 13 meters with only one rod change, using 203 mm and 229 mm bits with a COP M7 hammer.

More www.epiroc.com/smartroc-d65

For Epiroc, diversity is key for growing fresh and innovative ideas and solutions for our customers.

What benefits do you see with diversity?

Petra Grandinson
General Manager, UK & Ireland

"Diversity brings more perspectives and different experiences, which leads to better decision-making and – in the end – better business. It's also important to embrace diversity wholeheartedly: gender, of course, but also culture, educational background and personality."

Peter Sun
HR Manager, PC Nanjing, China

"I think diversity helps build a better team. It allows people to approach an issue from different perspectives and improves decision-making. As a result, a diverse team might come up with better ideas and options. With diversity, we see and understand each other better."

Davis Nongera
Country Manager, Zimbabwe

"My experience with diversity is that there is an added human element that results in improved team dynamics. There are fewer egos and also improved engagement. This has given us a creative, balanced, communicative and honest team, which has improved performance."

Troy Johnson and Sara Schmuck Scott Ellenbecker

Predictable productivity

SMART DRILLING SETS BENCHMARK IN SAFETY WHILE PROVIDING DATA CRITICAL TO SUCCESS FOR ARI

[On Location]
USA

Aggregate Resource Industries, Inc. is quick to spot advantages of high-tech solutions. Lately, the Oregon-based company went the automation route. A visit to the Roseburg quarry tells a tale of increased productivity and safety – and reveals how the brother-sister executive team plans to take the next step.

The ARI axis of siblings Katie Jeremiah (Chief Executive Officer) and Kris Jeremiah (President) makes sure that the family business, founded more than four decades ago, is in safe hands.

THE ROAD FROM Eugene airport to Springfield runs through rolling hills with luscious dark green silhouettes of pointy evergreens – an unmistakably recognizable Oregon landscape. It's humid and slightly chilly. Further south, a highway leads to a country road that meanders up a hill and stops at the Roseburg quarry.

Two Epiroc SmartROC drill rigs are drilling in the distance, but run by operator **Jay Lawhon** from a BenchREMOTE operator station approximately 75 meters away. "This is 100 percent better than anything I've run in the past," Lawhon says, having spent a few months behind the BenchREMOTE. "Other drills used a lot more fuel."

The SmartROC D65 uses intelligent control of compressor load and engine rpm for fuel savings. Lawhon says transitioning to operating two rigs from a distance wasn't difficult. "I'll try anything to make my job more efficient," he says. "Once you get your timing down, it is easy. While one rig is drilling the hole, I move the second drill to the next spot and get that one started. Then the process starts again."

Kris Jeremiah
President, ARI

Katie Jeremiah
Chief Executive Officer, ARI

We are outside of Roseburg, one of 200+ locations served by Aggregate Resource Industries Inc. (ARI), a drilling and blasting company based in Springfield, Oregon. ARI has been owned and operated by the Jeremiah family for more than four decades. Many years ago, founder Bob Jeremiah made a critical business decision that led to the company's evolution. The industry was largely segregated between drillers who bored holes and blasters who loaded and detonated the holes with explosives, but ARI chose to combine those services. It was an innovative move that paid off, and business innovation is still in the company's DNA.

ARI has grown to blast millions of tons of rock each year for projects ranging from traditional quarry and

gold mine development, to highway construction, wind farm foundation work, dam demolition, portable rock crushing, utility line blasting, communication tower drilling, and solar pile foundation drilling – operating in Alaska, Washington, Oregon, Idaho, Nevada, Montana, Colorado, Texas, Wyoming and California. The company is now run by a brother-sister executive team – President **Kris Jeremiah** and Chief Executive Officer **Katie Jeremiah** – eager to embrace new technology and methods.

The siblings recently explored increasing automation technology with remote drilling, partnering with Epiroc to enhance operational productivity as well as safety. A watershed moment was the implementation of the BenchREMOTE, a remote operator station that can simultaneously control up to three Epiroc Smart surface drill rigs from a distance of up to 100 meters. ARI became one of the early adopters, using it in a quarry.

"In order to get the best mobility on site, and across the large service territory, we set up the BenchREMOTE in a van. We are using it on our SmartROC D65 drill rigs, which are moved between many of the locations where we operate," says Kris Jeremiah.

Thanks to the BenchREMOTE, productivity and efficiency has increased, and the working environment for the operators has improved.

"The remote drilling has allowed us to leverage our experienced, qualified operators to be able to run multiple drill rigs at the same time on job sites," says Kris Jeremiah. "It keeps our operators a safe distance away from high walls and faces, while giving additional production to our fleet."

Jay Lawhon confirms that he has nearly doubled feet drilled per day with the two rigs at all the sites he's taken the rig to. He prefers to run the BenchREMOTE on the same level as the rigs rather than rely solely on cameras and an automated site plan. Also, Lawhon appreciates the noise reduction when working from the BenchREMOTE in the van with the doors shut. "And I'm out of the elements for longer periods, so that's a big plus," he says.

The BenchREMOTE has led to increased productivity and efficiency for ARI. Working environment for operators has also improved.

Jay Lawhon
Drill Operator, ARI

For ARI, high-tech drilling with the SmartROC D65 rig starts with Epiroc's Hole Navigation System (HNS), which makes set-up and planning faster and more precise. Operators and surveyors don't have to work outside in potentially dangerous areas, because the site has been pre-planned. A blasting engineer plans the site based on drone surveys input to Strayos blast design software, which optimizes hole

Aggregate Resource Industries

- Founded as BJ Equipment Company by Bob "BJ" Jeremiah over four decades ago. Still owned and operated by the Jeremiah family.
- Based in Springfield, OR, and operating in 11 Western states.
- Projects include traditional hard rock drilling and blasting in rock quarries and gold mines, dam demolition, and portable rock crushing.

"We anticipate a work environment where people with advanced video gaming skills will make ideal drill rig operators"

Katie Jeremiah
Chief Executive Officer, ARI

layout using a Global Navigation Satellite System (GNSS). The plan is sent right to the SmartROC D65, which adds rods and extracts them automatically when it reaches depth.

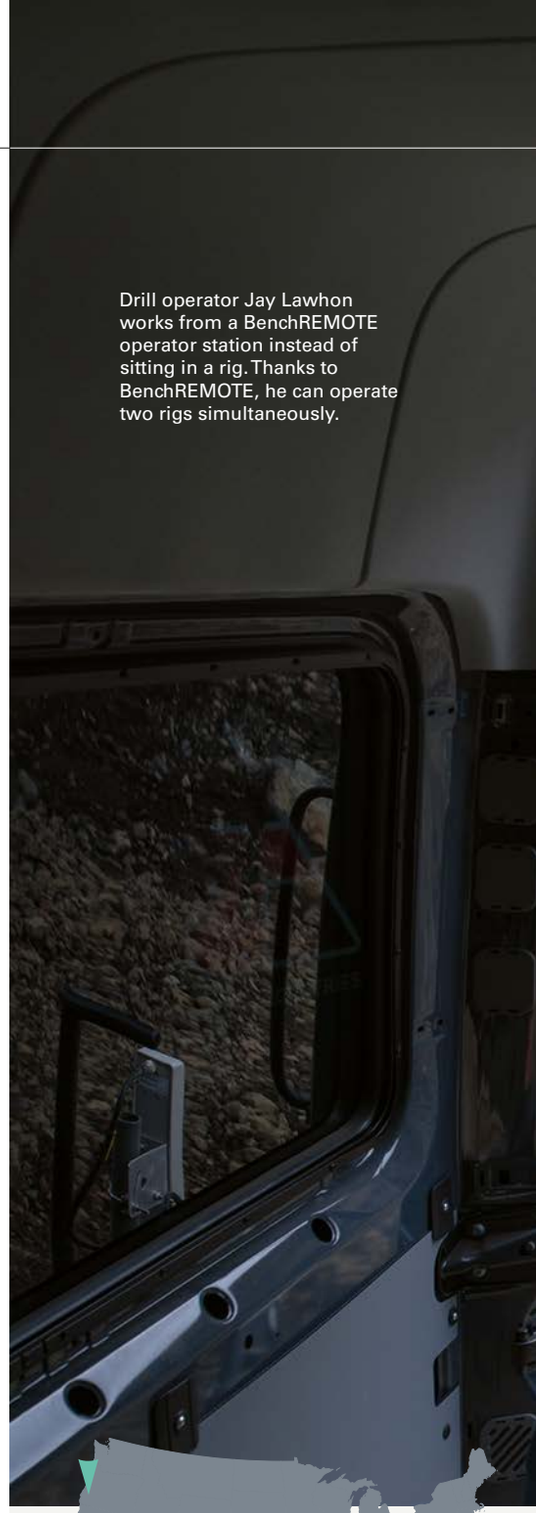
When drilling and blasting is completed, and even during the process, data tracking is a key part of ARI's strategy. Thanks to the Certiq telematics solution that comes on some Epiroc rigs, analysis is simplified as ARI can log in at any time and check on productivity. "With Certiq, if there's an issue, we can troubleshoot remotely, which is great for the size of territory that we cover," says Kris Jeremiah. As the rig ages, Certiq will help ARI plan for downtime or maintenance.

Passionate about technology, Kris and Katie Jeremiah share their vision for ARI. In the future, they see having a control room, where a completely new type of professional – teleremote drillers – run remote operations in the field, right from the main office. "We anticipate a work environment where people with advanced video gaming skills will make ideal drill rig operators. Instead of joysticks, they will operate real equipment running in the quarry. Drilling is no longer about being out on site all day," says Katie Jeremiah.

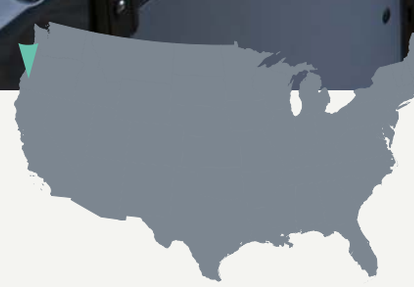
Keeping employees happy played a part in looking to the latest technology. "Drillers are embracing the technology," she continues. "When they learn it, it becomes pushbutton – makes them proficient in a short period of time. Giving our operators the tools to do their best helps us with employee retention."

While technology simplifies an operation, automation is the future of managing a modern fleet. "An operator is human and has limitations and good and bad days," says Kris Jeremiah. "The automatic drill doesn't have those same days. We are taking distraction out of the equation. Get on the pattern, and automation can work all day."

The Jeremiahs are already thinking of even greater automation – and fully autonomous drilling is not out of the question. It will come in steps. The next is off-site teleremote drilling operations from a control station anywhere in the world. For ARI, the current state of the art is a moving target. And they will be happy to sit at the controls.



Drill operator Jay Lawhon works from a BenchREMOTE operator station instead of sitting in a rig. Thanks to BenchREMOTE, he can operate two rigs simultaneously.



Roseburg quarry

- Location: Roseburg, OR
- Material type: Extrusive igneous basalt
- Use of materials: Crushed stone for base aggregates on roads, highways, residential and commercial developments
- Blast size: Approximately 160 000 tons

Epiroc and Aggregate Resource Industries

ARI success is rooted in its agility and in its quick adoption of technology that empowers the company to optimize results and maximize efficiency of personnel, machinery and consumables. ARI trusts and relies on Epiroc and partner Modern Machinery to maximize uptime through reliable equipment and provision of consumables, and to drive rapid development and implementation of technology critical to future success.

FIVE KEYS TO SUCCESS

1 Production data

Epiroc's telematics solution Certiq is installed on all of ARI's new machines from Epiroc, giving automatic access to accurate production data. This is compared with performance indicators to identify possible efficiency improvements.

2 Plan the work – work the plan

ARI aims to capture real-time topographic data via drone surveys for each site, which it uploads to Strayos blast design software. An optimized drill pattern is remotely uploaded to the Epiroc drill rig, and the site is drilled to the plan using GPS hole navigation.

3 Remote access to information

All operators are equipped with smart phones where they can access ARI's mobile app, which provides unlimited access to information, from historical design information for each work site, to equipment manuals, work order reporting and tracking.

4 Daily "9:09" huddle

ARI's executive team meets each morning at 9:09 to review key achievements from the previous day, roadblocks to success, and future actions in pursuit of accomplishing the company's strategic plan and core values.

5 Have a blast at work

Company culture is fundamental to ARI's success. In an annual survey for employee engagement, ARI asks employees to describe the company culture in three words. Family, friendship and innovation are always at the top of the list.

DRILLING WITH Simba Teleremote at the Kirovsky mine in Russia has increased production efficiency by 20 percent for Apatit JSC since remote drilling was fully implemented in 2018.

Simba E7 2015

- **PERFORMANCE:**
  Hydraulic drilling rig, drill hole diameter range 89–207 mm, RHS boom extension system, 150 kW electric engine, safe cabin, Simba Teleremote solutions, remote drilling.
- **NAVIGATION:**
  Simba automation system, RCS rig control system, operator station for remote control of several machines.

Ivan Chesnokov Oleg Savunov

Work around the clock

At the Kirovsky mine, the extraction of apatite-nepheline raw materials is hard work. Harsh conditions, safety and efficiency are the main challenges for Apatit JSC. Simba Teleremote tackles them easily.

APATIT JSC, PART OF the PhosAgro group, is the leading producer of mineral phosphate fertilizers in Russia and one of the largest in the world. Thirty-nine million tons of ore are mined annually at the company's mines, one of them being the Kirovsky mine in Kirovsk. To boost production and safety for the employees, Apatit has taken the automation route. Since its first purchase of Simba production drill rigs and tele-remote solutions – ABC Total, Teleremote, Certiq, and Rig Remote Access – from Epiroc in 2014, efficiency has increased. **Anton Yarunin**, head of the Kirovsky mine, recounts that Apatit now has ten Simba rigs operating at the Kirovsky mine – it is in fact the largest automated fleet in the world.

How did you work before?

"We drilled manually with other machines. The quality was low. We wanted to ensure the accuracy of drilling deep holes and achieve maximum safety for rig operators working underground. We drill holes of three diameters: 102, 152 and 89. In 2014 the first Simba machine was tested on the third type of diameter. That equipment was more modern. It has a high level of comfort for remote work and higher productivity."

How did you implement Epiroc's autonomous and teleremote solutions?

"We used to drill in semi-automatic mode. The operator did settings to drill one hole, and the rig worked itself. In 2018, we implemented ABC Total and Certiq software which allowed us to fully switch to remote drilling. Operators were bothered by cold, noise and dust. They now work on the surface in a special warm monitoring station and control several machines each. In the mine, our employees only move machines from one drilling position to another."

What about production efficiency?

"The efficiency increased by 20 percent, and the utilization of each drill rig up to 95 percent! That's because now they work 24 hours a day, seven days a week, with no stops. Epiroc helps us with all service maintenance. Thus, Simba rigs let us achieve unprecedented production volumes. I thought it was impossible!"

Tell us about future plans.

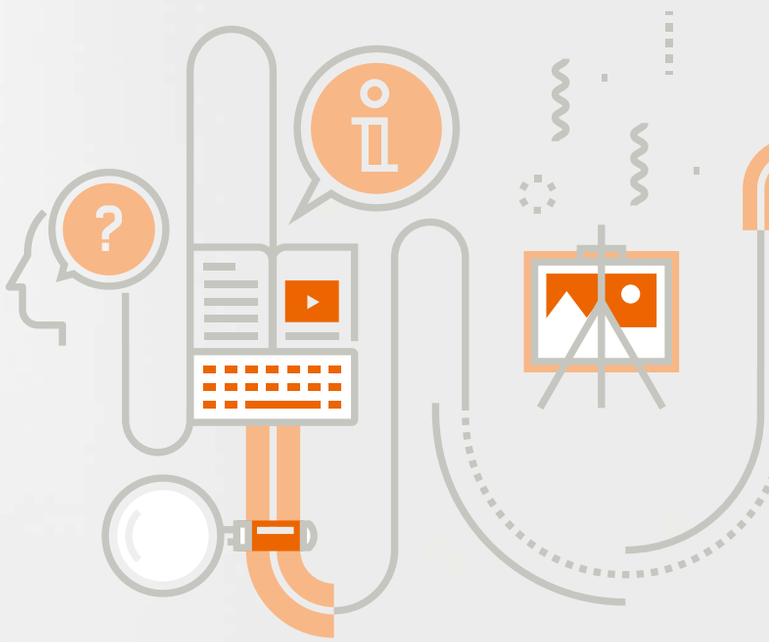
"This year we are going to buy four more units. Two of them will be used at the Kirovsky mine, and the rest will work at another mine operated by Apatit. We also want to create a single technological command center to control all Simba rigs from one location."

Anton Yarunin
Head of the Kirovsky mine, Apatit JSC

[On Location]
Russia

More www.epiroc.com/simba-automation

PIETER DE BRUIN
Regional Rock Engineering Executive at Epiroc's business line NCM. Based in Johannesburg, South Africa.



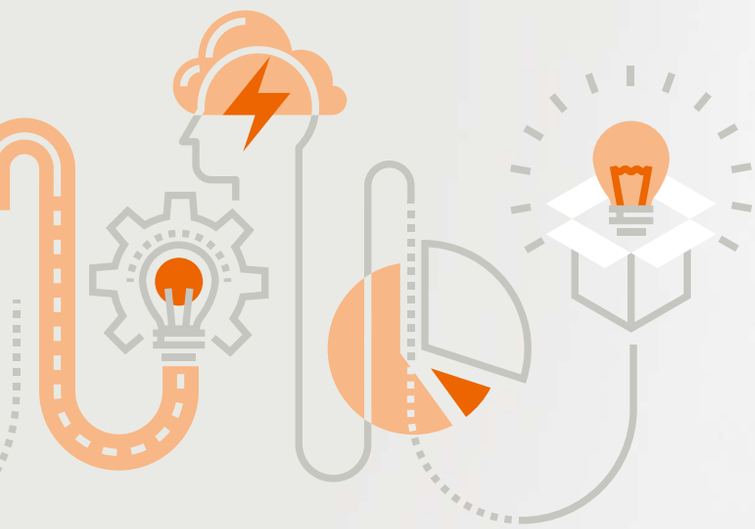
The game changers

BREAKING NEW GROUND IN PRODUCTIVITY AND SAFETY

Integrating lights with safety nets was the genesis of an Engineered Load Jackpot for Anglo American in South Africa, cutting costs and simplifying logistics. The collaboration with Epiroc has generated lots more value.

[On Location]
South Africa

Stephan Hofstatter James Oatway Shutterstock



Three years ago Anglo American Platinum, one of the world's major producers of platinum group metals, sat down with New Concept Mining (NCM) to come up with new technologies that would improve safety and productivity at its conventional underground mines. NCM specializes in devising and manufacturing underground rock support products. After the company was acquired by Epiroc, its unique expertise became part of the Epiroc offering.

The companies collaborated to trial a trio of new products that make underground mining cheaper, safer and more productive. Most are now being rolled out. This initiative is separate from the broader Anglo American smart technology strategy.

Mining & Construction Magazine brought **Pieter de Bruin** at Epiroc's business line NCM together with Anglo American Platinum's **Riaan Carstens** and **Frik Fourie** to discuss how they arrived at these game-changing innovations.

How did Epiroc and Anglo American Platinum's co-designing of new rock support technologies come about?

PIETER DE BRUIN: "About five years ago New Concept Mining changed its approach to collaborating

FRIK FOURIE
Head of New Mining Technology Platinum, Anglo American. Based in Johannesburg, South Africa.

with a customer rather than going off on our own tangent and designing something new. From a design and development perspective, this provides better clarity about the customer's requirements."

RIAAN CARSTENS: "In the past, supply companies would sit with their R&D teams and identify what they could sell to the industry, then develop a product in-house. I realised that a company like New Concept Mining, now a part of Epiroc, has huge research capacity and it would be beneficial for us to go to them with a concern or an idea and say: let's design something that will suit our requirements better. Now there's a vested interest from both sides to make this work. The initial product that we started off with was nets and lights. The Engineered Load Jackpot flowed from there."

What concerns did Anglo identify, and how were they tackled jointly with Epiroc?

FRIK FOURIE: "My job as head of new technology was to try and see how we could improve overall safety and productivity at the Amandelbult mine in South Africa. We had identified eight needs that would turn the safety as well as the productivity dial. Lights was one of those."

RC: "We've never been able to get lighting into the underground environment. One day I thought: Can't we start using things we have in the stope and just add to that? This is where the idea of integrating the lights with the nets came from. The breakthrough for the industry is hazard identification. Now you can see the danger."

PDB: "We knew what the research had shown in terms of lighting improving safety underground. We had the netting product range, which was well established and being rolled out in the majority of hard rock mines in South Africa. When Riaan said, look, isn't there a way we can combine these two work steps, it just clicked. In a few days we had a rudimentary concept. From there it was an iterative process to find the right type of lighting for the harsh underground environment and link that into the netting system."

FF: "Then there was the problem with the cable anchor system. The installation time is about 48 minutes per unit. If you put in 22 of these units, your support cycle takes so long you can only blast each production panel every second day. Riaan then pointed me in the direction of Epiroc."

PDB: "Frik invited us to a meeting and explained the situation. There was a technology that we had previously developed and shelved. We showed them what we had and our test results."

FF: "Now we have a Donut to put on the current anchors that we install underground. It improved the installation time significantly, down to 10 minutes. It's so fast and easy. Previously you had to use five different pieces of equipment to install an anchor. Now we've got one piece."

In Focus: Anglo American Platinum

Anglo American Platinum is one of the world's largest producers of platinum group metals. It operates in the Bushveld Complex in South Africa, and the Great Dyke in Zimbabwe. Its headquarters are in Johannesburg, South Africa. The company is majority owned by globally diversified mining group, Anglo American.

- **24 789 employees**
- **Listed on the JSE in 1995**
- **Underlying EBITDA 2018: $1.1 B**

← **STRIPS OF LIGHTS** clipped onto safety nets illuminate a stope panel being prepared for blasting at Dishaba mine, part of Anglo American Platinum's Amandelbult complex in the northwest of South Africa.

How did integrating lights with safety nets lead to an engineered jackpot?

RC: "It came about by chance. I had a meeting about progress with the nets, and they showed me some other stuff they were busy with. The original plan was to add a pressure valve to a Jackpot as a monitoring device. I thought if we put that on timber, the system would be controlled by a pressure release valve rather than the timber itself. Then we can reduce the variability and go to smaller diameter timber. So I asked: can't we look at this?"

PDB: "It was a light-bulb moment. We were going down a path for the monitoring device and the test data caught Riaan's eye. The potential and benefit was immediately clear. You have a more consistently performing product because it's an engineered component, and you are less constrained to use a specific timber."

RC: It has numerous benefits. One is cost. The other is logistics. The timber is not as heavy, so it's much easier to handle, easier to cut and easier to install underground."

Pieter de Bruin
Regional Rock Engineering Executive, Epiroc

Riaan Carstens
Principal Rock Engineer, Anglo American Platinum

Frik Fourie
Head of New Mining Technology, Anglo American Platinum

How closely did Anglo and Epiroc work together during the trials?

FF: "Epiroc has people on site. We've got people on site. There's feedback on a daily basis. With the anchors, we started working with their team on-site. They made us some prototypes that we trialed underground. We got the feedback and selected one of them. It was doing 90% of what we wanted. We made another three or four alterations, then we came to a solution with all the ideas shared between the two companies. The nets and lighting went through the same process."

PDB: "One of the biggest pros for us is that Anglo has an underground R&D facility dedicated to testing and trialing. One day you test something, the next day you do a modification, the next day you test it again."

Did your partnership face any obstacles? How did you overcome them?

FF: "The biggest obstacle was overcoming resistance to change—management, geotechs, workers underground. They need to have proven results to try something new. Then when you're testing and you don't get 100% results, a lot of people see that as a failure. For me, every failure was actually a victory to get to the ultimate solution."

PDB: "As an innovator, you partner with the people willing to take the knocks as well as the wins. Then they get the benefit of the new innovations quicker. From a global competitiveness perspective, it's the companies that innovate who will be successful going forward." ×

4

KEYS TO A SUCCESSFUL PARTNERSHIP

Co-designing new products and subjecting them to gruelling trials can put a strain on the best of relationships. Epiroc's Pieter de Bruin and Anglo's Frik Fourie offer advice on how to manage the pitfalls.

Openness

✓ Both parties must be willing to share their thoughts and ideas honestly and openly, with no hidden agendas. Epiroc was not afraid to suggest changes to improve tried and tested methods, while Anglo did not hestitate to provide robust feedback, especially from the workers underground.

Investmest

✓ It takes time, effort, money and expertise to conduct cutting-edge research. Epiroc is investing in human capital and two new testing facilities with machines found in only three places in the world.

Fearlessness

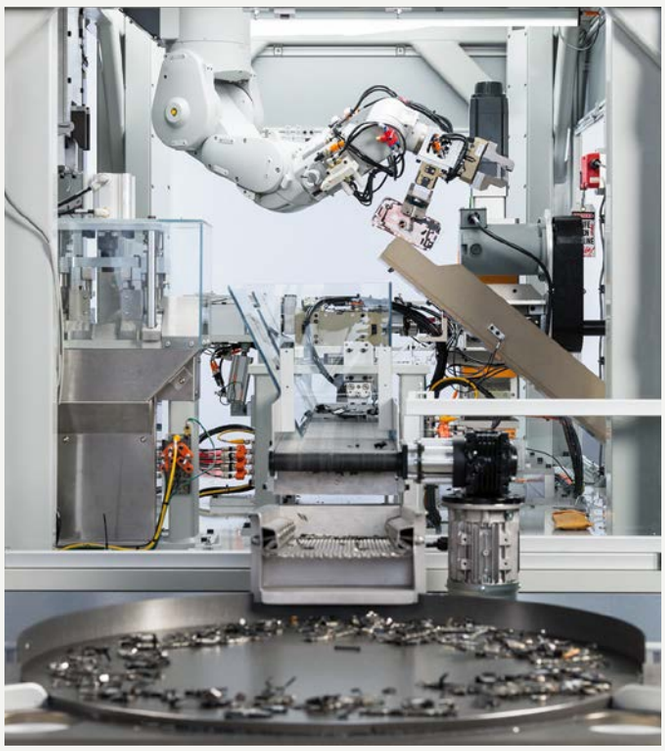
✓ Failure is part and parcel of R&D because it helps you arrive at a simpler solution. Both partners need to understand that.

Commitment

✓ You need unwavering support from the top down. Shareholders, managers and the board must be willing to invest in the unknown and remain undeterred by inevitable setbacks.

More www.epirocgroup.com/vision-and-beliefs

AROUND THE WORLD IN BRIEF



APPLE

Daisy, less than 20 yards in length, uses a four-step process to remove an iPhone battery with a blast of –80 degree Celsius air, and then pop out screws and modules.

Apple robot Daisy recovers rare minerals

APPLE INC. IS USING a robot, **Daisy**, to recover minerals from disassembled iPhones, *mining.com* reports. Daisy can break apart two hundred iPhones per hour to extract fourteen minerals, including lithium, for further recycling. Apple is already using recycled aluminum, tin, cobalt and rare earth elements in some of its products, with plans to add to that list in coming years. Apple's ultimate goal is to become a "closed-loop" manufacturer that does not rely on the mining industry, which some industry analysts have said is impossible.

Apple is considering sharing the Daisy technology with others, including electric automakers. With the rising popularity of electric vehicles, newly mined minerals will be needed on an even larger scale.

"We're not necessarily competing with the folks who mine," says **Lisa Jackson**, VP of environment at Apple. "There's nothing for miners to fear in this development."

Quarry plantations feed stricken koalas

FODDER PLANTATIONS AT Boral quarries are providing a crucial food source for koalas that were injured during and relocated after the disastrous drought and bushfire season in eastern Australia, *quarrymagazine.com* reports.

The company's Petrie and Narangba quarries north of Brisbane have been long-term suppliers of koala fodder to the Australia Zoo Wildlife Hospital. The plantation at Petrie consists of more than 2 500 trees.

SHUTTERSTOCK

Paul Duddy
CEO and founder, Hypervine

How can satellite data help the industry?

Hypervine is collaborating with the ESA to provide secure and accurate satellite data for the mining and construction industries. What are some potential uses?

"In my opinion, the industry is not using satellite data enough, and we want to help it improve. For example, it is possible to monitor water ingress in quarries, measure extracted materials, monitor the structural integrity of the walls, and track environmental changes. It is also possible to measure carbon emissions in great detail in order to help reduce them, which is very important. Today, companies generally have a rough idea of their carbon emissions, but satellite data enables them to pinpoint exactly when and from where carbon is emitted."

How do you protect the integrity of the data?

"Satellite data is often used for decades, so it is essential that the data is reliable. We use blockchain technology to record the data in an unalterable ledger, which eliminates the risk that small errors will accumulate and magnify over time. This high degree of accountability cuts down on the administration associated with regulatory demands since the data cannot be manipulated. This means it can be trusted from the get-go. The data is encrypted, and for all practical purposes, it is impossible to break into."

More www.bit.do/satellitedata

Want to keep track of what's happening in the mining and construction industry? Visit **miningandconstruction.com** for links to industry news and other interesting reading.

Pinpointed

1 Peñasquito and local community sign water pact

Zacatecas, Mexico

Newmont's Peñasquito mine and the nearby **San Juan de Cedros community** in Zacatecas, Mexico, have signed a thirty-year agreement securing sustainable water availability for the community's domestic and agricultural uses, *miningmagazine.com* reports. Additional water wells and infrastructure will supplement the 600 000 liters/day reverse osmosis drinking water plant and wells the company built earlier. As part of the agreement, the public water system will ultimately be owned by the municipality.

2 Germany proceeds with coal phaseout by 2038

Berlin, Germany

German Chancellor **Angela Merkel's** cabinet has approved legislation setting a detailed schedule for the phaseout of more than one hundred coal-fired power stations across Europe's largest economy by 2038, writes *mining.com*. Once the legislation is passed, it will govern EUR 50.8 billion of compensation for regions and companies that rely on coal, including EUR 40 billion in structural aid to the affected coal states of **Brandenburg**, **North-Rhine Westphalia**, **Saxony and Saxony-Anhalt** over the next eighteen years.

3 New forum for smaller miners in South Africa

Douglas, South Africa

The Minerals Council South Africa has set up a new forum to enhance collaboration among association members and "amplify" the voices of smaller miners, including artisanal miners, *mqworld.com* reports. **The South African Diamond Producers Organisation** (SADPO) will help give an official voice to smaller miners through the Minerals Council's new Associations Leadership Forum.

"The establishment of this forum is a significant step forward," says SADPO chair **Gert van Niekerk**, who was elected to be the forum's chairperson.

4 Toyota constructs a prototype future city

Mount Fuji, Japan

Toyota has revealed plans to build a prototype city of the future – **Woven City** – at the base of Mount Fuji in Japan, writes *khl.com*. The city will be a "living laboratory" – a fully connected ecosystem powered by hydrogen fuel cells and solar panels and home to full-time residents and researchers who will be able to test and develop technologies such as autonomy, robotics, personal mobility, smart homes and AI in a real-world environment. Buildings will be made mostly of wood and using robotized production methods, and only zero-emission vehicles will be allowed. Groundbreaking for the site is scheduled for early 2021.

SHUTTERSTOCK

ONE RIG TO RULE THEM ALL

In Mexico, the most important mining operations use the Epiroc Robbins 73R rig for raiseboring. It is here that CAUSA, a mining contracting company with 40 years of experience, recently broke a record using Epiroc cutters.

[On Location] **Mexico**

TWELVE KILOMETERS away from the city of Zacatecas, in an arid region of central Mexico, the Madero mine extends across an area of one thousand hectares. As a polymetallic mine, it relies on the extraction of multiple metals, but zinc is its main objective. When it comes to drilling in this part of the country, "the greatest challenge is the stability of the ground, but with the use of raiseboring machines, the human risk has practically been eliminated," explains **Gabriel Elizondo**, the founder of CAUSA, the mining contracting company responsible for raiseboring at the Madero mine.

"Raiseboring generally has four applications, the first and probably most important being ventilation. Through the large diameter hole that is created, fresh air can be pushed down into the mine or stale air can be taken out," says **Daniel Rodríguez**, CAUSA's Operations Manager. The engineer explains that the other purposes are to refill voids with rocks left over after mining, security purposes (mainly as emergency exits), and for services. "Electrical cables can be installed through the holes, pipes can be installed to carry diesel fuel down the mine, and pipes can be introduced to take concrete down faster, more easily," he says.

According to Gabriel Elizondo, CAUSA "is currently operating 20 Robbins raiseboring machines owned by the company and managing 10 more for various mining companies." While the relationship between CAUSA and Atlas Copco – now Epiroc – officially started when the former was founded in 1978, CAUSA's relationship with Robbins machines goes back to the beginning of the 1960s, through its parent company – NEMISA. That's when NEMISA acquired

The Robbins 73R raiseboring machines owned by CAUSA are critical in the day-to-day mining activities at the Madero mine, in the state of Zacatecas, Mexico.

Jennifer Fernández Solano Rodrigo Jordá Vendrell
Fredrik Saarkoppel & Epiroc

its first Robbins rig: the Robbins 32R with hydraulic motor. This was even before Atlas Copco purchased The Robbins Company in 1993. These days, CAUSA relies on the Robbins 73R rig, Epiroc's most popular model on account of its sturdy yet compact design.

Gabriel Elizondo
Founder of CAUSA

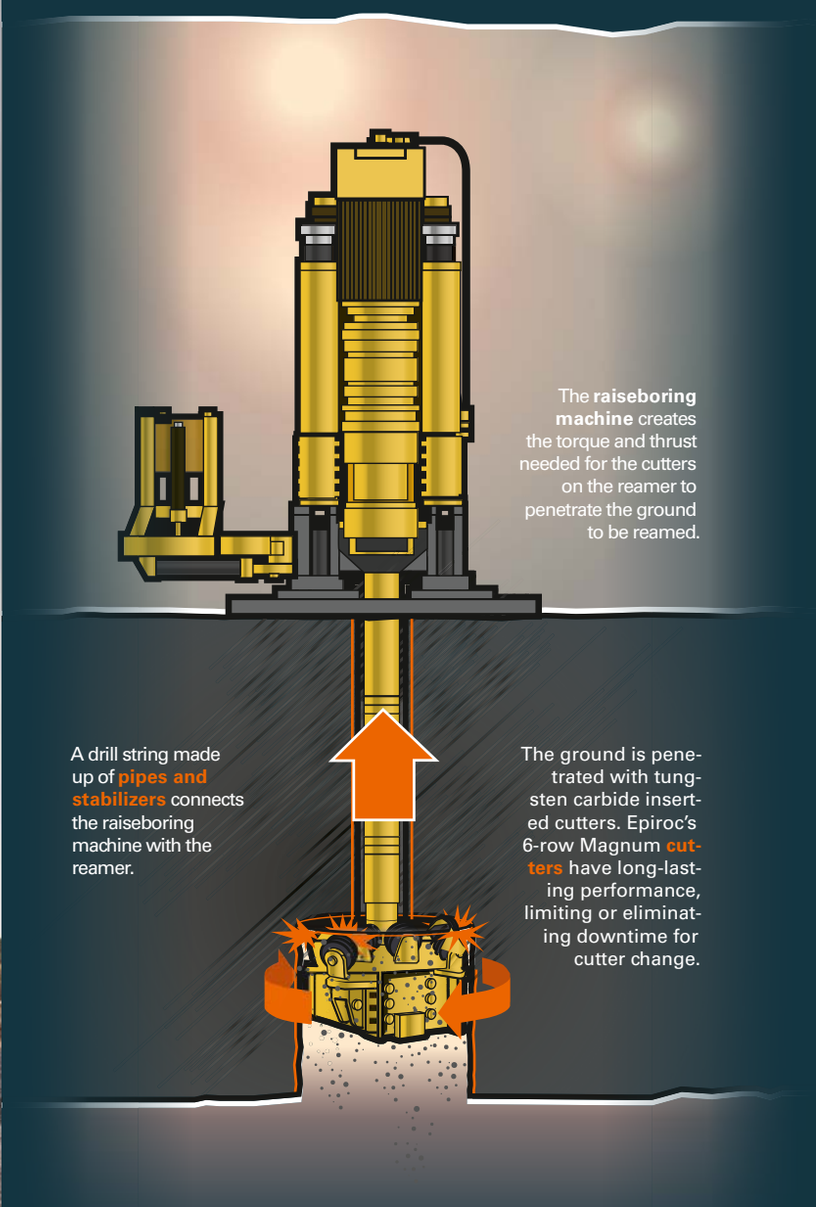
Daniel Rodríguez
Operations Manager, CAUSA

CRITICAL TO THE Robbins rigs' success are the cutters they're using. At the nearby Fresnillo mine, where CAUSA also operates as a contractor, Epiroc cutters recently broke a record. While drilling a 3.6m diameter raise last year, the cutters made it intact through all 682.6 meters that it took them to reach the top, and the hole presented zero deviation. "We didn't need to lower the cutters for review; they came to the surface all in one go because it always depends on the terrain, and here the ground is very soft, very easy to drill. There are terrains that are very hard; there we cannot guarantee that the reamer head comes all the way out. [When that happens] you have to go down half-

LEARN MORE // RAISEBORING

Here's the hole truth

RAISEBORING IS employed in underground mining to excavate a circular hole between two levels of a mine without the use of explosives.



The **reamer** enlarges a previously drilled pilot hole. In solid ground conditions, the result is a raise with smooth hole walls that, in many instances, do not need any further support.

More www.epiroc.com/raiseboring

Ernesto Puga, CAUSA's Chief of Raiseboring Operations, holding a float valve used to prevent backflow during a drilling operation. Here pictured at the Fresnillo mine in Zacatecas, Mexico.

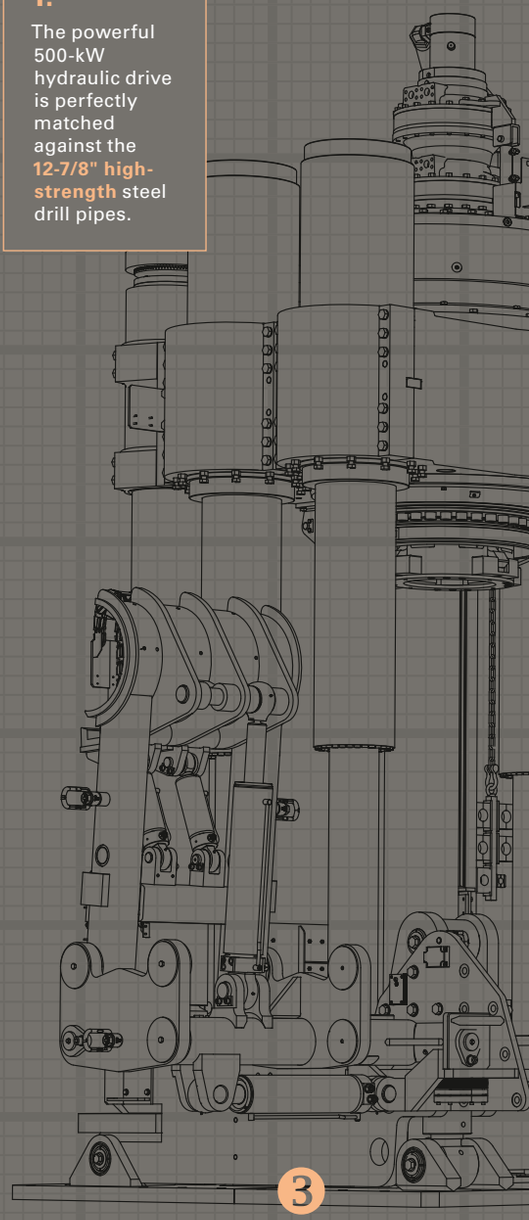
Ernesto Puga
Chief of Raiseboring Operations, CAUSA

Fidel Morín
Projects Superintendent at Fresnillo mine, CAUSA

way through drilling the hole to do a full inspection or to change the cutters but, this time, [all the] equipment came out all in one go, without giving us any trouble," recalls **Ernesto Puga**, CAUSA's Chief of Raiseboring Operations, who is in charge of supervising all the raiseboring machines. Besides saving time, the pilot took approximately 17 days to complete and reaming the raise 49 days – not having to send people down to service the reamer halfway through completing a raise is crucial in matters of safety.

AT THE FRESNILLO MINE, the shaft created by the record-breaking raiseboring operation will solve an efficiency problem. "This project began with the need to lower people through the mine in a more efficient way. Right now, taking a person down 682.6 meters is taking us around 45 minutes," says **Fidel Morín**, Projects Superintendent at the Fresnillo mine. By installing a hoist in the raise-bored shaft, workers will be transported vertically, instead of using ramps that already exist within the mine. "[It's] 45 minutes vs. 10 minutes, so we are saving a little more than half an hour," he adds. Besides saving time, "it has to do with transit, safety, pollution, vehicle maintenance, and a number of factors that are focused on productivity, which is what we are looking to do with this type of [project]," Morín says.

1.
The powerful 500-kW hydraulic drive is perfectly matched against the **12-7/8" high-strength** steel drill pipes.



CAUSA

Founded in 1978, CAUSA is a mining contractor for raiseboring and exploration drilling, with 30 raiseboring rigs working in Mexico: 20 are CAUSA-owned and 10 are mine-owned (and CAUSA manages their operation).

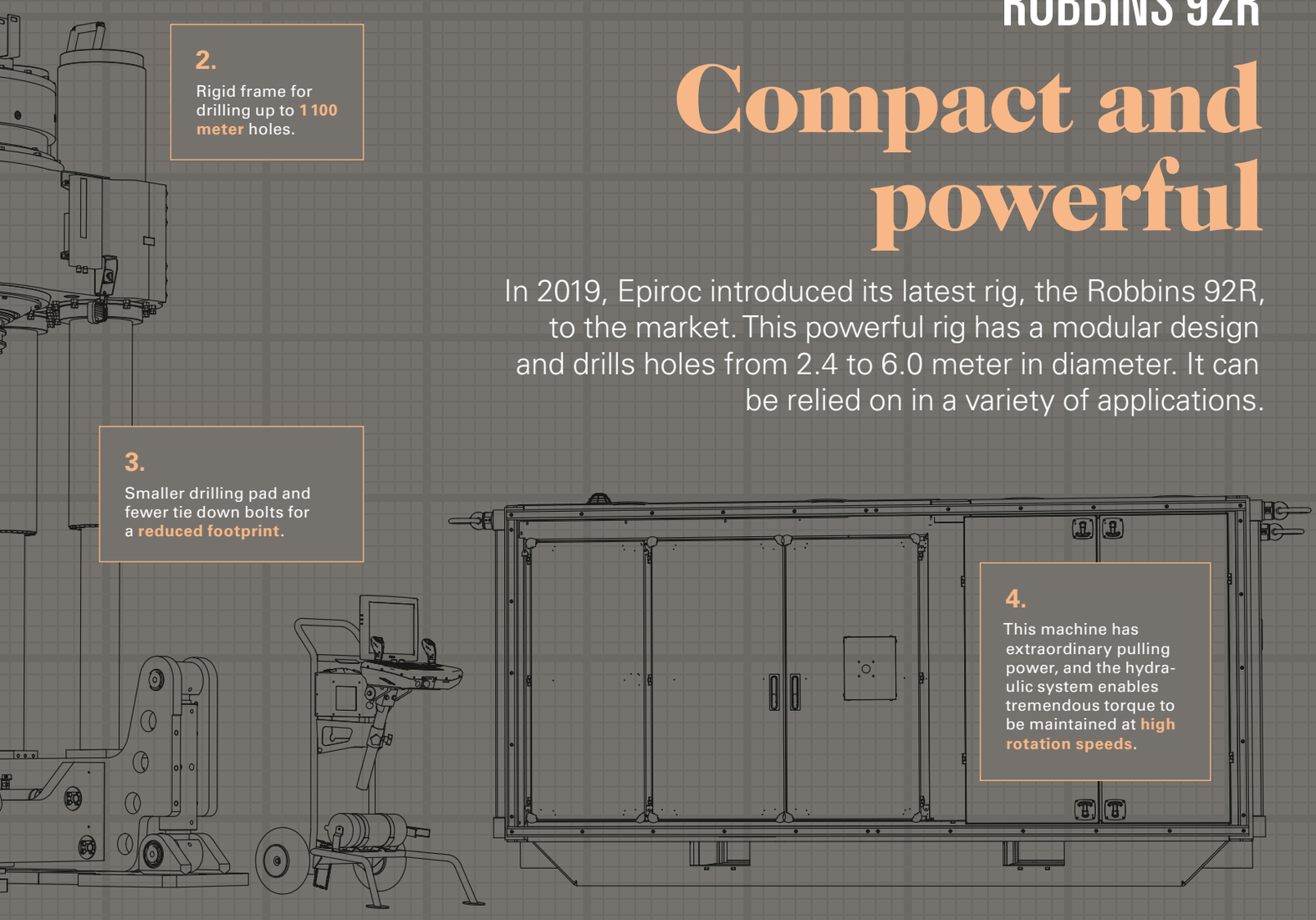
Important clients include: Grupo Peñoles, Minera Fresnillo PLC, Grupo México, First Majestic, Endeavor Silver.

More www.causa.com.mx

ROBBINS 92R

Compact and powerful

In 2019, Epiroc introduced its latest rig, the Robbins 92R, to the market. This powerful rig has a modular design and drills holes from 2.4 to 6.0 meter in diameter. It can be relied on in a variety of applications.



2.
Rigid frame for drilling up to **1 100 meter** holes.

3.
Smaller drilling pad and fewer tie down bolts for a **reduced footprint**.

4.
This machine has extraordinary pulling power, and the hydraulic system enables tremendous torque to be maintained at **high rotation speeds**.

Madero mine

- **Part of Industrias Peñoles, S.A.B. de C.V.**
- **Second most important zinc producer for the company**
- **Surface area of one thousand hectares**
- **Polymetallic mine**

Production for CAUSA operations in Madero mine

Ground ore (kton)
2018: 2 542
2017: 2 501
Var. 1.9 %

Source: Industrias Peñoles, S.A.B. de C.V. Annual Report 2018

	47 Ag Silver (koz)	82 Pb Lead (ton)	30 Zn Zinc (ton)	29 Cu Copper (ton)
2018	898	8 531	45 284	1 320
2017	967	8 673	50 159	1 726
VAR.	-7.1%	-1.6%	-9.7%	-23.5%

[Feature]

Recruiting outside of the box is likely a business boost. There are a number of benefits to reap by including people coming from a multitude of genders, ethnicities, age groups and backgrounds, who bring with them new knowledge, different ideas and perhaps unexpected perspectives.

DIVERSITY

CONTENTS

Why the pieces fit

Gustaf Höök Björn Öberg Shutterstock

Diversity is a complex affair. What we do know is that it makes sense in more ways than one, that a lot has happened in a short period of time… and that there is much more to come.

What is diversity? According to The Merriam Webster Dictionary, it is *"the condition of having or being composed of differing elements"* and *"the inclusion of different types of people (such as people of different races or cultures) in a group or organization."*

Diversity, by that definition, is by no means a new phenomenon. However, the headway made in the last hundred years or so is startling. During the 20th century, women's rights and civil rights were greatly improved thanks to reformed laws and regulations. Lately it has also involved a different way of thinking.

"In the mid 90s, psychologists at Harvard University spearheaded research on unconscious bias," says **Howard Ross**, co-founder Udarta Consulting and author of the books *Everyday Bias* and *Our Search for Belonging*. "A conclusion was that the problem is not necessarily that people will consciously do bad stuff, but rather how our subconscious influences our decision-making."

Ross elaborates: "Simply put, there is a need to retrain people's minds. We have to understand the way we think and how we make decisions, if they are to reflect our values. We all have biases, so being open about this is a good start."

To truly reap the rewards of diversity, representation alone is not enough. For people to be successful to the best of their abilities, they need to be included – and the next step is belonging. "Diversity is being invited to the dance, inclusion is being allowed to dance, and with belonging, you get to choose the music. When people are fully engaged, they co-create a culture that's better than what anyone can do individually."

Howard Ross concludes: "But the first step is, of course, to draw from a large pool of people. If you exclude certain groups, you are bound to miss out on a lot of talent."

Indeed, there's plenty of evidence that diversity is not just the right thing morally, but that it's also a sound business model. For instance, McKinsey & Company's *Diversity matters* report showed that companies in the top quartile for racial and ethnic diversity are 35 percent more likely to have financial returns above their respective national industry medians. For gender diversity, the likelihood is 15 percent higher.

Howard Ross
Co-founder,
Udarta Consulting

Margot Slattery
Global Diversity
and Inclusion Officer,
Sodexo

Food services and facilities management company Sodexo has featured prominently on DiversityInc's top 50 list for diverse companies. "About 17 years ago, at a time when we were expanding our business, we realized that we needed to think and act a bit differently," says **Margot Slattery**, Global Diversity and Inclusion Officer at Sodexo. "Things started off in North America with the hiring of a head of diversity and inclusion, and was then implemented in our worldwide business strategy."

Sodexo started its diversity work in key areas relevant to its business: race, culture and origin, with gender quickly becoming another priority. The board of directors now consists of more women than men, and women make up 34 percent of group senior leaders. Sodexo also has a bottom-up approach, where staffers are encouraged to join employer engagement groups – there's a plethora of them – to get actively involved in the diversity efforts and tackle discrimination.

"More than anything, we want to provide equal opportunities. We've made good progress on gender, race and LGBTQ, and we are now looking at how to create workplaces in which people with disabilities, and also migrants, can strive," says Margot Slattery.

A good indicator on how far a certain country has come in diversity is the *Global Gender Gap Report*, published since 2006 by the World Economic Forum. For eleven years straight, Iceland has topped

"Diversity is being invited to the dance, inclusion is being allowed to dance, and with belonging, you get to choose the music"

Howard Ross
Co-founder Udarta Consulting and author of the books *Everyday Bias* and *Our Search for Belonging*

the list. "We owe our progress to a robust women's movement and public policies such as universal, affordable child care and shared parental leave," says **Halla Gunnarsdóttir**, Special Adviser to the Icelandic government on Gender Equality.

More recently, other factors have played a part. The financial crisis, in the wake of the Lehman Brothers collapse, hit Iceland particularly hard and indirectly led to several men in high places being replaced by women; for instance, two of the country's three banks named women as their new presidents.

"Generally speaking, the admiration of risk-taking is more of a male thing, and the crash exposed the downside of that. I'm not saying women are better than men, but it's been proved that diversity – not just gender, but also factors like race, class and ethnicity – brings about better decisions. But you have to actively use the diversity, not just see it as a box-ticking exercise," says Halla Gunnarsdóttir.

Halla Gunnarsdóttir, Special Adviser to the Icelandic government on Gender Equality

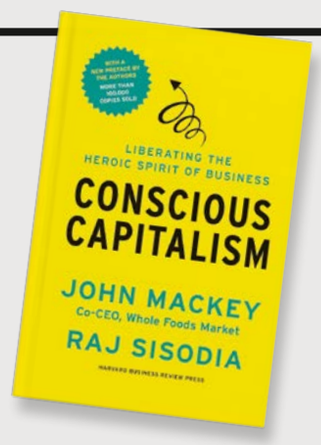
Iceland made a point of applying a gender perspective to post-crash policies, ensuring that public investments did not create unbalanced unemployment. Gender perspective is now considered in all budgetary decision-making.

"The gender lens is now present in most decision-making," says Halla Gunnarsdóttir, explaining that the plan is to use this knowledge in other areas. "We can do better – much better – including in relation to race, ethnicity, class and disability. Iceland scores high in the *World Happiness Report*. I think the progress on gender equality is important in that context, it makes people happier, including by allowing for a better balance between work and family life."

HIGHER PURPOSE

A new form of capitalism?

CAN THERE BE more to capitalism than voluntary exchange, entrepreneurship, competition, freedom to trade and the rule of law? **John Mackey**, founder and CEO of Whole Foods, and **Raj Sisodia**, professor of marketing at Bentley University, believe so. In their 2013 book *Conscious Capitalism: Liberating the Heroic Spirit of Business*, they present a framework that rests on four pillars: purpose, culture, stakeholders, and leadership. The conclusion is that conscious businesses are galvanized by higher purposes that serve, align, and integrate the interests of all their major stakeholders.



EMBRACING DIVERSITY

Increasing diversity and inclusion within a company is not merely making ethical statements – it is also sound business. At Epiroc's Underground division the bar is set high: no less than a quarter of women in the workforce by the end of 2021.

Christian Tarras Ericsson Andreas Hylthén

"We have to be open to, and value, other viewpoints and perspectives than the traditional ones in this business"

Carin Bergendorff
Vice President of Operations, Epiroc Underground division

URPRISING IT MAY BE NOT, but neither the production industry nor the mining and construction industries have traditionally stood out as shining beacons of gender diversity. But that is slowly changing. Or, as in the case of Epiroc's Underground division, hopefully blazing ahead.

[On Location] **Sweden**

As of 2019, around 15 percent of all Epiroc Underground division employees were women. In some departments, like Finance and HR, the number was higher. In other areas, much lower – for example, women blue collar employees comprised a mere 8 percent of the total. By the end of 2021, however, the goal is to have no less than 25 percent women employees in the division. For Epiroc group, the goal is to double the number of women in operational roles by 2030.

"We are working strategically to improve diversity in general and gender diversity in particular. We believe that this will have a number of positive and measurable effects on, for example, productivity, efficiency, decision-making and collaboration. Research in the area unambiguously supports these conclusions," says **Sami Niiranen**, President of the Underground division, continuing:

"The focus on diversity has to permeate all levels in the company and everything we do, from the management team to employer branding. Also, to appeal to a broader number of people while recruiting, we have to find ways to better visualize our operations. Diversity is increasingly on our customers' agendas, as well. We have to make sure our solutions are designed to be gender neutral."

CARIN BERGENDORFF, Vice President of Operations for the Underground division, is perfectly onboard with the goal and is one of the driving forces behind improving diversity:

"The challenges differ across our sites globally, but we are working to improve diversity and inclusion everywhere. This will lead to better decisions and higher productivity. We've had the goal of 25 percent women for a number of years now, but there's been no real improvement over time. We have to start thinking differently."

According to Carin Bergendorff, there are a number of strategies in motion. Looking over the employer branding of the company to appeal to

KAJSA GEIRON, Manager in Production Purchasing and Supply Chain, feels that a good mix and balance of differing perspectives on a team is important.

Sami Niiranen
President Underground division, Epiroc, Sweden

Carin Bergendorff
Vice President of Operations Underground division, Epiroc, Sweden

Åsa Gabrielsson
General Manager, Underground division Product Company, Epiroc, Sweden

more women is one way, as is finding female role models to inspire both present and prospective employees. There is an active Diversity Network in place, where people like Helena Hedblom (recently appointed president and CEO of Epiroc) has talked about careers, successes and challenges. The *FemTech network* and the *Female Mentorship Program* are other channels through which Epiroc can inspire and educate, as well as come into contact with prospective employees.

"Recruitment is a key component of success. Of course, recruitment by competence will always be paramount. But we have to pinpoint and perhaps redefine what the desirable competencies actually are," says Carin Bergendorff.

The qualities considered desirable in the Epiroc of today and the near future include adaptability and agility, open mindset, sustainable thinking and familiarity with working in a digital environment. Recruitment efforts – and ads – should reflect that.

"We have to be open to, and value, other viewpoints and perspectives than the traditional ones in this business. It's important that we challenge ourselves to think outside the box."

Carin Bergendorff is the first to concede that she needs to be challenged herself from time to time. She appreciates being called out and being forced to reflect on her decisions and way of thinking.

"Let me give you one example: we've challenged ourselves to always produce at least one female final candidate for every position we recruit for. If we haven't found one which, I admit, I too have sometimes failed to do, we have to go the extra mile and look again outside our regular recruiting grounds. Our ultimate goal is to not even have to think about these issues and have it all come naturally," says Carin Bergendorff.

THE MAIN RESPONSIBILITY for implementing the strategy at the Underground division's Product Company in Örebro, Sweden, falls on **Åsa Gabrielsson**. She has had a long career working in several global industrial companies and was recently appointed General Manager of the Örebro site.

"There is an increasing number of strong women in leading positions at customer centers globally, as general managers, in operations or in R&D. I think that's really cool," says Åsa Gabrielsson.

She has a clear understanding of how to make Epiroc a more attractive employer.

"We have to do away with a lot of preconceived notions about what working at Epiroc entails, and show that we have interesting products, business models and career opportunities. We have to catch the interest of young women early by working actively with schools. And, naturally, we have to make sure that we don't discriminate against

Q&A

Arvind Patil
General Manager, Epiroc Product Company in Nashik, Maharashtra, India

The production company in Nashik has in part a diverse mix of employees, from regions all over India. But gender diversity is very low.

Q How many women do you have in your workforce?
A "Our goal is 25 percent, but we have only 6 percent women employees today. If we include trainees and temporary contracts the number is a little higher, 15 percent."
Q Why are there are so few women in the company?
A "Partly it's a cultural issue – it's hard to find women to employ in Nashik, especially in the manufacturing industry. We also lose a few women engineers after marriage, as Indian women generally prefer to move to where the spouse is residing."
Q How are you working to improve the situation?
A "We collaborate with colleagues in Nashik, and Epiroc sponsors a scholarship for women engineers. To recruit new engineers for our assembly line, we invite students and their parents to visit our factory. Indian parents are protective of their daughters' well-being, and it helps to assure the whole family about our good work culture and decent workplace. This has been a successful idea, and we've hired ten female trainee engineers to our assembly line. We also look out for qualified spouses of male employees who recently moved to Nashik. We could recruit a few good female engineers with these efforts."
Q In what ways do you strive to keep the women you already have employed?
A "We try to support them as best we can. For example, one of our best engineers moved out of Nashik after getting married, so we worked out an arrangement for her to work from home. Also, Epiroc drives programs like the Female Mentorship. At Nashik, we have a LIFE group for all women that work with us, which is a forum to share their views and needs."
Q Why is gender diversity important?
A "In diverse groups where women are part of and included I have seen that other perspectives are being considered and with more empathy and compassion – which helps us make better decisions. I also find that these teams and individuals tend to be more hardworking and sincere."

More www.epirocgroup.com/diversity

“I believe we’re pushing strongly ahead in diversity, as well as R&D and sustainability”

Kajsa Geiron
Manager in Production Purchasing and Supply Chain, Epiroc Underground division in Örebro, Sweden

CARIN BERGENDORFF, Vice President of Operations, reviews the task list with a team of assemblers. The Underground division puts a lot of effort into recruiting more women to the assembly line.

ANNELIE MÅRD, Vice President of HR, thinks that including differences will make the Underground division stronger and lead to better solutions for customers.

Jonas Lindqvist
Assembly operator, Product Company, Örebro, Sweden

Kajsa Geiron
Manager in Production Purchasing and Supply Chain, Epiroc, Sweden

Annelie Mård
Vice President of HR, Underground division, Epiroc, Sweden

for example gender or cultural background," says Åsa Gabrielsson.

There are also some strategies to employ in everyday operations, to ensure that all voices are heard and that everyone feels included.

"We have to work on changing some internal cultures and breaking up homogenous structures. It will take time and effort, but we're prepared for that. The results will be beneficial for all, and will provide us with new perspectives. My experience is that women coming into our kind of company are extremely goal and team-oriented," says Åsa Gabrielsson.

ON THE SHOP-FLOOR of the Örebro production facility, **Jonas Lindqvist** is assembling a Scooptram ST18 loader. A critical step in the production process is securing a beam with two plugs. Until recently, he had to stand on a stepladder and, from an awkward position, use a 10-kilogram sledgehammer to literally pound the plugs into place. These days, there is a highly specialized tool for the job that allows him to simply turn a wheel to set a plug properly.

"I used to dread this task. You couldn't strike the plug more than a few times before tiring and having to hand the work over to a colleague. Sometimes you could only push it in a millimeter per stroke, depending on the initial alignment of the plug," says Jonas Lindqvist.

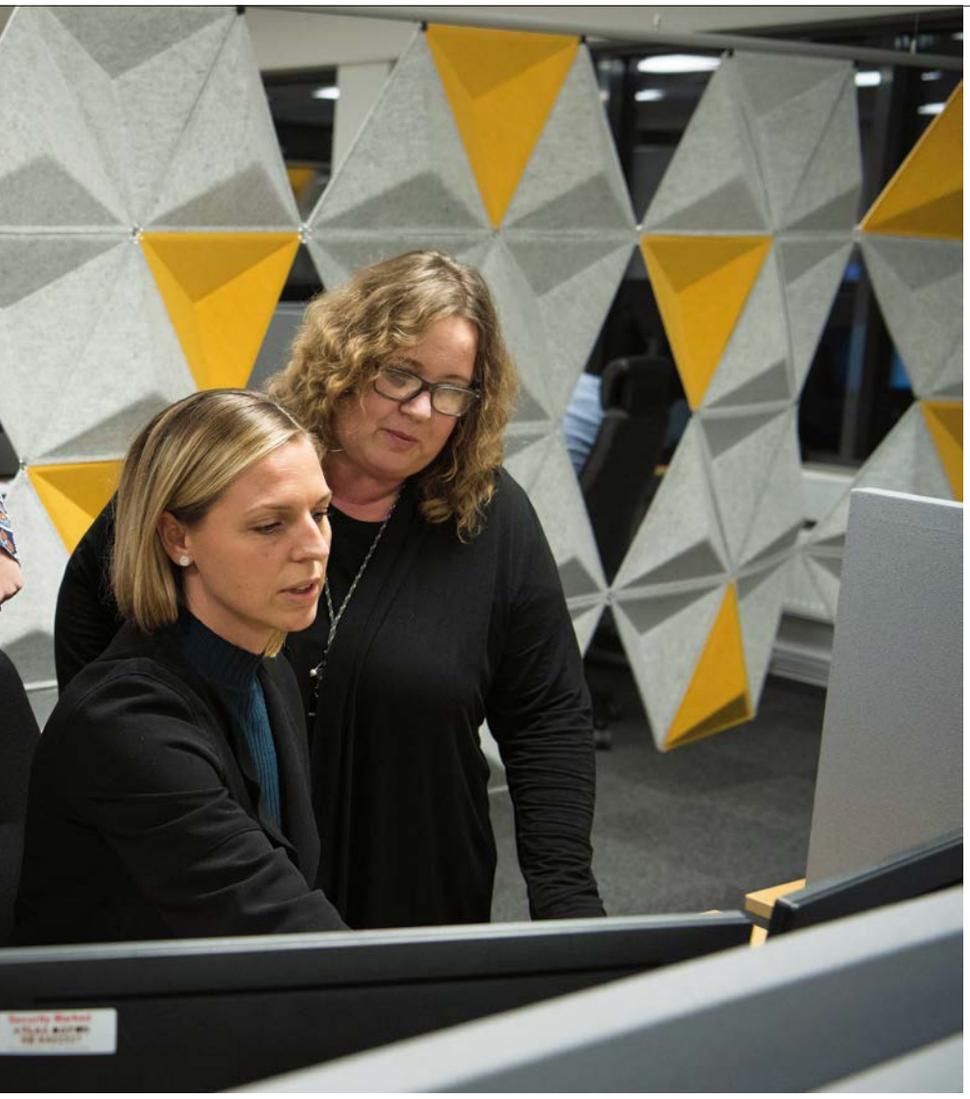
"Nowadays it's an easy job, and we get more accurate results, as well. It takes no strength at all to spin the wheel, so anyone can do it."

A short distance from the Scooptram loader, in an office with a view of the floor, **Kajsa Geiron** manages a Production Purchasing team of ten people as well as acting as Supply Chain Manager. She began her career at Epiroc in assembly at a time when few women here had blue collar jobs.

"When I started out, there were some physically demanding tasks that I definitely couldn't do. Today that has changed completely, with better tools and more focus on ergonomics and safety. Nowadays everyone can do everything," says Kajsa Geiron.

She started down the leadership track eight years ago, with a position as a line manager for a nearly all-male team of 40 people.

"It's not that long ago, but it was a different time, and a lot has happened since then. Not that I ever felt any disrespect for being a woman, but the jargon and jokes have definitely improved over time. I think having a good mix in a team is important. You need balance between differing perspectives. But I believe we're pushing strongly ahead in diversity, as well as R&D and sustainability."



When recruiting for her purchasing team, personal qualities weigh heavily.

"We talk to suppliers all day, so they have to be people persons with positive attitudes and respect for other human beings. They have to smoothly fit into the existing group dynamics. I look out for a good match, plain and simple – regardless of gender," says Kajsa Geiron.

NOT SURPRISINGLY, HR plays a major part in the company drive for improved diversity.

"There's a huge focus on diversity at Epiroc these days. The main focus is on gender, but there's also age, experience, personality and culture to consider, for example. The payoff is a safe and healthy work environment for all people," says **Annelie Mård**, Vice President of HR, Underground division.

The gender diversity goal of 25 percent women was not chosen at random. According to research, around that figure is the diversity "critical mass" – the point at which the positive business effects really take off.

"We need to reach that level to reap the benefits in productivity and decision-making. Including differences will make us stronger as a group and will lead to better solutions for our customers," says Annelie Mård.

Underground division

Epiroc's Underground division develops, manufactures and markets a wide range of tunneling and mining equipment for various underground applications worldwide. The divisional headquarters and main production center are in Örebro, Sweden.

Tony Sprague
Group Manager Technology & Innovation, Newcrest

Do innovation and diversity go hand in hand?

What does diversity mean to you?
"Diversity is critical. And we're not just talking about gender, also diversity in skills, background, cultures... even personalities. Newcrest operates in various areas of the world, and it's important for us to understand all the local communities and, of course, to build good teams within the company. I would say that diversity is a lot about the power of relationships."

You are in charge of innovation. How do you view the relationship between innovation and diversity?
"They go hand in hand. Most of the easy stuff has already been done, so moving the industry forward is not easy. Plenty of people have good ideas, but the trick is to turn them into reality. For that, you need to have all the skills you can get. You need the right people from the right industry at the right time, in order to create a bigger team. So diversity also means looking outside of your company, to create partnerships where everyone involved gets a lot of value without having to fund everything on one's own."

Having said that, what do you look for in companies you want to partner with?
"A freshness. You quickly get a feel for other companies, and some are just easier to work with. They go the extra mile, and when something goes wrong, you can get to the bottom of the problem quickly. If you want to create that win-win situation, it has to be a two-way street. Like with Epiroc, where you feel that we both want to create something good together."

More www.newcrest.com

PERSPECTIVE
AT&T

There are always things to be learned from other organizations and other industries. This is how another player has approached this issue

Christian Tarras Ericsson
Shutterstock

The gentle giant

AMERICAN TELECOM GIANT AT&T is a multinational conglomerate and the largest telecommunications company in the world. In addition, it is considered a paragon of diversity and inclusion.

According to DiversityInc, which since 2001 has published an annual top 50 list of companies with above average diversity and inclusion policies, AT&T ranked no. 1 in diversity in 2019. Reasons include having a CEO that chairs the executive diversity council and is very active in mentoring and sponsorship programs; that AT&T has a robust, agile high-potential selection process, using an unbiased approach to ensure consistent identification of a diverse pool of future leaders; and that the company actively seeks business with diverse suppliers.

A MILESTONE WAS passed in January 2019, when the *Supplier Diversity Program* celebrated its 50th year in existence. Since 1968, AT&T has spent in excess of USD 173 billion on minority, woman, service-disabled veteran and LGBT businesses, stating that the business has added value to the company through innovation and fresh ideas.

To document the work in diversity and inclusion, AT&T publishes a hefty 100+ page annual report. As of 2019, AT&T employed 33.3 percent women (36.7 percent in management) and 43.8 percent persons of color (38.3 percent in management). These numbers vary globally, though – AT&T India employs no more than 13 percent women, while at AT&T Latin America, women comprise nearly half the workforce: 47.6 percent.

AT&T EMPLOYS successful recruiting and outreach programs to further increase diversity. In 2018, 41 percent of applicants and 43 percent of people hired were women; 64 percent of applicants and 62 percent of people hired were persons of color. The company also supports programs to strengthen communities and to provide underrepresented populations with technological skills and experience.

AT&T has been in the telecommunication business for more than a century. Its inclusion goals have evolved with the technology.

In focus
AT&T Inc.

The original American Telephone and Telegraph company was founded in 1885 and has gone through a number of business changes over the years. In 2005, AT&T was purchased by a former subsidiary, SBC Communications, forming AT&T Inc. In 2019 the corporation had revenue of USD 182 billion and employed more than 250 000 people worldwide.

AT&T provides a number of communications services, including phone landlines, mobile phone systems, broadband, Internet services, satellite, cable and pay television, film and TV production, publishing, podcasts, network and home security, and video games.

More www.att.com

SURVEY
BENEFITS OF DIVERSITY

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

Gustaf Höök

01 What are the main benefits of diversity?

02 How can companies go about improving diversity?

Sarita Nayyar

Member of the Managing Board, World Economic Forum

01 **"THE FINDINGS OF** studies published in the last decade are unambiguous: companies with a diverse workforce – in terms of nationality, gender, ability, ideology, etc. – are more economically successful, innovative, attractive to employees and resilient to crises. Moreover, companies drawing information from a more diverse pool of employees perform better over the long term."

02 **"DURING THE** hiring process, strategies such as structured interviews, equal numbers of candidates by gender and policies to foster perception change, help improve diversity. Companies must also make efforts to improve diversity in leadership roles. These include building an equal pipeline to access key growth positions, equal opportunity to gain skills, experience and mentorship, supportive policies around parental leave, flexible work options, and a focus on creating inclusive work cultures and combatting unconscious biases."

Nanna Gillberg

Senior lecturer and researcher at the School of Business, Economics and Law at the University of Gothenburg

01 **"APART FROM THE** obvious equal rights perspective? Well, employer branding is one of many benefits. It is becoming increasingly important to attract young talent, to have progressive and inclusive values and to promote diversity. From a competence perspective, diversity is key. It is essential to recruit from a bigger pool and not continue to rely on a limited recruitment base, as this is suboptimal from a competence point of view. Diverse top work teams have also been proven to improve performance. Diversity contributes to increased creativity and innovation, and makes for better decision-making."

02 **"BY REVIEWING** their recruitment processes. Looking at the design of job ads and from what pool new organisational members are recruited. Narrow recruitment pools tend to give rise to recruitment of people who are very similar to those who are already in the organisation, i.e. homogeneous work groups."

Charles S. Johnson

Senior Director, Diversity & Inclusion, Ball Corporation

01 **"DIVERSITY AND INCLUSION** isn't just the right approach to business, it's the smart approach to business. In the workforce, it elevates the likelihood of success on every level by broadening the talent pool and attracting the best and brightest talent. At Ball, our commitment to D&I enables us to find innovative solutions to global challenges, push the boundaries of our imagination, and tap into unique perspectives that can only be found in a diverse workforce."

02 **"ELEVATE A FUNCTION** dedicated to advancing D&I, with direct linkages to business performance. Truthfully, D&I needs to live and breathe at the core of where your business makes money and have widespread advocacy. At Ball, we have ground level support from employees on the front line, and our entire leadership team and board of directors champion diversity from the top down. So you have duality in sponsorship and passion at all levels."

More www.bit.do/benefitsofdiversity

Christian Tarras Ericsson

Women in tech

Engineering is a man's world – or so they say. But really, it's not. We would like to pay tribute to seven of the all too often unsung heroines of engineering.

01

Sarah Guppy

1770–1852

In 1811, Guppy proposed a chain bridge to span the Avon Gorge in Bristol, England. She patented the design, making her the first woman to patent a bridge. She filed numerous patents, including a kitchen fire hood and a method of keeping ships free of barnacles.

02

Ada Lovelace

1815–1852

Lovelace – the mathematically talented daughter of the poet Byron – is credited with being the world's first programmer. In 1842, she wrote an elegant algorithm for calculating Bernoulli numbers using the proposed Analytical Engine, a mechanical computer.

03

Edith Clarke

1883–1959

Clarke – electrical engineer, inventor, professor and writer – was a powerhouse in her field. Among her many accomplishments is the Clarke calculator, a device that solved line equations involving hyperbolic functions ten times faster than previous methods.

04

Elisa Leonida Zamfirescu

1887–1973

One of the world's first female engineers, Zamfirescu ran a hospital during World War I. Afterwards she led several geology laboratories and participated in field studies, identifying new resources of coal, shale, natural gas, chromium, bauxite and copper.

05

Hattie Scott Peterson

1913–1993

Peterson was the first African-American woman to earn a bachelor's degree in civil engineering, from Howard University in 1946. She worked as a survey and cartographic engineer in California and actively encouraged engineering as a profession for women during her career.

06

Hedy Lamarr

1914–2000

Lamarr was not only a hugely successful movie star, she was a technology wunderkind. Among her accomplishments is a patented radio frequency-hopping system meant for allied torpedoes during World War II. Today's mobile phone system is a legacy of her invention.

07

Lilia Lobato Martinez

1999–

The next generation, exemplified by Martinez of Mexico, is proving strong. She taught herself programming through intensive study of YouTube videos and, at the age of 18, won the international Technovation Challenge with the app OOL that promotes volunteering.

Next issue [Feature] Sustainability is a given in today's business world, but how did it go from something peripheral to a key issue for companies? Read more in the next issue's Feature.

MY WORK: BUSINESS DEVELOPER

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.

Frida Valentin
James Oatway

"I am excited and proud of my pioneering role"

Tendayi V. Mwayi grew up in a mining town, and at the age of ten, he decided that one day he would become an engineer. Today, he is responsible for Epiroc's business development of the Mobilaris Mining Intelligence offering in Africa.

"I actually grew up next to a mining town, and many people around me told me how great mining was. At an early age, I took an interest in design work and engineering, so my choice of education was obvious. I knew I wanted to become an engineer. In college, I did my internship at Atlas Copco and got my first opportunity to work underground. That's when I fell in love with the machine aspect of mining: how the machines were made, how they were designed and how they could make work easier for miners. When I graduated in 2005, I began my career in the operational side of mining at Zimbabwe Platinum Mines (Zimplats) before I got into sales. In 2018, I joined Epiroc as business developer for the Mobilaris Mining Intelligence solution.

TENDAYI V. MWAYI

Age: 35
Job: Business developer for Mobilaris Mining Intelligence, Johannesburg
Joined the company: 2018
Best part of the job: "The opportunity to change lives, change the mining industry and change Africa"

I USUALLY START my days with a run or a workout at 5:30 AM. I then plan my day in writing and drive to the office in Johannesburg. The biggest work challenge is to meet customers that may not be ready for new technology. Many of the mines in Africa were built around conventional mining methods, with no plan of mechanization or digitization. Therefore, my sales focus is to alert existing Epiroc customers to the benefits of Mobilaris Mining Intelligence. I also spend a lot of time looking for new collaboration when it comes to promoting our solution. I work closely with the business development team responsible for the machines. My job requires patience and teamwork together with a love of technology and innovation. My strength is that I'm good at communicating and organizing, and also strong on the technical aspects of mining.

I AM SO EXCITED and proud of my pioneering role, in that I'm part of making mines safer, more efficient, more profitable and more sustainable. This year we will take new steps to empower the African mining industry to improve workers' lives. For me personally, this year means the start of my master's degree, and I believe that my two daughters will keep me even busier." ×

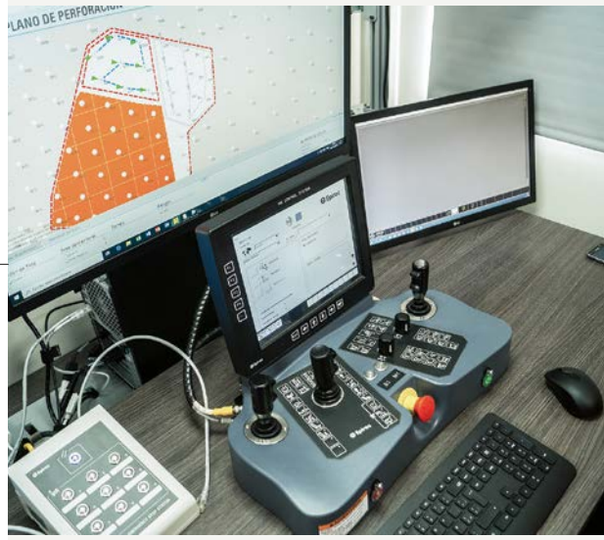
TENDAYI V. MWAYI revels in his pioneering role, contributing to making mines safer, more efficient, more profitable and more sustainable.

PIT VIPER 351 rigs refitted for autonomous operations have dramatically increased both safety and productivity at the Minera Los Pelambres site in Chile.

AUTOMATION PIONEERS

Ushering the Minera Los Pelambres operations in the Chilean Andes into the automated future has resulted in a significant increase in safety and production.

Christian Tarras Ericsson Nelson Henríquez



1
THE CHALLENGE

IN THE ANDES northeast of Santiago de Chile, at an altitude beginning at 3100 meters and just a stone's throw away from the border with Argentina, lies the open-pit mining operation Minera Los Pelambres (MLP). Run by Chilean mining group AMSA, the site has huge deposits of copper and molybdenum. Successful as the operations are, the AMSA Group aims to improve even more.

Rodrigo Izzo
Business Line Manager, Epiroc

"The owners and the General Manager, Mauricio Larraín, were quick to realize that newer technology brings value. The main drivers are to increase safety and productivity, and they've been quite inspired by automation projects in Australia. Automation simply seemed like the best tool to achieve the desired results," says **Rodrigo Izzo**, Business Line Manager in the Surface division of Epiroc Chile, adding:

"I have a hunch that they also liked the idea of pioneering mining automation technology in Chile."

Epiroc has had an equipment maintenance contract with MLP for over a decade and was the natural partner for a collaborative automation effort.

2
THE SOLUTION

THE CHOICE WAS made to test the concept by converting two Pit Viper 351 diesel drills to fully autonomous operations. Epiroc planned, developed and prepared the necessary technical hardware and software upgrades following a four-step blueprint guide to automation conversion.

"The first meetings with management, led by the mine, and the D&B team – led by Fabián Ortega, Jimmy Madrid and Edgardo Pabst – took place in late 2018. MLP placed the order by mid-2019, and we proceeded by engaging all stakeholders, from management down to the tech and IT personnel. It was important that everyone in the company was involved in the project," says Rodrigo Izzo.

THE MINE WIRELESS NETWORK was upgraded, and hardware for control centers installed. The two Pit Viper rigs themselves were taken out of production to receive upgrades, one in October 2019 and the other in January 2020.

"Each rig took four weeks to refit, at the end of which they were commissioned and put into production. Pedro Debia and Heath Young, Senior Engineers from Epiroc Chile and USA respectively, made sure everything was working properly before launching the first autonomous rig in December 2019 when the first autonomous drillholes were successfully done." says Rodrigo Izzo.

THE SYSTEM INCLUDES fleet management software called Surface Manager, a real-time monitoring system for operational data. The Rig Control System (RCS) integrates Auto Level and Auto Drilling with a high precision GPS. The tasks involved require process control rather than hands-on labor, and the operators were re-trained to reflect that.

3
THE RESULT

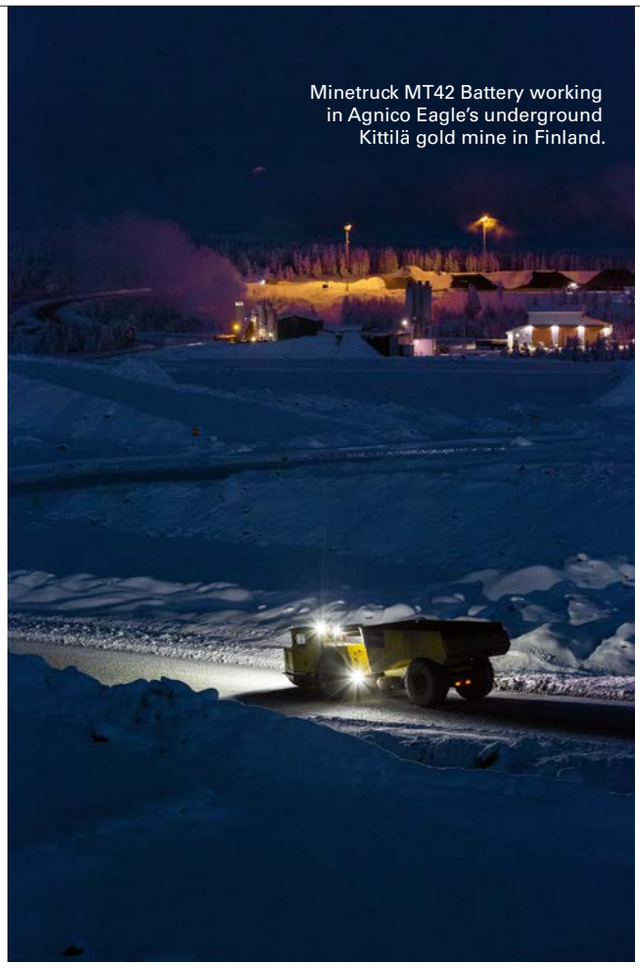
"**EVEN BEFORE WE** collected and presented the numbers, the company could see immediate results. MLP had set the goal to raise the autonomous utilization to 55 percent by March – we reached it in February," says Rodrigo Izzo.

The safety is vastly improved through remote operation outside the mine. The operators now work in an office environment with improved ergonomics, and elimination of risk factors like dust, silica, vibration and noise. Also, the figures for productivity and precision have risen: operational drilling speed is up 10 percent, well depth accuracy has increased to over 96 percent, and utilization has also increased thanks to shorter shift change times, blasting evacuation, and transfers of the operators in between the day. Additionally, an added bonus is lower wear and tear on the drilling steels, resulting in lower maintenance cost and longer service life.

THE NEXT STEP in the project is to convert three electric Pit Viper rigs to single row, semi-autonomous operations, with the initial plan to be completed by 2021.

More www.epiroc.com/surface-blasthole

Patrik Malmer Ville Sandqvist



Minetruck MT42 Battery working in Agnico Eagle's underground Kittilä gold mine in Finland.

Standing the test

Epiroc and mining company Agnico Eagle have conducted tests on battery-powered machines in the Kittilä mine in Finland – and things are looking good for the future of diesel-free mining.

The tests in Kittilä play an important role in the testing of battery-powered equipment in an operational mining facility, contributing to a safer working environment with sustained efficiency. They are a part of the *Sustainable Intelligent Mining Systems* (SIMS) project, in which Epiroc is serving as coordinator. This, in turn, is part of Horizon 2020, the European Union's most extensive research and innovation program ever.

An Epiroc Boomer E2 Battery drill rig arrived on site in April 2019, and in September it was joined by a MT42 Battery mine truck and a Scooptram ST14 Battery loader.

Jan Gustafsson – responsible for delivery of battery-powered mining equipment for the SIMS project (work package leader), as well as overall project manager for the SIMS project – is happy about the opportunity.

"The tests have focused on productivity, operational performance and energy consumption, as customers demand that battery electric vehicles works as well as diesel-fueled."

MORE SPECIFICALLY, tests have measured KPIs related to productivity, operational performance and energy consumption compared to diesel-fueled machinery. They have measured and compared ventilation costs, air quality, tramming distance, ramp haulage and battery changing time compared to diesel fueling. The Kittilä mine was chosen because Agnico Eagle, also a SIMS partner, wants to try out battery electric vehicles.

The transformation towards battery-powered equipment is driven by three major factors. One is legislation on reduced diesel emissions as well as NO_x gases. Another, equally important, driver is the will of mining companies to be a part of the solution to global environmental issues, not a contributor. In addition, mines are getting deeper and deeper, with increased heat leading to higher ventilation and transportation costs. Thus, there is a big incentive in the industry to shift to battery-powered solutions.

Jan Gustafsson
Senior Project Manager, Technology Development, Epiroc, Sweden

ANOTHER PARTICIPANT in the test project is battery provider Northvolt, and they have supported the Epiroc team during the field tests. Jan Gustafsson:

"From the tests, we have learned that

Minetruck MT42 Battery on its way, silently, to dump a full load.

the equipment works as well as expected and we have gained a lot of experience. Dual-battery charging equipment has worked well, too, and existing electrical installations can support the installed charging stations, as they work with regular charging."

INITIAL FEEDBACK from operators who have participated in the testing is very positive; no one misses the old diesel machinery. In parallel, Epiroc has been conducting tests in Örebro in order to collect data for KPIs and improve equipment.

"So far the tests look promising. We have gained valuable experience during the field trial and we are looking forward to evaluating the final results," says Jan Gustafsson. "This has really been a team effort in SIMS, where we have worked closely together with product development." ×

Christian Tarras Ericsson Lars Hagberg

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

Complying with laws and regulations, fighting corruption and supporting communities is the gist of UN Sustainable Development Goal number 16.

THE FIGHT AGAINST CORRUPTION

The global Sustainable Development Goals (SDG) formulated by the UN are also guiding Epiroc's sustainability work. We take a closer look at goal 16.

SUBGOAL 16.5, "Substantially reduce corruption and bribery in all their forms", is especially relevant for companies. Every year, trillions of dollars – equivalent to more than five percent of global GDP – are paid in bribes or stolen through corruption, the United Nations reported. Corruption is one of the biggest impediments to achieving the SDG's.

"The problem with corruption is that it disables sound competition, counteracts an efficient society, and distributes wealth and benefits unjustly. Corruption makes business unpredictable," says **Jörgen Ekelöw**, Senior Vice President General Counsel at Epiroc and owner of Epiroc's actions on the particular SDG.

Jörgen Ekelöw
Senior Vice President
General Counsel,
Epiroc

EPIROC PUTS MUCH emphasis on anti-corruption, which is where our Code of Conduct (CoC) comes into play, the company's guidelines regarding ethics, such as anti-corruption, conflict of interest, hospitality, and community engagement. Managers are required to review and re-commit to the CoC annually, and there are regular CoC workshops for all employees. In addition, to safeguard ethical business, our suppliers also need to comply with our CoC, and we have a responsible sales assessment process in place.

"Suspicions of misconduct should primarily be raised with management or HR, but employees may also use the SpeakUp service. SpeakUp provides two-way communication while also ensuring anonymity for the messenger," says Jörgen Ekelöw. ×

More www.epirocgroup.com/un-sustainable-goals

BLAST FROM THE PAST YEAR 1999

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 take a glimpse in the rearview mirror.

Gustaf Höök
wangdu88-123RF

Portfolio
Ertan hydropower station

In the lower reaches of the Yalong River in the Sichuan province, Southwest China, rises one of the most challenging constructions of the modern age. The Ertan hydropower station took eight years to build and, when put into operation in 1999, was the largest of its kind in China.

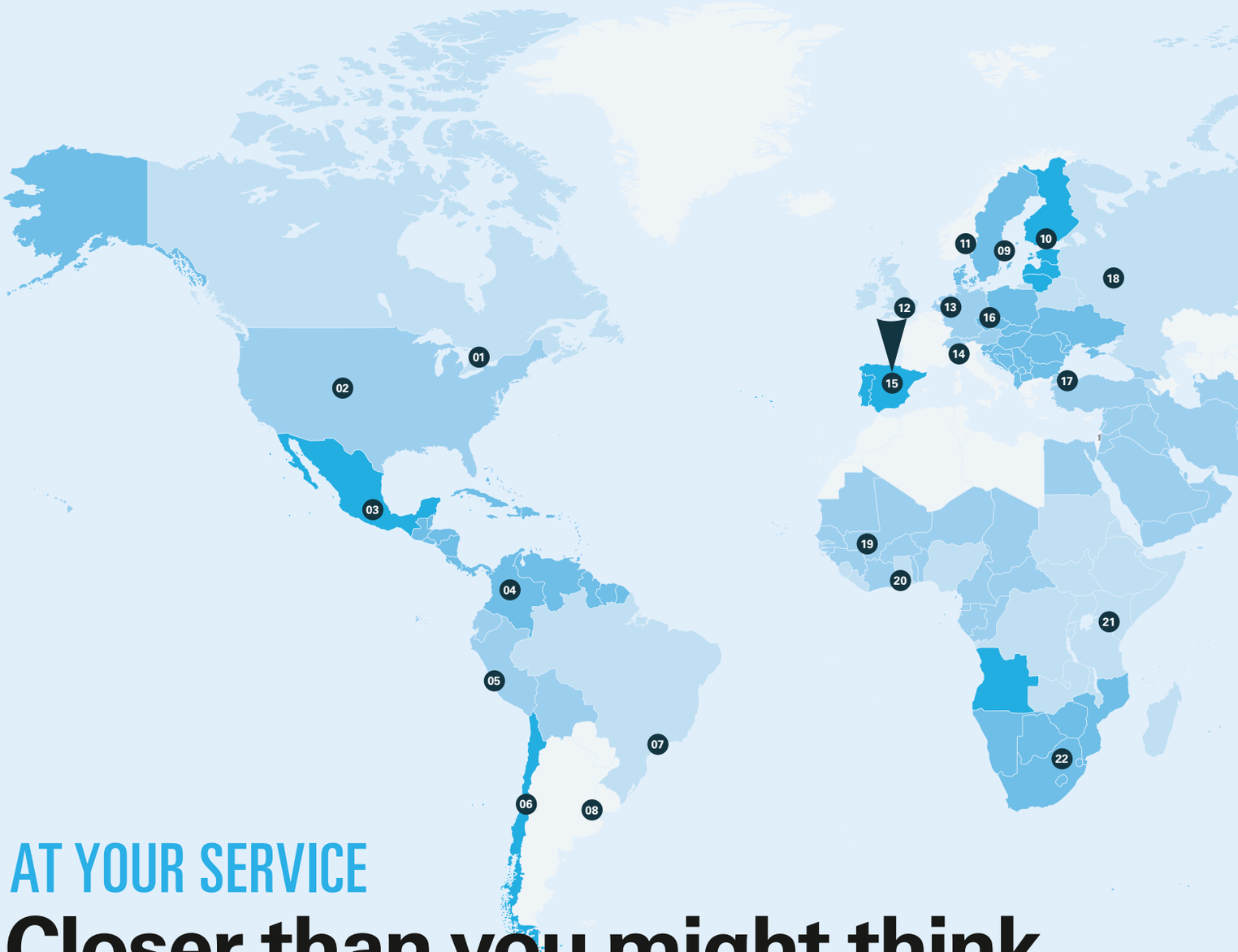
It includes a 787-feet-high concrete arch dam with a capacity of 193.57 million cubic feet of water, and an underground power station that produced 3.9 billion kWh of power in its first year of operation. Approximately 5 000 people were employed during construction and more than 39.37 million cubic feet of material were excavated, both above and below ground in a remote area with rugged mountainous terrain.

Epiroc (Atlas Copco, in those days) was chosen as supplier of drill rigs, tunneling rigs, rock-drilling tools, loaders, compressors, as well as training and service. At the time, it was the largest fleet of Epiroc equipment on any single worksite.

More www.power-technology.com/projects/ertan

The Ertan hydropower station is located near Panzhihua on the Yalong River (a tributary of the Yangtze) in the Sichuan province, a mountainous inland province in Southwest China with excellent hydro potential.

Frida Valentin Shutterstock



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 Customer Centers in 31 regions. 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 Andean
Lima

06 Chile
Santiago

07 Brazil
São Paulo

08 Argentina
Buenos Aires

09 Sweden
Stockholm

10 Finland
Helsinki

11 Norway
Oslo

12 UK & Ireland
Hemel Hempstead

13 Europe 1
Essen

14 Southern Europe & Northern Africa
Milan

15 Iberia (Spain & Portugal)
Madrid

16 Central Europe
Prague

17 Turkey & Middle East
Istanbul

18 Russia
Moscow

19 Mali & Burkina Faso
Bamako

20 Ghana
Obuasi

21 Eastern Africa
Nairobi

22 Southern Africa
Johannesburg

23 India
Pune

24 Central Asia
Nur-Sultan

25 Mongolia
Ulaanbaatar

26 Gr. China
Nanjing

27 Southeast Asia (South)
Jakarta

28 Southeast Asia (North)
Bangkok

29 South Korea
Seoul

30 Japan
Yokohama

31 Australia
Perth

[In focus]
Madrid, Spain

Hello there!
What's happening in Spain and Portugal?

Jaime Huidobro
Manager,
Epiroc Iberia

APRIL 1, 2020, Epiroc Spain and Epiroc Portugal merged under the new entity name Epiroc Iberia. The new organization will mean extended service for customers, increased efficiency, further growth and new business opportunities. **Jaime Huidobro**, previously General Manager for Epiroc Spain and new Manager for Epiroc Iberia, elaborates.

What are the reasons for the change?
"There are a lot of synergies between Epiroc in Spain and Portugal. First of all, we have very similar customer bases, such as underground mines and large international sub-contractors. Cross-border sales between our two countries frequently take place."

What benefits and strengths do you see, both for the company and the customers?
"The new organization and management structure makes us stronger and more efficient in relation to existing customers and also when it comes to approaching new markets and customers. For example, we will use the export experience that Epiroc Portugal has from Angola and we will share what we learned from Cuba. Customers can look forward to extended services and a stronger product portfolio."

In what way will customers notice the change?
"For customers there will not be any obvious difference, but the organization behind our salespeople will be a lot stronger in support and service, which means that the change will be evident for our customers in the long run." ×

Find Epiroc in your country: www.epiroc.com

Christian Tarras Ericsson Alexander von Sydow

Drilling from a distance

Office TeleREMOTE is a new product to let you remotely control surface drill rigs – from anywhere on a site. Global Product Manager **Mattias Hjerpe** gives a quick run-through of the main features.

In what way does the Office TeleREMOTE system differ from BenchREMOTE, a similar product?

"BenchREMOTE uses a closed WiFi network independent of any local infrastructure, giving it a range of about 100 meters. Office TeleREMOTE, on the other hand, communicates over any existing WiFi network, which means that you can remotely control the drill rigs from anywhere on the site. Also, BenchREMOTE is run from an exact copy of the drill rig operator cabin, while Office TeleREMOTE is run from a more regular work desk. You still have displays and controls, though."

How did you go about designing the system?

We used our experience from existing remote-control products within Epiroc when designing the desk, determining the best distance between controls, and so on. We've based the system on the RCS4 platform, the server rack is used in other Epiroc remote control solutions, and the network system is the same one used everywhere in Epiroc. The company-wide compatibility minimizes the number of parts and makes for easier maintenance and service."

Mattias Hjerpe
Global Product Manager, Epiroc

What would you say are the biggest advantages of Office TeleREMOTE?

"The possibility of a single person controlling multiple rigs productively and efficiently from a risk-free and comfortable working environment. The system effectively increases the number of productive hours in a day and also significantly improves utilization of the equipment."

More www.epiroc.com/6th-sense-surface

Office TeleREMOTE in brief

- Control of surface drill rigs via WiFi from any remote location on site
- Based on RCS4 platform
- Display and ergonomic control setup familiar from the drill rig cabin
- Includes server rack with Epiroc Automation Common Machine Server (ACMS)
- Includes video and safety systems for three drill rigs
- Option to extend the capacity to up to nine drill rigs per server
- Compatible with SmartROC models D50, D55, D60, and D65 with RCS4