[Feature]

A new world

Safer and more productive – automated mining is the way forward

28–31
We believe that automation and interoperability are the future of our industries. And at Epiroc, the future is already here. These are not just great ideas – they are reality. In this issue of Mining & Construction you can read about how Epiroc automation solutions are making a difference in the field. It all starts with an innovative idea, then making it work for your business while taking your productivity to great new heights. It’s a case of ideas put into action – and the solutions make your life easier, safer and more productive.

Being part of the growth of new technology is exciting. Seeing what automation and interoperability enables and how it improves businesses – in more than one way – is truly inspiring.

At Epiroc, we are excited to see what the future holds within this field, and we are looking forward to making this journey together with you.

Epiroc’s heritage dates back to 1873. Epiroc has been formed out of Atlas Copco’s mining and construction business, and builds on proven expertise, quality and performance.

Our innovations 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.

Revenues:
- More than 13,000 employees
- Customers in more than 150 countries
- 145 years of experience
- Revenues: SEK 31.4 billion

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About Epiroc
Epiroc is a leading productivity partner for the mining, infrastructure and natural resources industries. With cutting-edge 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.

The Group in numbers
13,000 employees
72% Equipment & Service
25% Tools & Attachments
28% Mining and Rock Excavation
14% Surface and Exploration Drilling
23% Rock Drilling
13% Underground Rock Excavation
12% Hydraulics
11% Hydraulics

The Group
- Rock Drilling Tools
- Rocktec
- Drilling Solutions
- Hydraulics
- Tools & Attachments
- Equipment & Service
- Mining and Rock Excavation
- Hydraulics
- Underground Rock Excavation
- Surface and Exploration Drilling

Epiroc Group – get to know us better

Epiroc Group

On my radar

New look for equipment
Supplying equipment is always a top priority and now we can put Epiroc branding on products leaving the factory.

Continuous improvement
How can we become a better partner and organization today and tomorrow?

#Epiroc
Seeing your images of Epiroc equipment in action on Instagram is very inspiring.

Enjoy!

Helena Hedblom
Senior Executive Vice President, Mining and Infrastructure

Epiroc Group

Our innovations
Industries we serve
Revenues by region

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Epiroc Group – get to know us better
26–41 | FEATURE
AUTOMATION

Robots are the future. Not as overlords – despite the disparaging imagery in books and movies. Instead, they will help us to a better life. The quest for automation in mining is making good progress.

08 | Automation pioneers
Barrick Gold Corporation has been running an automation program in the Hemlo gold mine in Ontario, Canada, since 2001. The most recent addition is autonomous trammelling and teleremote operation.

14 | Precision drilling
The Dynamic Smart 6 rig has made a big difference for Australian diamond drilling specialist Webdrill. Jared Webb (Webdrill) and Dave Brooker (Epiroc) elaborate on a fruitful partnership.

22 | Smooth loading
Loading efficiently in tight spaces can be tricky. The Häggloader is designed to solve this problem – helping operations enormously as BetonmastHæhre Anlegg builds two underground hydropower plants in northern Norway.

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“...an absolutely brilliant rig”
Swimpex Granite has been using a Sandvik ROD 2F drill rig since November. For operator Per-Anders Olausson, it was love at first sight.
EPIROC
IN BRIEF

IN JUNE OF LAST YEAR, a transcontinental demonstration involving a cableless Pit Viper 275 CA in Garland, Texas, demonstrated the potential of autonomous operation. The machine was controlled more than 8100 kilometers away by participants in Stockholm, Sweden – the longest distance known. The feat demonstrated how Pit Viper Teleremote and Autonomous – a capability already available in mines around the world – can be used from any location in the world.

Our core values – innovation, commitment and collaboration – are deeply rooted within the organization and serve as a competitive advantage in an ever-changing environment,” says Sofie Gielen, Epiroc Branding and Communications Manager.

EPIROC’S CORE VALUES are words that reflect the spirit of the company and at the same time mark the way forward.

“Our core values – innovation, commitment and collaboration – are deeply rooted within the organization and serve as a competitive advantage in an ever-changing environment,” says Sofie Gielen, Epiroc Branding and Communications Manager.

The mission of the rebranding project has been to interpret the spirit of Epiroc and create a look and feel that mirrors this. “The aim is to take the best and make it even better, with the same people and a bold new drive to support the success of our partners and customers.”

CREATING A NEW brand for a company is a balancing act. Coming from a renowned brand like Atlas Copco, it takes courage to create something new. “The foundation remains the same, but the face is new and we now have the added focus. I also think there’s an advantage in having to re-think your company. It prepares us better for the future and brings out fresh energy. I think that characterizes our organization – we are not afraid to try new paths to find the best one. These are very exciting times,” concludes Sofie Gielen.

Teleremote drilling demo sends global message

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BBE 57 rock drill still customer’s choice in Algeria

Sari Sapan, an aggregate quarry company in Algeria, has been using the Epiroc BBE 57 rock drill since 2010. “We have used it every day since we’ve been using this type of drill. It’s been an outstanding result,” says Keck. “Sari has a new drill rig and plans to replace it with the new model.”

Epiroc is a new brand, carrying 145 years worth of Atlas Copco experience.

Automated rigs to optimize productivity in Mount Morgan mine

On October 10, a Boomr S2 drill rig was loaded onto an aircraft carrier in Örebro, Sweden. The destination was Perth, Australia, and the drill rig will be used in Mount Morgan mine, owned by Dacian Gold. The company ordered a total of four Epiroc rigs: two Boomr S2 face drill rigs and two Simba S7C production drill rigs. Equipped with smart automation features, these drill rigs are designed to optimize overbreak/underbreak and to handle drilling plans. Both rig types also feature the new superior COP MD20 rock drill.

Master driller reaches magic number

In September 2017, Wolfgang Keck passed the 1 000 000 meter mark as a driller at TH Mining in Southwestern Germany. He has mainly operated DTH drill rigs, producing raw material in limestone and aggregate quarries. “The secret to his success? ‘It is the long experience – and the Epiroc rigs. They work very well in each geology,’” says Keck.

Protection system improves breaker performance

AutoControl and StartSelect have been popular features on Epiroc hydraulic breakers for some years. Now the functions are ingeniously combined in Epiroc’s Intelligent Protection System (IPS), which ensures that the hydraulic breaker always starts in AutoStart mode. The IPS makes for simpler, faster breaking with less wear and more uptime.

Drilling

Which core value is the most important to you?

Jenny Heimersson
General Manager
Construction Tools PC AB, Sweden

“Collaboration is necessary if we are to succeed in our other two values. It doesn’t matter that we have brilliant innovations if we don’t work together to bring them to market. Good collaboration will ensure greater commitment.”

Paula Böne E
Business Line Manager
Underground Rock Excavation, Chile

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Hedley Birnie
Business Line Manager
Surface and Exploration Drilling, South Africa

“If we are committed to our customers it will involve innovation, collaboration and far more than just our core values. When we are committed to our customers, we are up to speed with their demands, the issues that they are facing and with technology. It’s commitment that leads the process forward.”
Teleremote autonomous mining is helping Barrick Gold Corporation reach a deeper section of its Hemlo mine in Canada. Running an Epiroc Scooptram ST14 loader from the surface enhances worker safety while reducing ventilation and climate control requirements underground.

**All clear in the automation zone**

**BARRICK’S HEMLO MINE GOES DEEPER WITH TELEREMOTE AND AUTOMATION**

Teleremote autonomous mining is helping Barrick Gold Corporation reach a deeper section of its Hemlo mine in Canada. Running an Epiroc Scooptram ST14 loader from the surface enhances worker safety while reducing ventilation and climate control requirements underground.
“We still personally walk the area to make sure no one is in the zone.” Reas- planned for miners’ hard hats by the end of 2018. Exiting the cab, Locht says:

“Automation and tele-
remote control get work-
ers away from the oper-
ating environment to an office on the surface – the ultimate in safe operation,” says Mine Superinten-
dent Jon Laird. “And since it continu-
ously mucks from stopes at a steady rate even through shift changes, it elim-
inates having to move operators to it every shift.”

Laird says the 14-tonne-capacity Scooptram loader is “so efficient it threatens to outpace crushing opera-
tions at the ore pass.” He smiles broadly-
ly when he adds: “Overproduction is a good problem to have.”

ONE SOLUTION UNDER discussion is cre-
at ing additional ore passes to give one crushing operation time to clear ore between dumps. The Scooptram load-
er can easily learn multiple routes and alternate between them. Other sys-
tems Hemlo looked at took up to a full shift for the route-learning process.

Hemlo Mine in 2016

- Combined open-
  pit, underground mining operation
- Production: 235,000 oz
- Mineral reserves: 1.6 million oz
- Graded at 1.32 g/t
- Received Min-
ing Association of Canada’s Towards Sus-
tainable Mining Leadership Award

The dumping and autonomous function of the ST14 are controlled from an office on the surface. Tramming is completely autonomous once the rig has “learned” the route.

Graham Hanson, Innovation and Technology Manager, who heads up teleremote operations at Hemlo, says, “This rig, you just run the route to learn it and it’s ready to go.”

Trevor Kelly, Barrick Technical Excellence Director, says implementation requires faith and patience. “While we are seeing what we expect in general, we can’t precisely measure overall results for some time yet. How much are we saving? How much more productive and efficient are we?”

Certig, the telematics system in-
stalled on the Scooptram, will be es-
sential for tracking, documenting and analyzing operational data to learn how much they gain from their invest-
ment in automation. However, it isn’t all about numbers. Introducing advanced technology rais-
es concerns about job security. Hemlo

with a five-year plan after a year-long search for a solution offering the lowest cost, quickest implementation and solid product support.

“We studied all available technolo-
gy. We had conferences with manufac-
turers and visited their facilities. We toured operations where their equip-
ment was at work,” says Patrick Mar-
shall, Manager Automation Projects.

“We believe the Epiroc package fea-
tured the product support we wanted,
had the best integration capability for our multivendor operation, had the right pricing model and, in general, was the best fit for our needs.”

Barrick preferred to use Cisco for wireless infrastructure: “Commonality is important to us,” Marshall explains. “Epiroc’s system is easily adaptable for use with third-party wireless systems.”

OR HEMLO, SAFETY is the greatest benefit of the high-tech Scooptram ST14. Combining autonomous tramming with teleremo-
te operation also increases productivity.

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John Laird, Mine Superintendent, Hemlo Gold Mine

has actually added personnel to build and maintain its Wi-Fi infrastructure. And automation has opened paths for other employees to more fully realize their potential with expanded skillsets, achieving at higher levels in an improved working environment.

COOPTRAM OPERATOR Wayne Locht crosses to the desk to see how things have gone for the operator who has monitored the Scooptram ST14 since Locht left it in the automation zone. Then he’s off to the locker room just down the hall to get out of his underground gear. He returns minutes later showered and in his street clothes, takes his seat in the padded office chair and rolls up closer to study live footage from the Scooptram. It’s pulling up to the ore pass with a full bucket. Mucking is not yet an automated feature, so Locht takes the joysticks in hand. Until the rig is re-fuelled, after approximately 16 hours, no human being will visit the rig or enter the automation zone. Teleremote operators will monitor its routine, taking control only during loading and dumping operations. Barrick’s next step is finishing the wireless infrastructure throughout the Hemlo mine, expanding the automation zones, and getting more loaders. A single operator will run more than one machine from a control station, and the mine will have more than one station. Operators at any station will be able to control any of the automated Scooptram loaders, anywhere in the mine.

Patrick Marshall says, “Today, we’re connected. Tomorrow we’ll have optimized fleet management. In the near future, we’ll achieve our ultimate goal – fully autonomous mining underground executed by our operators from the surface.”

Epiroc and Hemlo

Hemlo Gold Mine Inc. is a wholly owned by Barrick Gold Corporation, the world’s largest gold mining company with proven and probable gold reserves of $85.9 million. Hemlo not only chose Epiroc for its recent autonomous, teleoperated initiative underground, but has included Epiroc rigs in its surface fleet for many years. The Hemlo pit mining fleet includes a DM45 and two Pit Viper 210 overhand drills, a SmartROC D65 down-the-hole drilling rig, and line-of-sight radio remote control. It also enables live access to performance data and provides mine-wide network access for location tracking and communication capabilities like real-time equipment tracking, but the precise location of each person underground – a vital advantage in case of an emergency.

5 KEYS TO SUCCESS

- Mobilaris real-time location tracking
- Designed with operators in mind
- Capacity and boost productivity
- Safer, more comfortable environment
- Multi-use Wi-Fi

Mobilaris Mining Intelligence not only gives Epiroc real-time equipment tracking, but the precise location of each person underground – a vital advantage in case of an emergency.

Operators report high satisfaction with the ergonomics, power, comfort and features of the Scooptram ST14 loader. Transitioning to teleremote and autonomous operation is quick and easy to learn.

Automated load-haul-dump operation reduces ventilation and climate control requirements for deep mining operations and moves operators to a safer, more comfortable environment than is possible with line-of-sight radio remote control.

Wireless infrastructure for autonomous operation also enables live access to performance data and provides mine-wide network access for location tracking and communication capabilities like real-time reporting.
Per-Anders Olausson, Drill Rig Operator, Swimpex Granite

He sets a drilling program using the remote control. The machine then takes over and takes care of the rest. For operator Per-Anders Olausson, the SpeedROC 2F drill rig means a whole new – and better – way of working.

On the west coast of Sweden, a type of gneiss that is unique in the world is quarried. It was named after the farm next door: Bårarp, which has been Anglicized as Bararp. This is where Per-Anders “P-A” Olausson works as a drill rig operator at Swimpex Granite. After 26 years he has got to know the soul of this rock.

“It’s the only rock in the world to have this coloring and patterning. Not only that, but the pattern varies depending on how I choose to drill. In western Europe they prefer a wavy pattern with more red in it, while the big eastern market likes a striped pattern,” says P-A Olausson.

His job is to drill out blocks, often a good five cubic meters in size and weighing 17 metric tons, which will then become gravestones, cladding, steps or countertops.

“In the old days, I had to take into consideration pattern, colors and any defects, cracks and other quality faults when I plan the positioning of the drilling holes. The drill bit has a diameter of 33 millimeters and there are just 10 centimeters between holes, so the rig can’t go off course.”

Swimpex Granite has had a SpeedROC 2F drill rig from Epiroc since November 2017. “We had a demo rig for a week, but I liked it so much the management decided to buy it. We had an instructor here from Italy for a week, and the support since then has also been really good and helps me with any questions. I’ve probably run the rig for at least 600 hours since we got it, and I’ve been extremely happy with it so far,” says P-A Olausson.

He compares it to the rig he used previously, reeling off point after point on his fingers. “This one’s faster, more fit for purpose, has more settings, higher capacity, lower fuel consumption and is much more automated. I set where and how deep it is to drill, and then it takes care of itself. It’s an absolutely brilliant rig. I’d never have believed it could be this good.”

On a good day, in good conditions, it takes P-A Olausson around two hours to drill out a block. “I maybe drill 1 000 meters a day. After 140 meters the drill bit is worn out and has to be replaced with a new one.”

The old rig was based on the same principles, but nothing was automated. “So it was a full-time job just keeping up with it. OK so I still have to change drill bits, but you have to do that on any rig you have. I’d never go back to the old way of working – that would be unimaginable.”

Swimpex Granite is one of the oldest accessible rock types in the earth’s crust. Bararp gneiss is a multicolored migmatitic rock in red and gray, and is found only in this quarry.

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The blockbuster drill rig

Main application area: Marble, granite and limestone in the dimension stone industry

Main benefits:
- Fast drilling and positioning
- 360° carrier rotation and extensive boom reach
- Outstanding terrainability
- Low fuel consumption

Drilling method: Tophammer

Rock drills (two parallel): 2 x DF500X

Hole diameter: 33 millimeters

Maximum hole depth: 9 meters

SpeedROC 2F
Australia’s newest underground diamond drilling specialist, Webdrill, was founded by industry expert Jared Webb in 2014. The company is contracting at the Nicolsons Gold Mine in North Western Australia, making first-class underground diamond drilling machinery a priority for the operations. Prior to making the investments, Webdrill conducted thorough research before settling on Epiroc as its exclusive supplier. Webdrill’s first purchase was the Diamec Smart 6 rig with the integrated Rod Handling System (RHS). The machinery makes the underground drilling less laborious and improves safety.

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In Focus: Webdrill

Webdrill is a new Australian-based diamond drilling company specialising in underground diamond drilling for exploration and grade control. The company focuses on consistently delivering high-quality core samples and value to the customer, with safety at the forefront of all operations. Webdrill is currently contracting at the Nicolsons Gold Mine, owned by Pantoro Ltd and located in the Kimberley region of Western Australia. This is part of the Pantoro Halls Creek Project, with gold extraction being the main objective.

- Founded in 2014
- Fifteen team and site employees
- Nicolsons Gold Mine contract established in 2015

Webdrill
Managing Director, Webdrill
AROUND THE WORLD

Exploration spending is growing

THE MARCH 2018 World Exploration Trends report, commissioned by the R Tat: Interna- tional Convention and authored by S&P Global Market Intelligence, offers some noteworthy insights. For the first time in five years, global spending on the search for nonferrous metals rose – to an estimated US$8.4 billion in 2017 compared with US$7.3 billion the year before.  

2017 was a good year for the global mining industry, with increased investments despite concerns over North Korea. Metal prices have also benefited from the improved global economy.

Why is social responsibility good business practice?

In your opinion, mining companies need to focus more on social sustain- ability. What’s that about?  

“The most important part of any mining operation is to get local communities involved from the start. If you asked a mining executive a few years ago in, for example, Latin America what the three key points for success were, they would’ve said energy, water and ore grade. If you ask the same question to- day, they’d say local communities, local communities and local communities.”

Why is that?  

“It simply makes good business sense. People in communities want to partici- pate in developments affecting their land. They are well informed and socially mobile on Twitter, Instagram and Face- book. It’s part of a wider process involv- ing developing communications and a focus on trust in relationships. Compa- nies have to build something lasting and positive. Both communities and shareholders expect this.”

Can you give us an example?  

“For example, BHP runs an effective anti-poaching program in Mozambique, assisting the local community. Not only is it a good thing to do, it’s also result- ed in less subsistence hunting in the workforce, and immensely increased productivity. The best RDI is to start a relationship at the geoscience phase, and make sure that the local community is in on board from the start.”

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it’s easy to fill the dumpers optimally. “The Häggloader is mainly electric-powered, with diesel required only for lengthy tramming. This reduces climate impact and lowers noise levels, as well as reducing ventilation costs. “The Häggloader requires a ventilation capacity of 16–17 cubic meters a second, “ says Rune Lien. “Had we used a diesel loader instead, it would have needed to be at least 40 cubic meters a second. Something like that would have required larger tunnels – and since we’re doing so much tunneling, the costs would be considerably higher. And all for nothing, because there would be no benefit in terms of what’s finally delivered. ” ON CERTAIN SECTIONS in the rock there are steep gradients of up to 15 percent. A wheel loader would find it difficult to work in such conditions – but for the Häggloader, which does not move and scrapes down the material onto the conveyor, it’s another matter. “The machine is incredibly good on a gradient, and it’s also multifunctional. I use the boom.
The Häggloader has been a key to success at the Smibelg and Storåvatn sites, where BetonmastHæhre is building two hydropower plants.

 Operators, Ole Jørgen Johansen, who has been working with the Häggloader for four years.

He continues: “It’s also nice not to be moving about when you’re loading. Driving a wheel loader to and fro can be quite bumpy, but this is much gentler on the back. We’ve even been given air seats, which reduces maintenance.”

BETONMASTHÆHRE IS TO complete the project at the end of 2019, and to date the work has gone according to plan. Combining a wheel loader to and fro can be quite bumpy, but this is much gentler on the back. We’ve even been given air seats, which makes the working environment even better.”

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“IT’S also nice not to be moving about when you’re loading. Driving a wheel loader to and fro can be quite bumpy, but this is much gentler on the back. We’ve even been given air seats, which reduces maintenance.”

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BetongmastHæhre

FOUNDED IN 1974, Hæhre Entreprenør has since become a major operator in civil engineering in Norway, and along with its subsidiaries Hæhre Mek. Verktøy, Hæhre Maskinløsninger, Hæhre Gullvått, Hæhre Auto and Zenith Survey offers a wide range of products and services. The company has offices in Vikersund, Bilingstad and Bergen and carries out work throughout the country. In 2017 it merged with Betonmast. The BetonmastHæhre Group has 2850 employees and in 2017 sales amounted to around NOK 10 billion.

Smibelg and Storåvatn power plants

THE TWO power plants are being built 150 meters and 200 meters respectively into the rock. Construction work began in May 2015 and will be completed in December 2019. The waterways consist of 27 kilometers of tunnel, five reservoirs, four brook intakes and a pumping station. The Smibelg and Storåvatn facility can be accessed by boat or helicopter.

Total annual production and rated output: 210 GWh/68 MW

Number of households whose electricity consumption is covered by Smibelg and Storåvatn: 10 500 (5 750 + 4 750)

Total cost of the project: NOK 1.4 billion

Saving time and money

To drive long tunnels cost-effectively, you need high capacity equipment designed to operate efficiently in narrow or confined spaces. Our continuous loader – the Häggloader – meets this need by increasing efficiency while lowering costs.
It is a grand vision: completely autonomous mines, comfortably supervised from safe distances by humans. A lot is happening in mining automation these days, and the buzz is steadily increasing. But where are we heading? And how far are we from the vision?
A steadily increasing number of tasks are being automated, in virtually all strata of society. Over the next few years we will see automated solutions for businesses as diverse as transport, retail, security, healthcare, food services, ... and mining.

The age of automation is here. A plethora of tasks is being automated; even tasks that just a few decades ago would have been inconceivable to put in the hands of robots and artificial intelligence. To pick just one recent example, artificial intelligence drastically outperformed – in speed as well as accuracy – a team of lawyers in scanning a set of non-disclosure agreements for legal errors. Automation, experts agree, is the inexorable future. The questions are: why is the mining industry on the automation conveyor belt, how far along is it, and how well will it be affected?

The reasoning behind automating mining is, put simply, safety and productivity. The mining industry has seen modestly declining figures since 2013. Operational Equipment Efficiency (OEE) has stuck around at 20 to 25 percent – compare that to the value of 80 to 90 percent in the automotive industry. There’s also a need to increase Asset Utilization (AU), according to Jonas Albertson, President Rocktec division at Epiroc. He says: “Neither machines nor mining sites are being used with a high enough degree of efficiency. Automation is a way to increase safety, predictability and productivity.”

**THE PATH TO AUTOMATED solutions in the mining industry will involve several increasingly complex steps, the first being adding automated functionality to machines. This is where most mining companies are today. The second step involves getting machines to cooperate and work together, markedly increasing efficiency while removing employees from hazardous zones. Further steps involve increased automation and integration of systems, even though they might be from different manufacturers. The final step – the automation “vision” – is largely self-sufficient round-the-clock operation of mines, with human presence many miles away. “A good way to start would be with positioning, and then to begin optimizing the traffic flow. The key to successfully implementing automation is to optimize processes and make them work tighter together. For example, optimizing drilling processes to get better fragmentation after the blast, so as to facilitate loading,” says Jonas Albertson.**

Increased safety, as previously mentioned, is also one of the major driving forces for automation in the industry. Automated solutions allow personnel to work outside of hazardous areas, or even far away from the actual sites. There are already examples of machinery being successfully operated from control rooms many miles away. “There is still some way to go before the industry can apply fully integrated system solutions though. Mine sites differ from, for example, manufacturing plants in that they are not controlled environments – and also that they keep expanding. It will take time to design and apply the necessary infrastructure to support fully automated solutions,” says Albertson.

Building the necessary infrastructure for automation at new sites is a lesser problem, considering; this can be taken into account at the onset of the planning stage. As Albertsson states, converting existing sites to incorporate automated solutions poses a much greater challenge.

### Entering the age of autonomy

Tony Scheres, Manager of Technical Services and Business Development at Lalor mine, Hudbay in Manitoba, Canada, has hands-on experience trialing innovative technology at an existing mine. He has been at the Snow Lake site since 2010, and has been putting new equipment through the hoops ever since.

“I think we were the first in the world to test the Scooptram ST18 automated loader; for example, and we’ve been running automated Scooptram loaders for more than a year now. At Lalor mine we do a lot of trialing and testing of equipment and products to improve operation.”

**HE SEES LOTS OF major benefits from automation, not least in safety. “Automation allows us to remove people from the underground work environment hazards of dust and other contamination. During automation the equipment operates at designed optimal levels with less wear and tear. Automated equipment continues to operate between shift changes and is not affected by blast clearance when the mine is being ventilated and employees are at the surface. The efficiency of automation has the potential to reduce operating costs and mine low-grade ore, extending the life of our mines.”**
Converting to automation is not without its problems, however. “For safety reasons, the operation of automated equipment must be separated from other working areas of the mine where we have underground miners actively working. We’re not set up for transferring the ore automatically to a haul truck at the moment, for example. If we switch to autonomous trucks they will have to move through areas where we have active crews working, and we need to solve that. Another downside, we’ve discovered, is not having miners in the drawpoints of the stopes. Miners are still better at spotting potential hazards in the stopes, and we’ve lost a couple of loaders when oversize pieces came down on top of them.”

According to Ulla Korsman-Kopra, Global Business Manager Automation and Information Management Systems at Epiroc Underground Rock Excavation division, the first step in converting an existing site is to do a thorough audit. “You have to see what is at all possible. You need to get a full picture of aspects such as the layout, restrictions, barriers, safety systems, dumping points, traffic flow and personnel. The existing Wi-Fi network may certainly have to be enhanced – every automation solution is dependent on having a reliable communication network,” says Korsman-Kopra.

When building automated solutions, she also stresses the importance of designing good user interfaces. “It’s vital to build solutions that are easy to understand and use. If they’re too complex, a lot of the functionality will remain unused because nobody understands it. The functions should be accessible and easy to use correctly. The point is to help people do better work.”

In order to reach that goal, she advocates using best practice solutions from other industries – be it aviation, bionics or space. “We have to be open to new kinds of solutions; technologies that nobody has thought of applying to the mining industry before,” says Korsman-Kopra.

Our wireless tomorrow

The next generation of wireless standards, the upcoming 5G for mobile and 802.11ax and 802.11ad for Wi-Fi, will pave the way for better communication both above and below the ground. Early tests of candidates for the 5G standard suggest it boasts speeds that are at least a magnitude higher than 4G, while also dramatically lowering latency times – very important not least when used with remote control, where split-second reactions can make all the difference. The 802.11ax standard promises access points that can talk to multiple devices simultaneously, not sequentially like today, while the 802.11ad standard will be a very short-range system with very high throughput capabilities, which could be an option for demand-intensive implementations.
MINING FOR EFFICIENCY

The world’s mining industry is becoming safer and more efficient, thanks to developments in automation by Epiroc. Making the switch from manually operated rigs to automated is also surprisingly smooth.

“Who would want to go back to sitting on a noisy rig? This is a smarter way to do the job in so many ways. I see this changing everything for the better,” says Germain.

He and eight other Epiroc employees are learning about the next revolution in mining. Their classroom is modern but casual, with huge flat screen TVs, shelves stocked with binders of documentation, a refrigerator filled with refreshments, and people rapidly scribbling notes from subject matter experts. The attendees come from the U.S., Chile, Russia, Morocco, Canada, Sweden, and Ukraine. No two accents are the same, but they’re all speaking the same language – automation.

The classroom is a part of the Epiroc Surface Automation Center in Garland, Texas, and they are gathered here for Boot Camp. Several are held every year for Product Managers and Product Specialists. State-of-the-art automation equipment requires thorough training for all Epiroc stakeholders involved, so the attendees are immersed in every phase of the process using the same equipment they will use on the job.

EPIROC IS PLACING a huge focus on automated solutions to meet the challenges facing today’s mining industry. For example, new safety restrictions protect workers but could affect productivity. Operators are driven to meet quotas, which wears out costly consumables like bits and rods. The costs of transporting workers to remote locations are rising, and skilled workers are becoming more and more difficult to find.

ANDS ON JOYSTICKS have controlled drilling rigs for years. But today, a huge smile appears on the face of the operator. It’s the first time Steve Germain, Product Specialist from Canada, is controlling a rig with no noise, fumes, dust, or vibration. He calmly sips coffee in a quiet, air-conditioned, state-of-the-art classroom, and the rig is outside the windows 80 meters away.

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According to Herman Krause, Automation Implementation Manager, Drilling Solutions division, “Our customers today want safety, efficiency, increased productivity, cost reductions, and improved quality of life for workers. Automation is solving all these problems. We’re setting the pace for technological advancements, and it’s our goal to offer customers the best possible solutions and products. This is why we established the Surface Automation Center and hold Boot Camps at our training center – we’re equipping people to lead the future of mining.”

Automation is a key ingredient in meeting the challenges facing the industry.

“First, we would install an Auto Drill system. ”

“Installing Tele-Remote Operation. This upgrade enables the rig to consistently follow an exact drill pattern of burden and spacing, to precisely place the holes and eliminates errors. In fact, it places them where they are needed within the diameter of our bit. When the holes are perfectly placed it offers downstream efficiency advantages such as load balancing and fragmentation. A geo-fence could also be loaded onto the pattern, which would keep all our Pit Vipers safely contained.”

Steve Germain sees the advantages of automation in underground mining. “After an underground blast we wait four hours for the air to clear. The Surface Automation Center is a fast-growing part of the Epiroc Group vision, providing cutting-edge automation solutions for all types of drilling challenges anywhere in the world.

Q&A

Herman Krause
Automation Implementation Manager, Drilling Solutions division

The shift towards automation in the mining industry goes hand in hand with Agile methodology replacing Waterfall methodology. This means a big change in everyday ways of working for the customer.

- What’s the first step in the transition?
  “First, we would install Auto Level and Auto Drill. This simple upgrade to any rig increases efficiency of the drill cycle by the repeatability of our Auto Level and Auto Drill system.”

- What’s the second step?
  “Next, we install GPS. This upgrade enables the rig to consistently follow an exact drill pattern of burden and spacing, to precisely place the holes and eliminates errors. In fact, it places them where they are needed within the diameter of our bit. When the holes are perfectly placed it offers downstream efficiency advantages such as load balancing and fragmentation. A geo-fence could also be loaded onto the pattern, which would keep all our Pit Vipers safely contained.”

- And the third upgrade?
  “Installing Tele-Remote Operation. This upgrade includes all of the above plus remote control either from our line-of-sight trailer option or our operating station option in an office for a safe, climate-controlled environment which could also be somewhere on the other side of the world. This enables one operator to run several drills at a time for greatly enhanced productivity.”

- What’s the final step in the automation process?
  “A fully autonomous Pit Viper. By going fully autonomous, a rig can be programmed and sequenced to complete a drill pattern automatically from anywhere in the world to drill 24 hours a day to complete a given task. This greatly reduces drilling costs, safety risks, and operational feet on the rig. The ultimate drilling machine is an automated Pit Viper.”

The Boot Camp attendees enjoy a few minutes outside the classroom, just a few steps from the fully-automated drilling rig in the background.

The Boot Camp attendees enjoy a few minutes outside the classroom, just a few steps from the fully-automated drilling rig in the background.

Steve Germain
Product Specialist, Epiroc Canada

Herman Krause
Automation Implementation Manager, Drilling Solutions division

In Focus: The Surface Automation Center
clear of toxic gases before an onsite driller starts the next hole. That’s four hours wasted. But with tele-remote we can start the next hole immedi-
ately. With four extra hours of drilling we get 30 buckets per hour at 400 tons an hour. That’s 2,000 extra tons a day per rig. The automation upgrades pay for themselves after two days.”

Anna Rönning, Underground Project Manager in Underground Rock Excavation division, mar-
vels at how similar the efficiency improvements are between underground and surface mining. She also realizes the enhanced quality of life. “Au-
tomation is the future for the business. It’s a much cleaner, healthier, and safer work environment.”

As the mining industry faces the challenges of im-
proving safety and efficiency, it is evolving from the business model of traditional Waterfall meth-
odology to Agile methodology made possible by automation. For decades, development methods have relied on variations of the Waterfall sequen-
tial workflow process based on moving from task A to B to C without variation. But it doesn’t adapt to a product’s evolving needs, so it’s difficult and costly to change the scope if needed. The advan-
tage of Agile methodology is that it breaks down the workflow into smaller stages so that adapta-
tions can be made along the way as a project pro-
gresses, allowing problems or opportunities to be addressed and solved much faster.

Herman Krause sees automation as the perfect partner for the Agile approach. “The problem with Waterfall is that it stands in the way of efficiency. Rapid change is not possible. But with Agile, a small focused team of people are constantly talking and working with each oth-
er. Development time for new solutions is broken down into shorter periods (bursts), and custom-
ers can be very involved. We are not a huge bu-
reauacracy tied up in red tape, but rather make changes to our technology faster to make the product better.”

Another problem facing the mining industry is that workers have to be transported to remote lo-
cations, and they’re away from home a long time. Tyler Berens, Automation Product Line Manag-
er in the Drilling Solutions division, describes many lifestyle improvements automation brings to mine workers. “Instead of commuting over bumpy roads, flying in bad weather, or staying gone a week at a time, operators go home to their families every night. They’re happier, and it saves on transportation, food, and remote housing.”

Tyler Berens also explains how the performance of an automated rig compares to a manual rig: “An onsite operator might drill some holes faster than an automated rig, but over a long shift the performance advantages of automation are ob-
vious. There are no lunch breaks, no bathroom breaks, and no loss of concentration that caus-
es accidents. Plus, automation delivers increased consistency from hole to hole with fewer redrills.”

One of the companies that has benefitted from Epiroc’s autonomous technology is BHP Billiton, a global mining company that has been running a trial of Epiroc’s autonomous technology on Pit Viper 271 rigs at Australia’s Yandi mine for three years. “The machines have operated autonomously for more than 3.5 million meters. Their fleet of autonomous rigs has initially been controlled on site at BHP Billiton’s mines in Pilbara, but they are switching to remote operation from Perth – over a thousand kilometers away. Be-
cause of the successful results, the company is continuing to roll out automation to more sites,” says Berens.

Herman Krause sees many challenges ahead for automation. “People are used to doing things the same old way, and this will require changes in people and processes.” But he goes on to sum up the advantages for customers quite simply. “We are selling a good quality, precise, fast hole in the correct place in the ground at the lowest possible cost per meter, and we offer a solution to do that.” With big picture gains in efficiency, profitabil-
ity, safety, and working conditions, Tyler Berens looks to the future and makes a bold prediction: “Epiroc is changing the way mining gets done.”
Maritime shipping is heavily regulated by law and accords. As presently written, for example, the rules require commercial ships to have a person in charge – a “captain.” Until the rules catch up with developing technology and industry demands, the first step to autonomy is having ships remotely controlled by operators from a shore control center.

Technical hurdles still to be overcome include settling on a fuel capable of handling intercontinental distances; traditional heavy fuel oil engines require too much manual maintenance. A prime candidate is liquefied natural gas.

In Focus

The route to autonomy

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In other words, autonomous short sea freight ships are just around the corner. Passenger traffic, as well as intra- and intercontinental shipping, will take longer to implement (see sidebar). Research initiatives into unmanned intercontinental ships are under way – not least in the Pacific region, for example China, Japan and Australia.

The Maritime Shipping industry, like the mining industry, is gradually pushing towards autonomy. It’s a step-by-step process, explains Ørnulf Jan Rødseth, senior researcher at Sintef Ocean in Trondheim, Norway:

“Autonomy is a broad concept: it includes everything from advanced autopilots and expert systems to remote control operations and fully autonomous unmanned ships.”

Rødseth speculates that crewless ships – has own area of research – will become a reality in the next few years for select tasks, mostly short sea freight routes between designated ports. An example is Yara Birkeland, the world’s first fully electric container feeder ship, which will be launched in Norway in 2018.

It will initially sail with a crew, but will switch to remote control from a shore center in 2019. In 2020 Yara Birkeland will become completely autonomous, moving 40,000 containers per year for distances up to 50 nautical miles between three ports. In time, all tasks – including loading, navigating, and unloading – will be automated.

“There are many advantages to autonomy. By removing the crew from hazardous offshore work the number of injuries decreases drastically. No crew also means no crew quarters, less heating and no lifeboats, and that makes smaller, simpler ships viable,” says Rødseth, continuing:

“To be frank, I see very few drawbacks with this development. There might be a few new types of accidents, including some that maybe could have been avoided by having a crew on board, but the overall gains in safety, services and reduced environmental impact more than outweigh that.”

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“I see very few drawbacks with autonomous ships”
Which obstacles have to be overcome in order to fully utilize automation technology?

Mats Strömsten
Research Engineer, LKAB, Kiruna, Sweden

"This is nothing new – we’ve been working with automated solutions for a long time to increase efficiency and productivity. Automation can compensate for increased depth and we have a lot of automated solutions for handling ore, for example. It’s more time-efficient, letting us operate more hours. It also makes for a better working environment, minimizing personnel exposure to hazardous areas and allowing more operations to be run from control rooms nearer the surface."

Hans Wahquist
VP Business Development and Strategic Product Management, Mobiliris MCE, Luleå, Sweden

"There are massive benefits that will potentially increase efficiency, for example by facilitating short interval planning, through optimization of machine utilization, and the ability to visualize what’s happening in the underground mine in real-time 3D with machines, vehicles, equipment and people. Also, ventilation on demand will dramatically reduce energy consumption. In the case of emergency evacuations, we can save lives by cutting the time for evacuation, knowing where people are at all times and knowing if they are in need of assistance."

Christian Niestroj
M.Sc., Research Assistant, AMT, Aachen, Germany

"More comfortable workplaces and a higher level of safety for people. Since automated machinery requires specialized knowledge, I personally hope it will lead to better wages. On top of this, automation brings with it better planning and less dependence on people’s gut instinct, making for improved efficiency. Automated solutions are potentially cheaper to operate, faster, more efficient and selective, and produce better quality."

Christian Tarras Ericsson

"We have to stop staring at buzzwords like the Internet of Things and Mining 4.0, and focus on two things: what does it make sense to use? Also, it will take time to change the mindset of the people in the industry. Regarding tech, today’s solutions don’t cover all aspects of the operations in a mine. First and foremost, we need better positioning systems. And finally, OEMs need to work together – we need universal solutions and open standards."

The story of automation

“Anything you can do, I can do better,” sang Annie Oakley. Some would say that robots, too, are rapidly approaching that point.

01
Thermostats
© One of the first examples of a feedback-controlled automated system was a mercury thermostat constructed around 1820 by Dutch scientist Cornelis Drebbel. This was a constant temperature in a chicken incubator.

02
Bombs
© Bombs were electrically-ignited devices used by the Allies against enemy targets in World War II to crack the enigma code and reveal German Enigma messages. The new codes rendered the cave talents of deciphering messages from years to mere hours.

03
Autopilots
© Modern airliners can do more with traffic and gusty winds than in last century’s era of the pilots setting course in the clouds using a map and compass. The only exceptions are the landing and takeoff phases.

04
Baristas
© The Briggo company has launched a robotic barista aimed at college campuses, airports and malls. The robot mimics real-life baristas in how he makes a cup of coffee, from how the coffee is ground and tampered, and hoe shots are pulled.

05
Chatbots
© Automated conversation agents have yet to dominate the face-to-face test for artificial intelligence. The best, though, are Mitsuku and Cleverbot, are getting better every day, learning from real human conversations.

06
Treadbots
© In 2014, more than a quarter of the stock exchange order books were executed by automated entities. The bots have taken over, and algorithms and bots continue to dominate in the financial sector.

07
Cleaning robots
© While lawnower robots have reclaimed their human masters in the garden, the next, robotic vacuum cleaner is still at the level of searches using a brush and dustbin. Good to know that machines aren’t yet lost over dirt.

08
Thermostats
© The bots have taken over the order books, with machines as by people.

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

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

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miningandconstruction.com

Want to delve deeper into zero-emission technology for underground mining? Make sure not to miss next issue’s Feature.
“I like showing the customers all I know about the machines”

Raúl Almonacid has worked his way up from being a service technician in Andean mines to the level of Service Expert. Now he travels to sites in Peru to start up mining and tunneling equipment, and supports other South American countries.

“I started as an outsourced service technician, working for three years in a mine 4,800 meters above sea level, then one year in another mine. I wanted a more challenging job, preferably based in Lima, and now I’m a Service Expert. I have learnt English and travelled to several countries on assignments.

My main job is to go on site to start up new equipment for underground mining and tunneling construction: rock bolting rigs, loaders, mine trucks and long hole drilling rigs. I also do warranty analyses and provide training, both internally in our Customer Center and externally to end customers.

TO PREPARE FOR a start-up, I first make sure that the machine is ready by performing a pre-start-up in our workshop. The machine is then delivered as per the customer’s wishes. I contact the customer to plan the training program, then I travel to the site. The first order of business is meeting with the customer, to go over the commissioning plan and to set up the training program for operators and maintenance crew. Sometimes we need to adjust the plan to fit the customer’s schedule. Then I make sure that the machine is okay after delivery. After that, training and operations start. At the end of it, I do a second equipment check to make sure it performs optimally. I write a detailed report, which the customer will sign. Not until then is the delivery considered complete. I often stay on as a technical contact for further support.

AT THE START of my career I used to travel with a partner, but now I take on the assignments by myself. My strength is that I’m good at preparing before meeting the customers. I have a deep knowledge and understanding of how the equipment works, and I think the customers feel that. I like working with them, and showing them all I know about our equipment. I’m happy in my job.”
MAXAM is the world leader in the production of explosives and the largest company in the market for drilling and blasting services in Poland. Its fleet is distributed across Poland and provides services to granite, dolomite, sandstone, basalt and mafic intrusions aggregate quarries, as well as limestone quarries for the production of cement and other components due to the time-consuming nature of hole sampling and the risk of blocking, its use was very limited, "says Marcin Plachta, Business Manager Surface Drilling at Epiroc Poland.

MAXAM WAS ALSO aiming to decrease the seismic vibrations attributable to blasting. "Minimizing seismic vibrations is always desirable, particularly when operating close to populated areas, so that was a distinct goal for MAXAM," says Marcin Plachta.

Later in 2016, MAXAM purchased another SmartROC with HNS. MAXAM was also reliable assessment of the costs of drilling and also get an idea of the actual wear on drilling tools. To begin with, elimination of excess drilling meant that total drilling decreased by 70 meters per 1,000 drilled meters. "These rigs drill 60,000–70,000 meters per year, so the decrease measures up to a lot of money over time. Fuel consumption dropped by 50 percent, as did seismic vibrations. The penetration rate increased by 10 percent, the hole quality improved and there was no need for horizontal drilling. The total operating cost was reduced by more than 30 percent, so the results exceeded the customer’s expectations," says Marcin Plachta.

The SmartROC T45 drill rig equipped with a COP 2560+ rock drill, HNS (Hole Navigation System), Certiq and remote control. Testing took place in a granite quarry in Rogoźnica operated by Colas Poland.

"WE TRAINED THE operators and then we tested the rig under our supervision. Our customer was very pleased that they could perform extended tests at one of the company’s sites. MAXAM had heard about HNS, but hadn’t experienced the benefits. The system made it possible to perfectly maintain the depth level of all drilled holes and to avoid uncontrolled excess drilling,” says Marcin Plachta.

After completing the entire grid, the operator can save the data and transfer it to ROC Manager software. ROC Manager is used to plan the drill grid and compare it with data received after drilling. Marcin Plachta says: "Using HNS, the customer could create the drill plan on the computer and upload it to the rig, so that the operator could follow it on a screen in the cabin. Thanks to the system, the start points and end points of the holes were a lot more accurate and it was easier for the customer to analyze data after blasting.”

\[Mining & Construction | No. 01 | 2018\]
Epícor takes a life cycle approach to innovation and focuses on resource efficiency, thereby reducing the environmental footprint across the value chain.

**Epiroc maintains an old tradition**

In safe hands

Safety and sustainability are an integrated part of Epícor's strategy to achieve its vision of becoming the customers' first choice. This accords well with Epícor's values and beliefs, and opens up new business opportunities.

Sound values are becoming increasingly important for companies and organizations. For Epícor, building the business strategy on a sound foundation is a given.

“Our focus on safety and sustainability is inherently connected to the productivity and success of our customers. We urge our customers to develop cutting-edge products in this respect — so being sustainable opens up new markets and business opportunities. Energy efficiency is just one example. By developing battery-driven machines for underground use, we truly help our mining customers. They lower their costs and improve the working environment. At the same time, greenhouse gas emissions are zero,” says Mattias Olsson, Senior Vice President, Corporate Communications.

Epícor is a good and reliable corporate citizen. Being a trustworthy company also encompasses a strong commitment to respecting human rights and taking a clear stance against corruption. “As far as sustainable performance goes, the largest footprint for Epícor is energy consumption from the use of our products. Our product development projects therefore have targets for reducing the energy consumption of the equipment and, in addition, large investments are being made in developing battery-powered equipment.”

Epícor has its history with Atlas Copco, which has been a pioneer in integrating sustainability into its business. We will continue on that path in the future, as a standalone company. We have our own Code of Conduct, we contribute to the UN Sustainable Development Goals and we are a signatory to UN Global Compact. We are committed to providing a diverse workforce and our mission is to increase the percentage of female employees in the organization.

**SAFETY AND SUSTAINABILITY: OUR FOUR KEY TOPICS**

- Improving safety and well-being
- Developing people and leaders
- Responsible and efficient use of resources
- Living by the highest ethical standards

Epícor's Code of Conduct covers the well-being of employees and a safe and healthy working environment in Epícor's operations. “Safety is important for our customers, as the Group is engaged in industries where work-related accidents are a reality. The ambition is to continuously reduce the number of accidents and have zero fatalities,” says Mattias Olsson.

A fundamental belief at Epícor is that diversity inspires innovation and gives insights that help to create a better understanding of customer needs. “We wish to attract a diverse workforce and our ambition is to increase the percentage of female employees within Epícor.”

Epícor believes in reducing its environmental footprint across the value chain by taking a life cycle approach to innovation and focusing on resource efficiency. “As far as sustainable performance goes, the largest footprint for Epícor is energy consumption from the use of our products. Our product development projects therefore have targets for reducing the energy consumption of the equipment and, in addition, large investments are being made in developing battery-powered equipment.”

**EPIROC IS A GOOD** and reliable corporate citizen. Being a trustworthy company also encompasses a strong commitment to respecting human rights and taking a clear stance against corruption. “This also applies to our business partners: suppliers, subcontractors, agents and distributors.”

Mattias Olsson concludes: “Epícor shares its history with Atlas Copco, which has been a pioneer in integrating sustainability into its business. We will continue on that path in the future, as a standalone company. We have our own Code of Conduct, we contribute to the UN Sustainable Development Goals and we are a signatory to UN Global Compact. We are committed to this area.”

SUSTAINABILITY

Giving the gift of water

The rainwater tanks used for Water for All in Ticoma were decorated by people from the community together with Epícor employees. The rainwater collection systems are set up near the villages. The villagers were invited to help assemble the tanks and water, as well as a system to maintain and distribute the water. A healthy and well-equipped community is more likely to achieve its set goals. Water for All is an initiative of Epícor and its partner World Vision, with the goal of providing water to some 100,000 people in Latin America by 2020.

**THE REGION RECEIVES** a lot of rain from April through June, but the villagers lack equipment to make use of it. Thus, big rainwater tanks are being installed in order to collect and store water, as well as a system to maintain and distribute the water. The villagers were invited to help assemble the tanks and water for All project, and held talks with different NGOs. “We decided to partner with World Vision Mexico, an organization dedicated to working with children to overcome poverty. In August 2016, thanks to contributions from employees, a Water for All project became reality in Ticoma.”

**RINKABLE WATER IS** scarce in Ticoma. Located at high altitude in the Mexican state of Veracruz, the village has around 200 families with no access to running water at home. At times, mothers and children have to walk several kilometers to get water — or get water off the ground and boil it. However, thanks to Atlas Copco’s and Epícor’s Water for All initiative, times are changing.

“We wanted to launch a local Water for All project, and held talks with different NGOs,” says Tita Alvarez, Communications Manager, Epícor Mexico. “We decided to partner with World Vision Mexico, an organization dedicated to working with children to overcome poverty. In August 2016, thanks to contributions from employees, a Water for All project became reality in Ticoma.”

**GIVING THE GIFT OF WATER** in Ticoma.

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Read more epirocgroup.com/en/sustainability

miningandconstruction.com
Tides, pollution and the constant battering of waves from motor boats are taking their toll on the slowly sinking city of Venice. An effort to save the World Heritage Site was launched in 1985. One of the projects is Mose: a series of breakwaters, underwater gates and dykes that will protect the lagoon from destructive high tides. Much of the stone needed for construction was harvested from a local quarry, Cava di Sarone. With the introduction of a new Epiroc drill rig, the quarry was able to produce a significantly higher yield in fewer man-hours — reducing drilling days from six to four per week.
**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 33 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.

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**Hello there!**

What’s happening in Milan?

Since the summer of 2017, the map of newly formed Epiroc Customer Centers has been taking shape. In particular, this goes for parts of Southern Europe and Northern Africa, including the following countries: France, Belgium, Italy, Greece, Israel, Cyprus, Malta, Morocco, Algeria, Libya, and Tunisia. All of these countries will be centrally managed from Italy, with local support in each of the countries in the region.

Edoardo Angelucci, Regional General Manager for Southern Europe and Northern Africa, explains the reasons for the change.

“Due to legal requirements we have set up Epiroc company functions and premises where these were previously supported by Atlas Copco. The aim is to have a good footprint in the territory within every operational area.”

What organizational changes are being made?

“We are providing general management here in Italy. Locally, we have the functions to support the business and customer collaboration – like sales, service and logistics – but also functions for business development and controlling. We are working on putting together a good group of people with great experience and skills. People from different cultures working together towards the same goal will create a better customer experience in every country of the region.”

What difference will this make for the customer?

“It will enable us to have greater customer focus and proximity, with a dedicated product portfolio for the mining and infrastructure industry. We will be working more closely with our customers in order to increase their productivity and their satisfaction with our products and services.”

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Find Epiroc in your country.
You're part of the team that developed Load Assist. What need were you looking to fill?

"Loading rock in underground mines can be very difficult and for safety reasons, the operator sometimes has to use a remote system. That poses certain challenges as the operator never 'feels' the machine and rarely sees more than the back of it. Thus, loading can get quite inefficient. Our goal was to develop an assist function that enables the operator to properly fill the bucket with ease."

What challenges did you face?

"Load Assist is enabled by the sensors that already exist on Epiroc loaders equipped with RCS, Rig Control System. The operator uses two joysticks; one that controls the gas, brake and steering functions, and one that controls the boom and bucket. What we did was advance the software so that the boom and bucket can be put in automatic mode, which makes for more efficient loading. The main challenge for us was to make Load Assist reliable. The solution has to function at all times, even under poor conditions and in different circumstances. We also made sure that it's easy to operate."

What's the next step for Load Assist?

"Additional field tests will be carried out in late 2018. We're keen to evaluate how the function improves customers' operations. I'd like to think that we've achieved something significant."