

MEET SANDVIK

No 1–2023

The impossible statue

See the
final result on
page 11.

We asked AI to help us
create a true masterpiece

PLUS:

Why Sandvik is investing in AI

A pioneer in a male-dominated sector

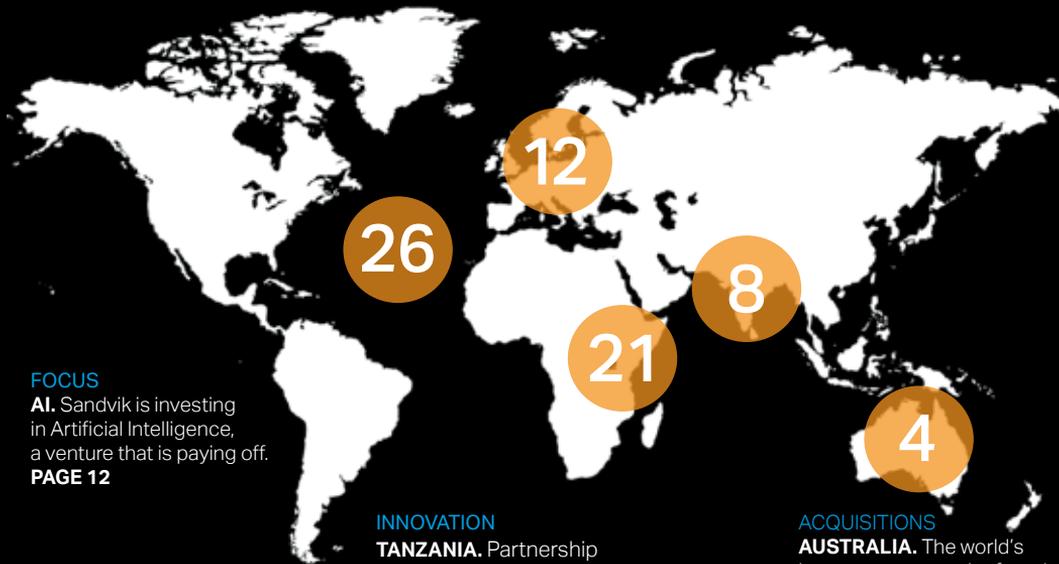
How the mining industry can reduce its energy consumption

SUSTAINABILITY

GLOBAL. Sandvik is committed to reducing the energy consumption in mining. **PAGE 26**

INTERVIEW

INDIA. Meet Sushma Nainawat, business line manager in Pune. **PAGE 8**



FOCUS

AI. Sandvik is investing in Artificial Intelligence, a venture that is paying off. **PAGE 12**

INNOVATION

TANZANIA. Partnership improves living conditions. **PAGE 21**

ACQUISITIONS

AUSTRALIA. The world's largest screen can be found here. **PAGE 4**

CONTENT No1-2023



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MEET SANDVIK: A Sandvik Group magazine

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Future business opportunities

SANDVIK MUST be leaders in managing opportunities and challenges, in both the short and long term. This means that we do everything we can to help our customers improve their operations. At the same time, we want to ensure that we are both relevant and well positioned for the future. The industry trends we are seeing in areas such as automation, electrification and sustainability, serve us well. With our solutions, we can create value and help our customers become more productive and sustainable every day, for a better future.

IN THIS ISSUE of Meet Sandvik, we describe how we are working with Artificial Intelligence (AI), and how it is playing an increasingly important role for the manufacturing industry. AI enables us to stay one step ahead and, for example, inform our customers how to use and service their equipment in the most efficient manner.

We are helping to shape the future of mining – mining that is automated and electrified, and we are world leaders in both areas. Mines are going ever deeper into the ground, and processing is becoming increasingly complex, which works in our favour.

Electrification, increased circularity and energy consumption are other key areas for the mining and infrastructure sector. The mining industry today accounts for some 4–6 percent of global energy consumption, and our crushing and screening equipment plays a valuable role here. It saves a great deal of energy by crushing



rock ever finer rather than grinding it. Read more on page 26.

ON PAGE 10 you can find out how we have used AI to create the 'impossible statue', based on the works of some of the most iconic artists throughout history. Once the AI sketch had been delivered in a cloud solution, we manufactured the statue in stainless steel using a digitalized process, all the way from AI to CAM design, through machining and verification. The statue illustrates how we are digitalizing and automating the manufacturing industry. This transition is absolutely crucial for the future of Sandvik, and our combination of hardware and software is unique.

STEFAN WIDING, PRESIDENT AND CEO

Introducing mega screens

Over the last few years, the Canadian-based copper producer First Quantum Minerals Limited has commissioned some of the largest mineral processing equipment ever built. To help increase production at its mine, the company engaged the vibrating equipment specialist Schenck Process Mining to deliver three of the largest banana scalping screens ever to be built. These 85 ton giants, designed and built at Schenck Process Mining's state of the art production facility in Western Australia, will handle 8,000 tons per hour of primary crushed ore. Sandvik acquired the mining-related operations of Schenck Process Group last year. ■

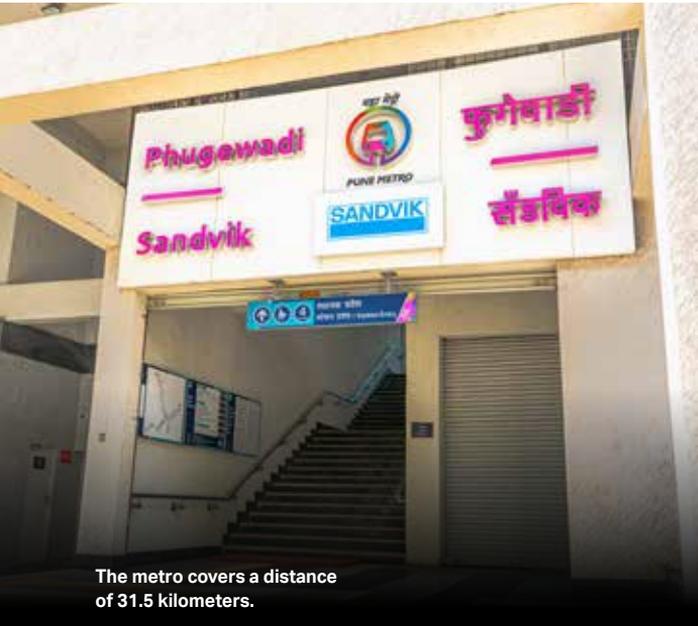




On the metro map

SANDVIK IN INDIA has acquired the branding rights of a new metro rail station situated across the road from the Sandvik Dapodi manufacturing facility. The station in Pune is now called Phugewadi Sandvik.

In the last two decades, Pune has witnessed enormous industrial growth and rapid urbanization, putting additional stress on the city's infrastructure and resulting in longer traveling times and increased air pollution. The Pune metro project covers a distance of 31.5 kilometers and will help save time and energy for Sandvik employees and others, while contributing to a reduction in carbon dioxide emissions. ■



The metro covers a distance of 31.5 kilometers.

Sandvik expands in Latin America

SANDVIK HAS SIGNED and completed the acquisition of MCB Services and Minerals ("MCB"), a seller of mining software and services and exclusive reseller partner to Deswik in Brazil. MCB, which had revenues of SEK 60 million in 2022, will be reported in Digital Mining Technologies, a division within business area Sandvik Mining and Rock Solutions. ■

New faces in Executive Management

MATTIAS NILSSON

becomes the new President of Sandvik Manufacturing Solutions. He was previously Vice President Offer Management and R&D at Sandvik Coromant. Nilsson replaces Christophe Sut who leaves Sandvik to become CEO of the Finnish machine manufacturer Scania.

BJÖRN ROODZANT

becomes the new Head of Group Communications and Sustainability. He was previously Vice President Group Communications and Brand at Sandvik. Roodzant replaces Jessica Alm who leaves Sandvik to become Communications Director at the hygiene company Essity.

SOFIA SIRVELL has joined the Sandvik Group Executive Management as the new Chief Digital Officer. She was previously the Sandvik Group Chief Information Officer. Before she came to Sandvik Sirvell worked at H&M where she had a leading role in the company's digital transition. ■



Sofia Sirvell,
Chief Digital
Officer.



Crown Princess Victoria and prince Daniel visited the Sandvik stand in Sydney.

Showcasing the future

SWEDEN'S ROYAL HIGHNESS

Crown Princess Victoria and His Royal Highness Prince Daniel were among the visitors to the Sandvik stand at the Sweden-Australia High-Level Sustainable Mining Summit held in Sydney on February 15. The summit, which attracted mining

leaders and dignitaries, provided an opportunity for Sandvik to showcase its commitment to electrification, automation, data and analytics, as well as end-to-end optimization solutions for the sustainable mine of the future.

Summit attendees had the opportunity to find out more

about Sandvik equipment and experience AutoMine® autonomous solutions. The solutions are transforming the mining sector by moving operators from the underground environment to the safer surface, while at the same time increasing productivity and reducing downtime. ■

First place ranking

IN A SURVEY CARRIED OUT by web agency Comprend, the Sandvik Group's website was ranked number 1 in Europe in the "industrial goods and services" category and number 8 in the ranking of websites for the 500 largest companies in Europe. The website also took first place among Swedish corporate websites in all categories. The annual survey is based primarily on input from analysts, investors and job seekers. ■





SUSHMA NAINAWAT:

"It's by growing people we grow our business"

Sushma Nainawat's love for people, numbers and big machines has made her a pioneer in India's male-dominated mining industry. At Sandvik, she is a valued business line manager for three business divisions.

FEMALE REPRESENTATION is increasing in the mining industry but achieving gender diversity is proving to be a slow process. Sushma Nainawat, business line manager for three business divisions, says that despite her 15 years in the Indian mining industry, her presence is still sometimes met with skepticism and, when she visits customers at mining sites, she still encounters a lack of washrooms for women.

"In many cases I am the first woman to have visited," says Nainawat. "It has been necessary for me to break down gender

barriers and set an example for others to follow."

WHEN NAINAWAT joined Sandvik as business line manager in 2021 she already had several years of experience in selling machining equipment for other international companies in India. Big machines have always been a driving force for Nainawat, who has operated all of the equipment Sandvik offers its mining customers and knows how every machine works.

"I also love numbers, traveling and



SUSHMA NAINAWAT

Role: Business Line Manager for three business divisions in India (Load & Haul, Underground Drilling and Digital Mining Technologies)

Located: Pune, India

Family: Married, four-year-old twins

Favorite hobby: Reading biographies and traveling

Secret superpower: Ability to easily connect with strangers

to connect with people. Her weakness is her tendency towards impatience. "I am working on that. I don't want to micromanage and I am keen to make sure the team knows what is expected without me hovering over every detail."

Her role as manager for three divisions means that her teams are spread across the country. Good communication skills and the ability to truly listen are vital, since meeting on a

regular basis isn't feasible.

"Managing and growing your team is not only about trusting them and giving them responsibilities," Nainawat says. "It is also about understanding the challenges they are facing and making sure they get the help they need to deliver."

TO STRENGTHEN team members to grow, she works a lot with guidance, mentoring and feedback.

"It's by growing people that we grow our business, and feedback is a very effective tool. I also work a lot with job rotation, to encourage my team members to try new roles. In addition, I encourage participation in our mentorship and training programs, to improve skillsets."

As a mother of four-year-old twins, Nainawat is also often asked how she balances work and family. "I tell people that I have an on and off button for home, as well as the office," she says. "Like most women I am good at multitasking. But the fact that I manage to handle three divisions is thanks to my business teams, my manager and leadership team. I support them and they support me. It's a combined effort." ■

cross-cultural meetings where I can connect with people," Sushma says. "I have a great job that combines it all."

LEADING BY EXAMPLE has been an essential part of her leadership style. "For me, a good leader is a person who can motivate, inspire and set clear goals for the team."

"As a leader, the more aware you are of your own abilities, the more successful you will be at leading others and helping them to utilize theirs."

Her strength, Nainawat says, is her ability

Creating the impossible statue

A unique fusion of artistry spanning 500 years from some of the world's most iconic sculptors was made possible through AI and advanced digital manufacturing solutions from Sandvik.

The Impossible Statue is designed to reflect five historic sculptors. It also showcases what can be achieved when AI and cutting-edge Sandvik software and hardware tools are combined. The result is part of a branding campaign launched in May.

"By using all our capabilities we could significantly improve manufacturing efficiency, reduce waste and ensure the highest quality in each step of the process," says Nadine Crauwels, President Sandvik Machining Solutions.

A combination of different AI programs resulted in a 3D mesh model.

"The mesh consisted of nine million polygons with no density. We had to convert this into a solid model that our CAM programs could work with," says Henrik

Loikkanen, Machining Process Developer at Sandvik Coromant who together with Jakob Pettersson, CAM & Machining Specialist, led the team of Sandvik machining experts that carried out the work.

After the conversion was achieved, the team started programming the CNC machines using the leading MasterCam® software from Sandvik.

"Originally we planned to make it in one piece," says Pettersson. "But we realized that the size made it impossible. We had to adapt the parts to fit our CNC machines, so we sectioned the model into 17 components. Each of these had to be designed and programmed, along with the interfaces between them."

VERICUT®, THE SANDVIK proprietary machining simulation and optimization software ensured safe, reliable and efficient tooling and machining processes. Not a single part of the statue had to be scrapped and remade throughout the process as they had been digitally perfected before the start of machining. The actual machining was made using a wide range of Sandvik Coromant tools for turning, milling and drilling.

"The complexity meant that verification was a necessity," says Loikkanen. "There is a lot of trial and error and that is done digitally, prior to machining. Simulation ensured that we could reach the features we wanted when manufacturing the statue."

Some tools and software used in the making

Mastercam®.

The most widely used Computer Aided Manufacturing (CAM) software.

Vericut®. Machining simulation and optimization software.

CoroPlus®

Tool Library. Creates, stores and manages 3D tool assemblies.

Coromant Capto® tooling interface.

Used to connect the arm and head to the torso of the statue.

Solid round tools from the CoroMill® Plura and Dura families.

Finishing of all surfaces and features.

High feed milling cutter CoroMill MH20.

Used to machine the bulk of the stainless steel removed.

Metrolog X4

inspection software was used to compare the finalized statue to the 3D-model.

The sculptors who inspired the statue:

- The dynamic, off-balance poses of MICHELANGELO (Italy, 1475–1564)
- The musculature and reflectiveness of AUGUSTE RODIN (France, 1840–1917)
- The expressionist feeling of Germany’s KÄTHE KOLLWITZ (1867–1945)
- The focus on momentum and mass exhibited by KOTARO TAKAMURA (Japan, 1883–1956)
- The defiance in the figures of AUGUSTA SAVAGE (USA, 1892–1962)



The statue weighs 500 kilos and stands at 150 cm.

The statue is on display at Tekniska Museet (Sweden’s National Museum of Science and Technology)

With the digital simulations, the total time for testing and verifying the process was cut to a sixth of what would have been required in a manual operation. Additionally, twice as much stainless steel would have been required without the digital simulation tool, if traditional proofing methods had been applied.

Thanks to the digital tools for virtual optimization of tool usage and tool paths there was also a very steep development curve throughout the process. Only three simulations were needed to make the last piece compared to 100 simulations for the first one.

THE FINISHED STATUE is made of stainless steel, weighs 500 kilos and stands at 150 cm. It deviates from the digital design by less than 30 microns (0.03 mm), a remarkable result considering its size and the complexity of the 3D model. This is the same level of precision demanded in, for example, the manufacturing of Swiss watches, and it was achieved through virtually simulating the optimal way to manufacture the statue, utilizing digital twin technology and technology for optimizing tool paths. And by using Sandvik Coromant tools to make the statue so precisely, very little material was wasted. ■

Find out more on [home.sandvik/statue](#)



THE FUTURE IS NOW

One thing is certain – AI will have a major impact on manufacturing around the world. **How can Sandvik lead the journey into the future?**



How AI is transforming factories

Artificial intelligence is already having a major impact on manufacturing operations around the world. From quality control to forecasting and product design, manufacturers are using AI systems to change the way their factories work.

THESE DAYS, when a new vehicle rolls off the line at any major European car manufacturer, chances are that an AI system was involved in the production process.

Machine learning is quickly revolutionizing the way products are made across industries as manufacturers utilize the benefits of AI to perform tasks faster and more accurately than any human could.

This is only the beginning, however. Most experts are already talking about Industry 4.0, considered a fourth industrial revolution in which machine learning algorithms create autonomous systems that make the smart factory a reality.

“AI will doubtlessly speed up the automation process in manufacturing,” says Robert Luciani, Executive Advisor at the AI Framework in Stockholm.

A standard computer algorithm contains a specific set of programming instructions that tells the system what to do, and in what order. An AI algorithm, however, is designed to learn the best way to perform a task without using specific instructions. Instead, it uses input data and feedback to develop a model, often through millions of repetitions of trial and error.

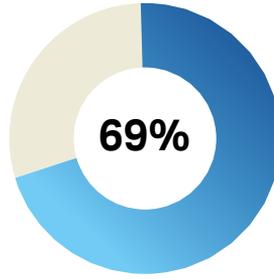
TODAY THE MOST COMMON applications of AI in manufacturing are for quality control and predictive maintenance; many companies also use it in production, product development and supply chain management.

AI systems can monitor input from a multitude of machines and systems for early signals that something may be about to break down. They can then take action, preventing factory shutdowns.

"AI can study values from dozens of components and see well ahead of time if there's a problem brewing and whether preventive measures are needed," says Luciani. AI is especially good at quality control as it can use automated visual inspections to detect minute flaws that the human eye may not spot.

AI is also increasingly being used in the design process, especially when it comes to additive manufacturing (3D printing). In what is called "generative" design, the AI algorithm is told the design goals and parameters to follow, such as materials and cost constraints, and the algorithm then tries out thousands of different design options to find the best one.

GENERAL MOTORS used such an AI tool to design a 3D-printed seat bracket that consolidated eight different parts into one part that was 40 percent lighter and 20 percent stronger than the previous one. Other popular uses of AI include forecasting demand for certain products, which can help optimize production schedules, inventories and raw material procurement.



German manufacturers implementing AI

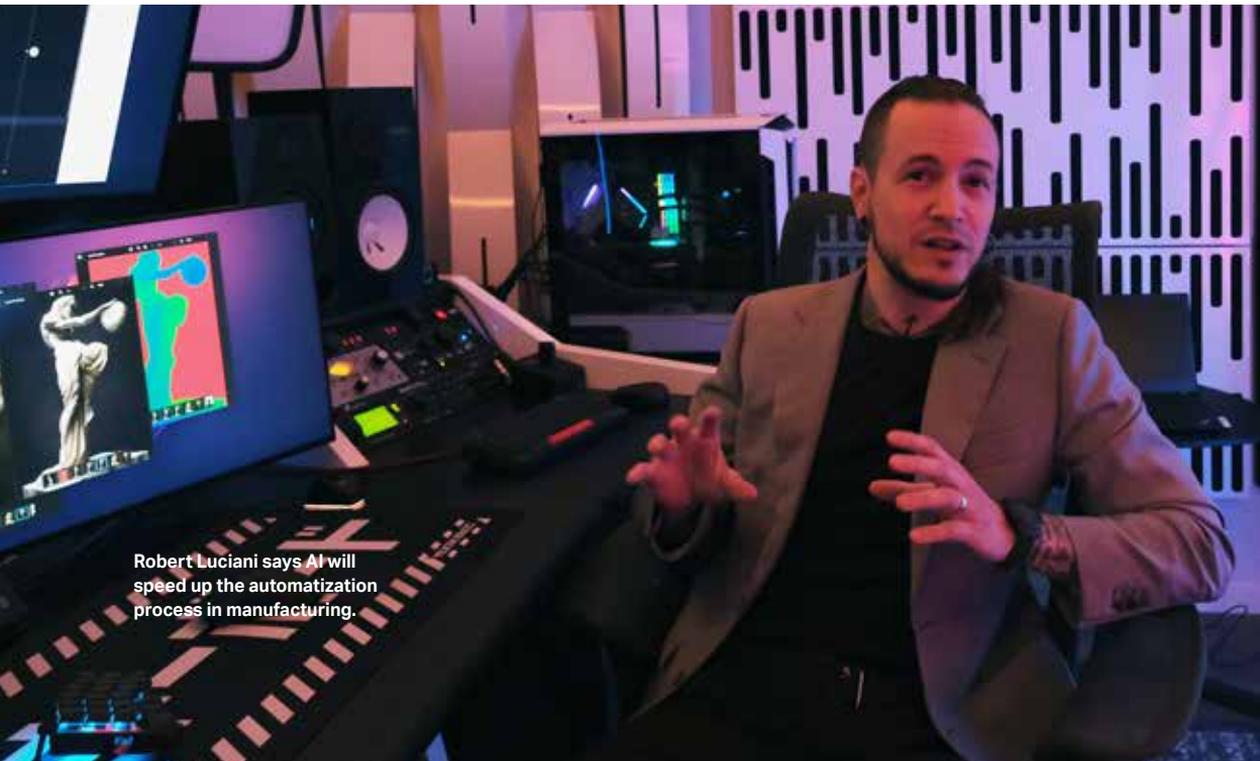
SOURCE: CAPGEMINI

There is still a level of skepticism surrounding "intelligent" machines, which means that mistake made by an AI system is often seen as more serious.

AI systems can also be very expensive to develop and are only as good as the data that is fed into the algorithm.

So far, most uses of AI in manufacturing are taking place "under the hood" in a way that consumers don't experience. But Luciani thinks that may change in the future.

"One area where I think AI will be used is in made-to-order products such as tailor-made clothes, where AI can help measure the right fit for suits and shoes," says Luciani. "It can really be used for anything." ■



Robert Luciani says AI will speed up the automatization process in manufacturing.

Why invest

Sandvik is investing in AI, which is becoming an increasingly important element in the company's solutions. A new AI Center for Enablement will further ensure that the Group is ready for the future.

SANDVIK HAS BEEN researching and developing AI capabilities for many years, but the appointment last year of Rahul Kedia as Head of the Sandvik Artificial

Intelligence and Automation Center for Enablement (CFE) says something about the increasing focus that Sandvik now has on the advanced technology.

"Sandvik has been acquiring a lot of industry-specific software companies that are pioneers in AI," Kedia says. "Organically, we are investing in the development and implementation of AI-based systems. We are hiring data engineers, data scientists and other professionals who are working

on various AI-based developments. And through the establishment of the AI and Automation Center for Enablement last year, we will enable and expedite the usage and adoption of AI and automation across Sandvik business areas and divisions."

THE CFE WORKS in close collaboration with the various business areas and divisions, and the focus is on enabling and supporting them to develop services and products that, through AI and automation, will improve efficiency and productivity for customers. "The CFE plays a crucial role by bringing expertise, skills, competence and knowledge sharing from other similar initiatives within Sandvik," says Kedia.

One of the first significant AI-enabled



in AI?

services that Sandvik established, the Remote Monitoring Service from Sandvik Mining and Rock Solutions, is already providing value to customers and increasing revenue streams. Used for predictive maintenance, the service utilizes advanced analytic AI models to identify problems in mine equipment before they occur, thereby enabling mine operators to prevent failures.

“We use AI to identify when the machine is about to fail,” says Esa Mattila, Global Productivity and Reliability Centre Manager, Sandvik Mining and Rock Solutions, who is the driving force behind the Remote Monitoring Service. “And then we tell the customer to perform certain inspections to fix it before it fails. Perhaps we should say prescriptive maintenance. Because as well as predicting what is going to fail, we describe what to do.”

Mattila adds that the groundwork for this service has been laid over many years through connecting machines and sending data to the cloud. “But,” he emphasizes,

Remote Monitoring Service

- The foundation for the AI enabled Remote Monitoring Service is the large fleet of connected Sandvik mining equipment at customer’s mines.
- The work of connecting the mining equipment

to the cloud began in 2016.

- AI enabled advanced analytical development began in 2018.
- The service was made available to paying customers in 2020.
- Over 700 machines in over 50 mines are currently being monitored by the service.

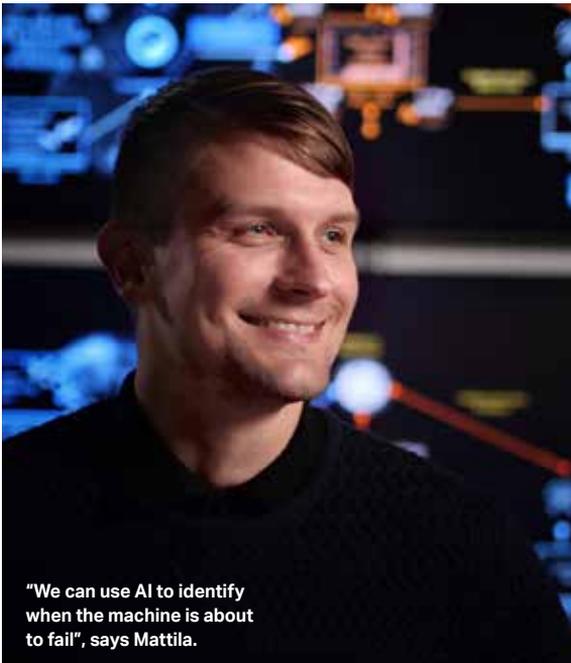
“the ability to understand the data through AI models on such a big scale, and accurately give the customer quick visibility about what will happen and what needs to be done, is revolutionary.”

BY ANALYZING the improvements that the service made for one customer, Mattila determined that the utilization of machines increased by 15 percent and the costs of using the equipment decreased by 20 percent. “That is a massive improvement,” he says. “And that is because they had visibility of what is happening and visibility to understand what to do next. This resulted in the machines breaking down less often.”

Customer uptake of the Remote Monitoring Service increased last year. “And we see that it is ramping up further,” says Mattila. “Customers understand the value of how we can improve their operations through data.”

As well as predicting equipment failures, Kedia points out that AI can be used in many other ways. “To optimize production processes, improve energy efficiency and improve supply chain management. It can also help customers identify new opportunities for growth and innovation.”

And of course, AI can be used to increasingly automate operations. “The more we



“We can use AI to identify when the machine is about to fail”, says Mattila.

store data, the more AI can be used to automate things," says Mattila.

The CFE has in fact evolved out of work to develop Robotics Process Automation; automating simple tasks that were repetitive in nature and had a pre-defined algorithm. "We subsequently added new technologies like intelligent document processing and conversational AI," says Kedia. Currently, the CFE is focused on, among other things, moving from more conventional automation to intelligent process automation and end-to-end business process automation.

"This is being enabled through design thinking and rapid process scan workshops with businesses to understand their top challenges," Kedia explains. "We are currently supporting a plant in the US to evaluate more than 500 processes to understand whether it is possible to automate the entire process."

MATTILA POINTS OUT that AI-enabled services make the working environment safer because there is better understand-



Rahul Kedia is Head of the Artificial Intelligence and Automation Center.

ing of what is happening. "It reduces the probability of catastrophic hazards," he says. "And with AI we can automate the processes so that we can identify in real time what is happening next and make sure that the resources and tools are available for people to perform their duties more efficiently."

The CFE is also working on tasks that include establishing an agile framework and Sandvik common processes and procedures when it comes to AI and automation.

These include a strategic playbook, enterprise and technical risk management and a mechanism to calculate the return on investment once automation is done.

"Being at the forefront of AI is already helping some of our customers improve their productivity," says Kedia. "And it will help Sandvik make a variety of advancements for its customers. ■"

Image and speech recognition

- Sandvik is looking at use cases for AI-enabled tools such as image and speech recognition.
- Image recognition could help automated

- mining equipment recognize boulders in tunnels or help machine-cutting tools make exact copies of components.
- Speech recognition could make background systems more interactive with human operators.

The school has a room with computers and internet access.



Partnership improves living conditions

Water supply, sanitation and education are focus areas driven by Engineers Without Borders Sweden. As the main partner Sandvik contributes to the development of rural areas in Tanzania.

ENGINEERS Without Borders Sweden (EWB-SWE) involved in 20 international programs in low-income countries. One of the largest is the collaboration with the Mavuno project, a local non-governmental organization in Tanzania.

“Mavuno is working to improve living conditions in Karagwe and Kyerwa in Tanzania. The organization is highly trusted among inhabitants as well as governmental institutions, and they can ensure that the infrastructural advancements we facilitate result in improved education, health,

gender equality and poverty reduction,” says Marlene Rosendal, Head of international projects at EWB-SWE.

EWB-SWE has, for example, developed a solution to pump water to supply villages in the area with fresh water, serving about 5,000 people a day. Rainwater is collected in a large tank and a technical solution to filter and purify the water now supplies schools in the area with fresh water.

“Now people don’t need to walk long distances to get water,” says Charles Bahati, director of the Mavuno project. “It also reduces the risk of contaminated water and disease.”

THE PROJECT HAS helped the children and also the teachers according to Janester Lwisa, head teacher at the Rukole primary school. “Before they used to walk long distances to fetch water instead of preparing for lectures. Now they are performing well in their teaching.”

Education is essential to development in rural areas. At Mavuno Modal Girl’s Secondary school the focus is on sustainability and giving the girls better conditions

“Now people don’t need to walk long distances to get water.”



INNOVATION

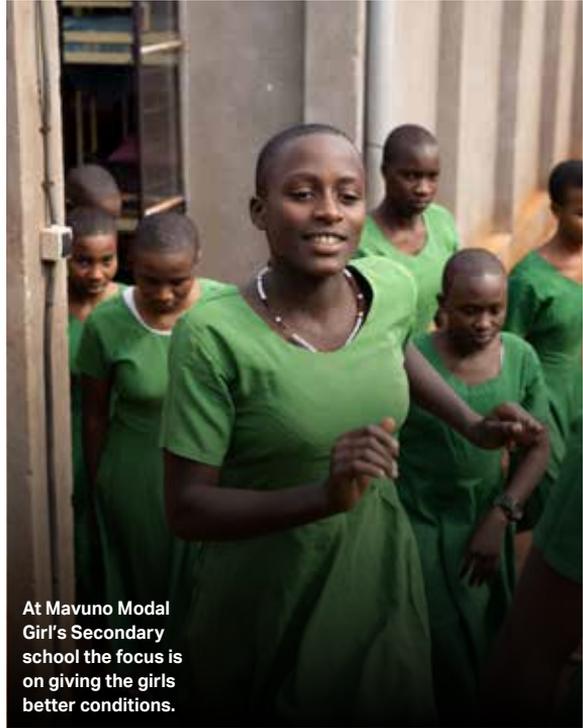
at school. Composting toilets have been built to reduce the need for water and to be able to produce biogas and fertilizer for agricultural use.

“The separate toilets also lead to better safety and privacy. Sometimes the girls don’t go to school when they have their period,” says Charles Bahati.

The School also suffer from a lack of computers. With the ‘Computers for school’ program, the school now has a room with computers and internet access.

The Mavuno project is also working with sustainable solutions, such as implementing biogas or installing solar panels.

“Despite great achievements, the needs for basic services are not yet being met in Karagwe and Kyerwa. We can clearly see how our technical expertise and engineering projects continue to improve living conditions, and we are currently outlining our common strategy with Mavuno to scale up our efforts,” says Marlene Rosendal. ■



At Mavuno Modal Girl’s Secondary school the focus is on giving the girls better conditions.



Education is essential to development in rural areas.

ABOUT: ENGINEERS WITHOUT BORDERS SWEDEN

- The organization is volunteer-based and dedicated to making a long-term impact by addressing challenges linked to the United Nations Sustainable Development Goals.
- They strive to engage, inspire and unite people to build sustainable communities through humanitarian engineering. Since 2017 Sandvik has been the main partner of EWB-SWE.



Susanne Norgren became the first woman to earn the prestigious Professor Gunnar Wallquist's Mining and Materials Medal.

Q+A: Susanne Norgren...

... is the brain and force behind several of the sharpest tools produced by Sandvik. Most recently she received the prestigious Gunnar Wallquist Mining and Materials medal – an award only handed out every ten years.

What is the best thing about your job?

"The opportunity to work with really difficult technical problems and solve them together with my clever colleagues. It's such a privilege to continuously get to explore new and innovative issues in all our business areas, from machining and rock drilling to 3D printing and everything in between."

What is your main focus at present?

"My main focus is the trend towards sustainability, electrification, and the green transition, as this puts enormous demands on recycling, processes, applications and new materials."

How do you build creative teams?

"I think it's important to make sure that you have a safe environment where thoughts and people are allowed to flourish. Keep an open mind. Stay focused. Have fun."

FUN FACT:

Susanne has published 75 research articles and obtained more than 400 patents.

Scan to read the full article



The power of

Digitalization is transforming the manufacturing industry. Sandvik harnesses collective intelligence to empower smart factories of the future. "Sandvik is revolutionizing manufacturing with digital solutions that enhance productivity and creativity," says Magnus Malmström.

IN A NEW COLLABORATION program entitled Collective Intelligence, 14 Sandvik brands from across the globe teamed up to leverage the power of connectivity between the various stages of the digital production chain, and to develop a common technology roadmap for the future. "We want to harness the tremendous amount of knowledge in the product teams and encourage communication between them, exchange experiences and innovate together," says Magnus Malmström, Chief Technology Officer at business area segment Sandvik Manufacturing Solutions.

Participating Sandvik companies are highly specialized in different areas, from

CAD/CAM to metrology. As part of Sandvik Group, their skills may be applied in a much bigger context. "By aligning on customer needs and key use cases, we overcome obstacles and become even more relevant."

"Our customers must be able to trust that our products work smoothly and seamlessly together, to create the best user experience."

Malmström testifies to the benefits of introducing digital, automated production. "Many European customers report that they are increasingly able to compete with low-cost suppliers in China and India."

The agnostic approach means products and solutions work together across the



collaboration

manufacturing chain irrespective of vendor. "The open ecosystem secures interoperability and connectivity with products from all leading manufacturers."

Digital solutions and connectivity are key enablers of digital manufacturing. Many smaller manufacturing companies, however, lack a dedicated IT team, which makes user friendliness and ease of use when installing new software a top priority. "Our customers demand software that is easy to understand and apply, and creates added business value from day one without time consuming and costly configuration."

The path towards smart manufacturing is not a revolution, but an evolution in incremental steps. Sandvik customers are found in different sectors, from automotive and aerospace to energy and consumer goods. The goal of Sandvik and the Collective Intelligence program is to

address different customer segments with varying requirements.

EVERY GREAT JOURNEY begins with smaller steps. The smart factory envisioned by the Industry 4.0 concept may not be realized overnight, at least not for smaller workshops. But, as Malmström concludes, the collective intelligence of Sandvik and early adopter customers is a great way to start: "We want to offer a smorgasbord where smart manufacturing is the common theme. The ultimate goal is seamless integration of all production steps". ■

The 14 brands taking part in the Collective intelligence program:

Mastercam, Cambrio, SigmaNEST, Cimatron, GibbsCAM, CRIBWISE, Comara, TDM Systems, Metrologic Group, Sandvik Coromant, Walter, SECO Tools, CGTech, ICAM.



Saving energy with sustainable solutions

About 4–6 percent of the world’s total energy is consumed by the mining sector. Sandvik is committed to bring a more sustainable and eco-efficient way to reduce the energy consumption in mining.

ROCK PROCESSING in the mining and infrastructure industry are cornerstones in the development of our society. It’s essential for the construction of roads and buildings, and to get access to metal and minerals, including the rare earth metals necessary for the green transition.

Hence the industry accounts for a large portion of the global economy. The amount of energy consumed by comminution – the size reduction of rock material – is considerable though, and there is a huge potential to save energy by rethinking the process, Jonas Olsson, Director Strategy and Business Development at Sandvik Rock Processing Solutions says.

“40 percent of the energy used in the global mining industry is consumed in conventional grinding operations with an efficiency below 5 percent,” Olsson says.

“We have made it our mission to help our

customers find the best sustainable solution in terms of financial savings, energy efficiency and climate gains throughout the lifecycle of the plant.”

There are great improvements to be made in the disintegration of ore, by extending the application window for crushing and reducing the volume of grinding. This would enable huge energy savings in the ongoing refinement process of all essential metals such as copper, iron, lithium, gold, aluminium and others.

“Our cone crushers have an energy efficiency of around 50 percent, compared to conventional mills where energy efficiency is less than 5 percent. This means that for every ton crushed rather than ground, there’s a relative energy saving of 90 percent, which benefits our environment and ensures greater sustainability,” says Jonas Olsson.

Crushing is better than grinding

5%

is the energy efficiency at conventional grinding of rock material.

50%

is the energy efficiency of Sandvik stationary crushers.





40 percent of the energy used in the global mining industry is consumed in conventional grinding operations.

THE BIG CHALLENGE is to make the industry aware of how much there actually is to gain from making the shift towards energy-efficient rock processing solutions, where Sandvik specializes in the crushing and screening part of the process. High energy prices have led to increased interest in inviting Sandvik to review operations.

"There is generally always an improvement potential of 10 to 15 percent that can be reached through configuration and customization of the equipment already in use. We look at the entire process to identify the true bottlenecks, as well as areas with the best improvement potential," says Anders Lindström, Performance Optimization Manager at Sandvik Rock Processing Solutions.

As it has become increasingly important for mining and aggregate producing companies to show permit authorities and stakeholders that they are using the best

and most sustainable methods, solutions from Sandvik is increasing in value.

"It's no longer enough to only be price competitive and we do have a unique know-how based on decades of processing experience," says Lindström.

TO ENSURE SUSTAINABLE efficiency gains, Sandvik focuses on knowledge transfer of best practices of operating rock processing plants and equipment. The customized performance optimization starts with characterizing the customer material in a test lab.

That provides reliable and powerful information, which in combination with software tools, such as PlantDesigner, are used to maximize the value of using Sandvik rock processing equipment.

"Thanks to our decentralization strategy we can provide certified expertise knowledge regardless of where our customers are located," says Anders Lindström. ■

Mine software acquisition

SANDVIK HAS ACQUIRED Polymathian Industrial Mathematics, a provider of advanced mine optimization software and services. The Australia-based company has several of the world's largest mining companies as customers.

"We now have a unique digital portfolio that will help our customers to optimize their data-driven operations across the value chain and ensure their mine design is fully compatible with technologies like AutoMine® and BEVs," says Mats Eriksson, President of Sandvik Mining and Rock Solutions. ■



New load and haul factory in Malaysia

SANDVIK HAS DECIDED to invest in a new production unit in Malaysia for manufacturing underground loaders and trucks. Equipment production is planned to begin in the fourth quarter of 2023 following factory upgrades and other site improvements. The investment is expected to total SEK 350 million over the coming three years.

The establishment of the new factory will help Sandvik Mining and Rock Solutions to cater to the growing demand for battery-electric vehicles (BEVs) in the mining industry. ■

And the winners are ...

At the Annual General Meeting 2023, the team behind the PowerCarbide® drill bit family was awarded the "Wilhelm Haglund Medal for the Product Developer of the year". The team included Ioannis Arvanitidis, Malin Mårtensson, Krystof Turba, Susanne Norgren and Erik Östhols. The "Sustainability Award in Memory of Sigrid Göransson" went to the team behind "Charging while drilling" technology for battery electric underground drilling equipment. The team included Juha Piipponen, Jukka Osara, and Jarno Kuittinen. ■



Orders for BEV:s and more

- Sandvik has received an order of 35 mining machines from the Canadian mining company Torex Gold Resources. The order, including 15 battery-electric vehicles (BEVs) and 20 machines with combustion engines is valued at **SEK 650 million**.
- Sandvik has also received an order worth **SEK 370 million** that includes a fleet of 19 BEVs for use at Rana Gruber's iron ore mining operations in Storforshei, Norway.
- A fleet of load and haul equipment, valued at SEK 210 million, was ordered by Chinese global mining services provider JCHX Mining Management to be used in copper and cobalt mines in the Democratic Republic of the Congo. An order from Canadian gold mining company New Gold is valued at **SEK 135 million**. It includes BEVs to be used at the New Afton mine.
- Sandvik has received an order from Codelco, the world's largest copper producer, to supply one AutoMine® Fleet automation system and six autonomous loaders for use in the Recursos Norte operations at the El Teniente mine in Chile. The order is valued at approximately **SEK 180 million**.

A good start to the year

Cecilia Felton,
Chief Financial
Officer.



What are your takeaways from the first quarter performance?

"We had another strong quarter with favorable overall demand, solid underlying profitability and strong progress on our strategy. Demand in the mining business remained at a high level, driven by the aftermarket.

We won two of our largest orders ever for battery-electric vehicles (BEVs), and the Digital Mining Technologies division reported exceptionally strong growth. This bodes very well for the future and is a clear sign of our strong market positions.

There was also a strong execution by Sandvik Manufacturing and Machining Solutions, which reported improved margins. Demand developed well, primarily driven by Europe, and with particularly good growth within the Aerospace and Energy segments.

Organic order intake declined for Sandvik Rock Processing Solutions due to softer infrastructure demand and challenging comparables, but it was good to note a continued high aftermarket activity."

What is your view on acquisitions going forward?

"The execution of our acquisition plans has been very successful in recent years, with a faster realization than we anticipated.

This means we have already added many of the important pieces identified for our strategy execution. We will continue with our acquisition activity, but at a slower pace compared to in the last couple of years.

The reason for the lower pace is to enable us to focus on integration and value realization of the companies we have acquired, as well as to be in line with our financial balance sheet target. We have used most of the headroom we had in our balance sheet for acquisitions.

Going forward, the cashflow we generate will be the financing source for acquisitions as opposed to taking on additional debt. While we are now in a period with a different pace of acquisitions after completing these strategic acquisitions in recent years, we remain active and continuously work to identify potential acquisitions. This is part of how we drive and develop our company, ensuring we have the right offering, competence and market coverage to serve our customers in the best possible way."

What are important focus areas when you look ahead in 2023?

"We leave the first quarter in a strong position, and we are optimistic about our prospects when we look ahead. Still, the outlook for the global economy remains uncertain, given continued high inflation, high interest rates, geopolitical tensions and leading indicators continuing to point towards a slowdown in economic activity.

We have lived in an uncertain global environment for several years now and know how essential it is to maintain strong contingency plans to be able to act quickly if needed. Overall, I think the focus areas ahead are very much the same that they have been – agility, cost control and a relentless customer focus. ■

Sandvik at a glance

Sandvik is a high-tech global engineering group offering products and services that enhance customer productivity, profitability and safety. In 2022, the Group had approximately 40,000 employees and sales of SEK 112 billion in about 150 countries.

BUSINESS AREAS



SANDVIK MINING AND ROCK SOLUTIONS

A global leading supplier of equipment, tools, parts, service, digital solutions and sustainability-driving technologies for processing rock and minerals in the mining and construction industries.

SHARE OF REVENUE 51%
SHARE OF ADJUSTED EBIT 50%



SANDVIK ROCK PROCESSING SOLUTIONS

A leading supplier of equipment, tools, parts, service, digital solutions and sustainability-driving technologies for processing rock and minerals in the mining and construction industries.

SHARE OF REVENUE 8%
SHARE OF ADJUSTED EBIT 7%



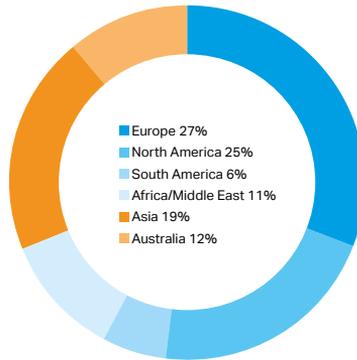
SANDVIK MANUFACTURING AND MACHINING SOLUTIONS

A market-leading manufacturer of tools and tooling systems for advanced metal cutting, expanding into digital manufacturing and software solutions, as well as technologies such as additive manufacturing and in-line metrology.

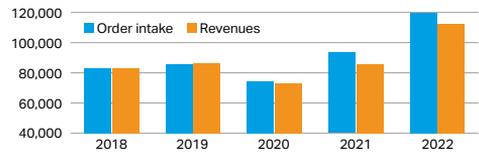
SHARE OF REVENUE 41%
SHARE OF ADJUSTED EBIT 43%

THE GROUP

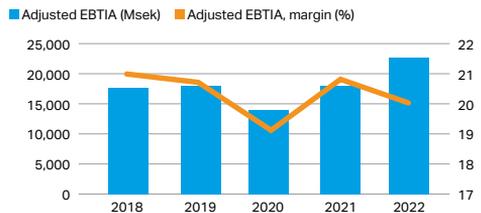
REVENUES BY MARKET AREA 2022



ORDER INTAKE AND REVENUES, MSEK



EBITA, MSEK AND EBITA MARGIN, %



INDICES AND MEMBERSHIPS



MAIN CUSTOMER SEGMENTS



MINING. We deliver drill rigs, rock-drilling tools and systems, load and haul machines, tunneling equipment, continuous mining and mechanical cutting equipment, crushing and screening, service and sustainability-driving technologies to increase digitalization, automation, safety and customer productivity.
SHARE OF REVENUE 48%



ENGINEERING. Our tools and tooling systems for metal cutting and manufacturing software are used in engineering industries worldwide, improving productivity, profitability, quality and safety as well as reducing environmental impact. We are also a global leader in high-alloy metal powder.
SHARE OF REVENUE 22%



INFRASTRUCTURE. We offer solutions that increase safety and customer productivity in breaking, drilling, cutting, crushing and screening. Application areas include tunneling, quarrying, demolition and recycling.
SHARE OF REVENUE 11%



AUTOMOTIVE. Our software solutions, tools and tooling systems for turning, milling and drilling in metals, as well as our industrial metrology offering, increase productivity when manufacturing, for example, engines and transmissions. Metal powders are used in Metal Injection Moulding.
SHARE OF REVENUE 7%



AEROSPACE. We work closely with the world's aerospace companies. As they apply new materials to manufacture airplanes that are lighter, safer and more fuel efficient, advanced tooling solutions and end-to-end optimization are critical.
SHARE OF REVENUE 3%



ENERGY. We supply tools and tooling systems for the energy industry, including clean and renewable energy.
SHARE OF REVENUE 2%

OTHER. 'Other' includes mainly die and mould, electronics, medical, pump and valve, rail and defence.
SHARE OF REVENUE 7%

THE OBJECT
3D-printed
brooch for
Nobel Peace Prize
Laureate



THE 2022 PEACE PRIZE was awarded to human rights advocate Ales Bialiatski from Belarus, the Russian human rights organization Memorial, and the Ukrainian human rights organization Center for Civil Liberties (CCL). The latter is headed up by Oleksandra Matviichuk who represented the organization at the award ceremony in Oslo during which she wore the Freedom brooch – gifted to her by Humanium Metal and 3D printed by Sandvik.

"We are humbled and proud to have 3D printed the Freedom brooch," says Mikael Schuisky at Sandvik Additive Manufacturing. "When we were approached by Humanium Metal to cooperate on creating the brooch, it was a project that the entire team took on with great enthusiasm."