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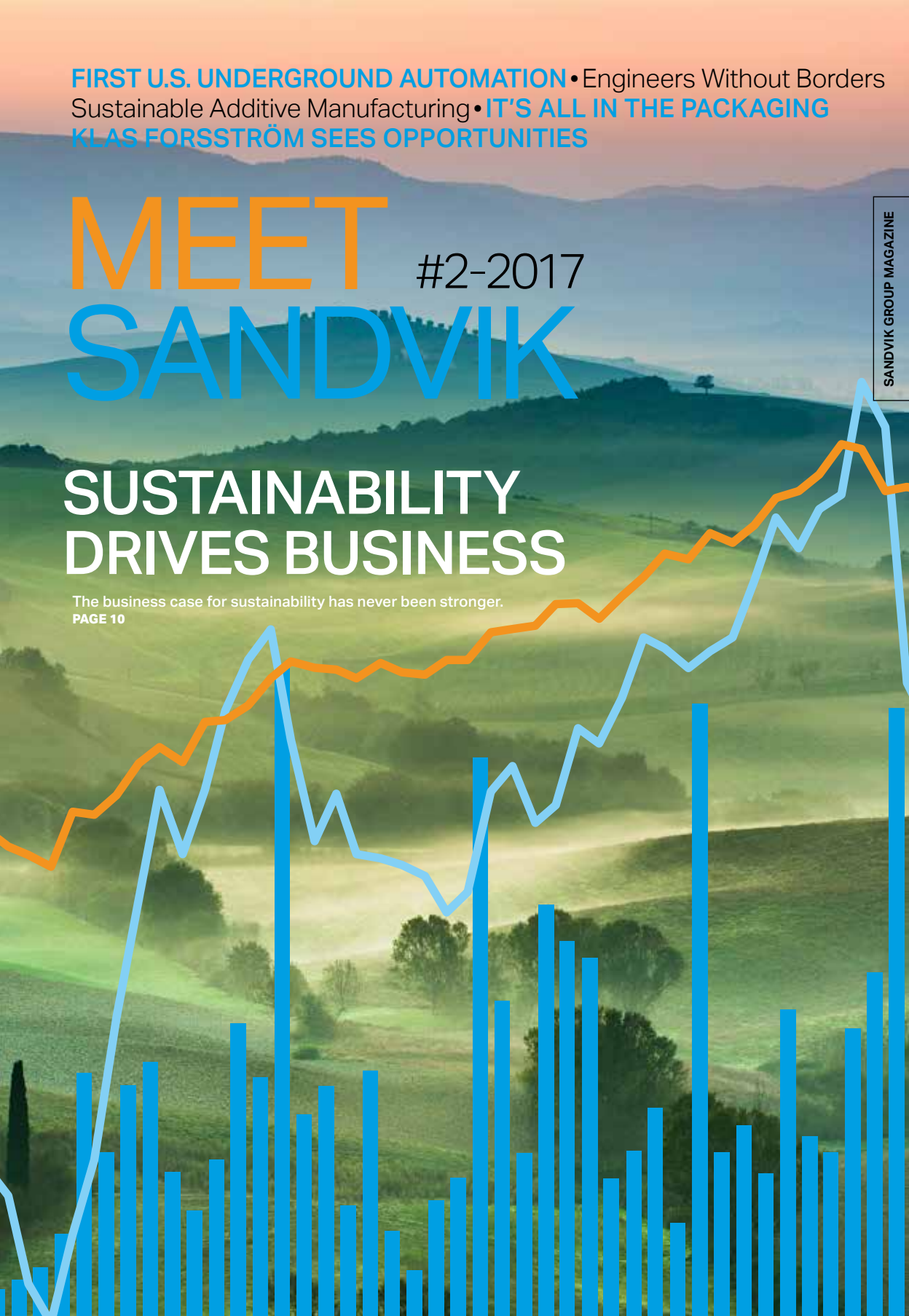
Sustainable Additive Manufacturing • IT'S ALL IN THE PACKAGING
KLAS FORSSTRÖM SEES OPPORTUNITIES

MEET SANDVIK

#2-2017

SANDVIK GROUP MAGAZINE



SUSTAINABILITY DRIVES BUSINESS

The business case for sustainability has never been stronger.
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KLAS FORSSTRÖM takes over as President of business area Sandvik Machining Solutions.
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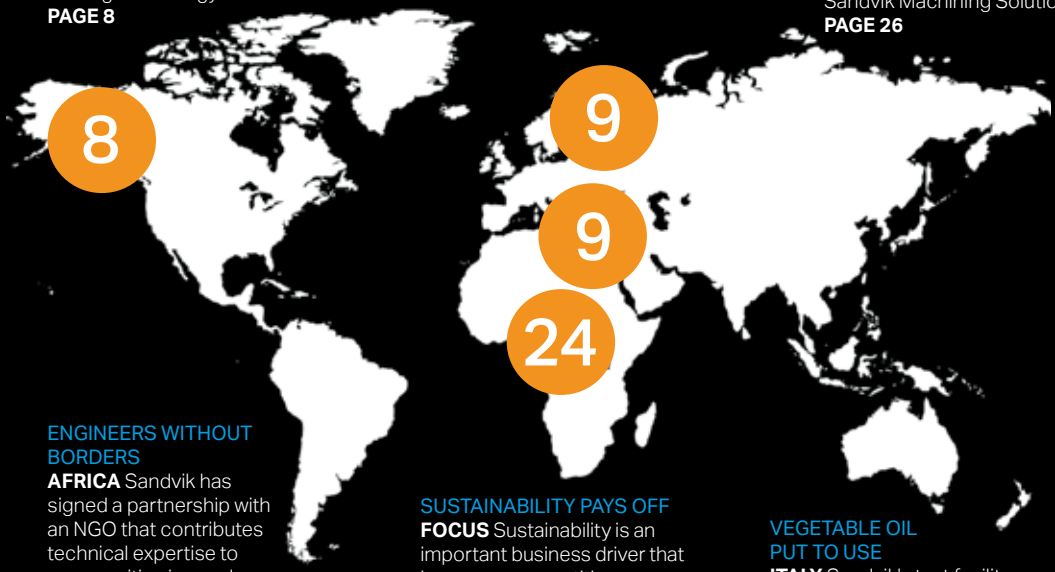

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SANDVIK

MEET SANDVIK: The Sandvik Group magazine
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DEAR READER,

WHEN WE TALK ABOUT sustainability at Sandvik, it's from a business perspective, creating value for both our customers and our organization. We view sustainability from two points of view – how our products and solutions affect their surroundings and how we manage our own business. Each new product that we launch is designed to be more efficient than its predecessor and have less of an impact on the environment, supporting our customers' efficiency, productivity and sustainability. It's clear to see that innovation and sustainability are closely linked, with the demand for sustainable products driving innovation and vice versa.

SAFETY IN THE WORKPLACE is particularly important to Sandvik and we can never be satisfied until we have zero accidents. Our products and solutions are also designed to contribute to improving customer safety. Our mine automation system AutoMine® is an example of how automation can help to reduce the risk of accidents in hazardous activities.

WORKING FOR A COMPANY with ethical values is of importance to an increasing number of people, particularly our youth, and the ability to recruit the most talented people requires us to be at the forefront of sustainability efforts. This also includes creating value for society, and I'm pleased to announce the partnership we have entered into with the organization Engineers Without Borders. This organization is doing fantastic voluntary work, mainly in Africa, and Sandvik will be contributing knowledge and resources to a number of its projects. Find out more about this exciting cooperation initiative on page 24.

Björn Rosengren, President and CEO

RACING WITH THE SUN

Bridgestone World Solar Challenge is a competition for student-built electric vehicles fueled solely by solar power in a race across the Australian outback, 3,000 km from Darwin to Adelaide. This vehicle was designed by engineering students from Mälardalen University in Sweden. Sandvik is one of the sponsors of the project featuring its Kanthal® and Osprey™ products which are used in the manufacturing process of parts. Some 70 students have contributed to the project since 2014 and students who travel to Australia for the race in October will be sharing their impressions on Instagram.

The underlying purpose of the competition is to inspire young people, raise awareness of environmentally sound energy sources and promote knowledge about energy conservation.

Participating teams are made up of students from top universities across the world, such as Cambridge, UK, Stanford, USA and Tokai University in Japan. Mälardalen University and Jönköping University are the only Nordic contestants.

Follow the team during the race in October on Instagram: @sandvikgroup


VOLVO

NEWS

BEHIND THE SCENES
Meet Sandvik employees sharing their thoughts on topics such as Industry 4.0 and diversity at youtube.com/sandvik

2 **Sandvik is rated number two among the most sustainable** companies in its industry by the Dow Jones Sustainability Index (DJSI) for 2016–2017.

AWARD-WINNING PRODUCT DEVELOPMENT

Bo Jönsson, Thomas Lewin, Roger Berglund and Krister Wickman received the 2017 Wilhelm Haglund medal for Product Developer of the Year for their work on the heat-resistant materials Kanthal® APM™ and Kanthal APMT™. Read more on pages 20–21.

TO CRUSH ALL COMPETITION

SANDVIK introduces a new addition to the Sandvik QJ jaw crusher range with the new Sandvik QJ341+. The model incorporates a pre-screen feature that provides high amplitude for excellent separation, which enables the removal of large amounts of fines - resulting in greater efficiency, higher productivity and less wear on the crusher. This is particularly effective in quarrying applications where a high proportion of fines in the feed material are found. Test results confirm an increase in productivity of up to 30 percent.

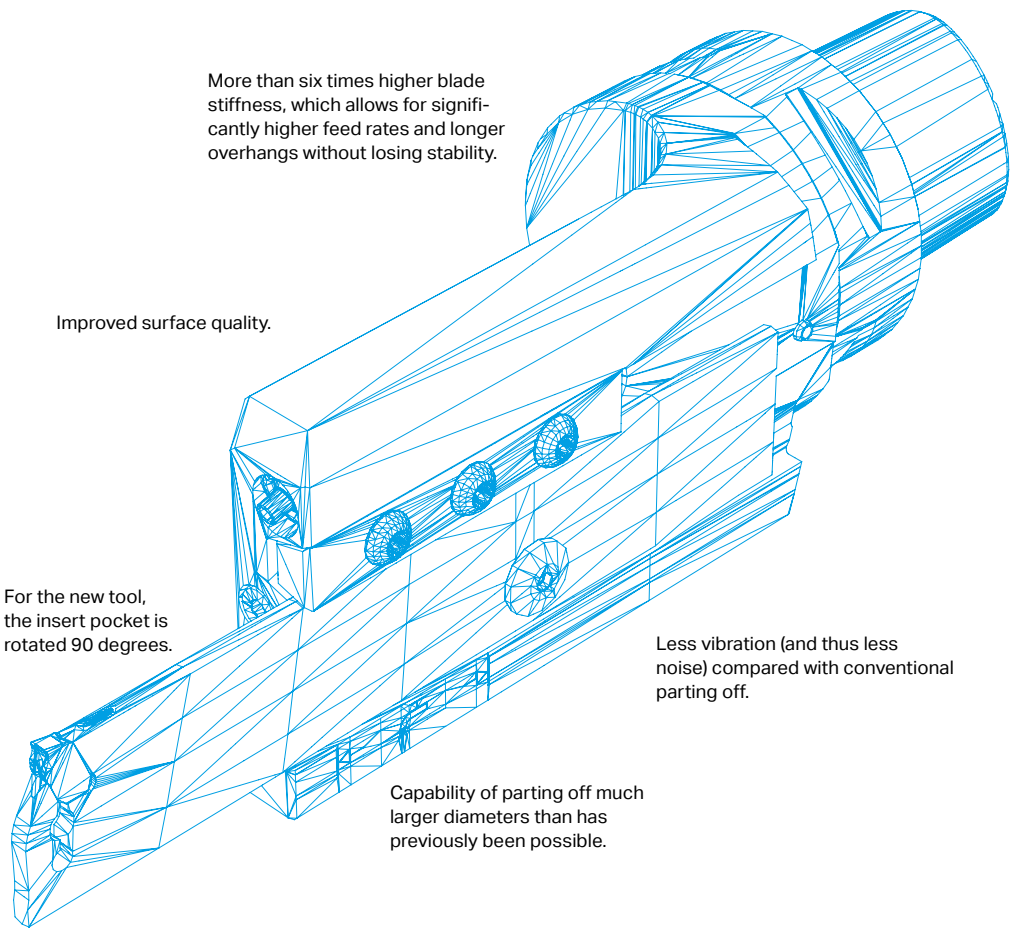
PORTAL FOR OPEN INNOVATION LAUNCHED

Sandvik has launched a portal for open innovation, where partners are invited to solve challenging problems.

The central idea behind open innovation is that companies cannot afford to rely solely on their own research. They should also benefit from external knowledge by integrating, for example, external inventors, research teams, companies and potential partners in their own development process. "Great ideas really can come from anyone, anywhere," says Pasi Kangas, Vice President and Head of R&D at business area Sandvik Materials Technology.

PARTING OFF TAKES A NEW DIRECTION

The new CoroCut® QD y-axis parting tools carry all the features of the conventional CoroCut® QD tools, but with a small change: the insert pocket is rotated 90 degrees. This results in a more beneficial cutting-force direction, resulting in much higher stability as well as maximum reliability and effectiveness when parting off. Conventional parting off uses the feed motion in the x-axis. The cutting force is directed through the weakest section of the blade, which can lead to vibrations and instability. The new CoroCut® QD tools use the feed motion in the y-axis instead and the cutting force is directed into the strong section of the blade resulting in much higher stability. It eliminates vibration and reduces noise levels to a minimum.



GROUNDBREAKING INSTALLATION IN ALASKA SILVER MINE

Hecla's Greens Creek silver mine, in southeastern Alaska, is the first U.S. underground mine to use automated loading technology from Sandvik. The installation will enable increased productivity, improved safety and better cost control.

The mine is one of the largest and lowest-cost primary silver mines in the world. Sandvik's mine automation system AutoMine® Lite is used in production areas to enhance safety, accelerate underground efficiency and improve production numbers.

"We have been able to increase mucking time by operating the AutoMine loader between shifts when personnel cannot be underground due to blasting activities," says Keith Malone, Vice President and General Manager of the Hecla Greens Creek Mine.

SANDVIK DIVESTS PARTS OF ITS WIRE BUSINESS

Kanthal® wire for industrial heating enjoys a strong market position.

IN MAY, SANDVIK announced it intends to divest its welding and stainless wire operations in order to further consolidate the product portfolio and improve its long-term performance. The wire business to be divested generated revenues of about 700 million SEK in 2016. Kanthal® wire for industrial heating will however remain in the company due to strong market positions and growth potential. In 2016 these operations had revenues of about 800 million SEK.

"The divestment of the welding and stainless wire businesses will make us more focused on our core operations; advanced stainless steels and special alloys for the most demanding industries", says Petra Einarsson, President of business area Sandvik Materials Technology.

NEW ROCK DRILL **COMPETENCE CENTER**

Sandvik is establishing a global rock drill competence and development center at its site in Tampere, Finland, to drive the development for rock drills used in underground and surface drilling applications.

"The innovation program will ensure Sandvik's technology leadership in the rock drilling business for generations to come," says Björn Rosengren, President and CEO.

The innovation will bundle rock drill technology development capabilities from across the company. The rock drill is the heart of drilling equipment with great influence on performance and operating costs.

The new rock drill competence center will drive the development for rock drills used in underground and surface drilling applications.
Pictured: Sandvik RD211 rock drill.

BENEFITS OF VEGETABLE OIL

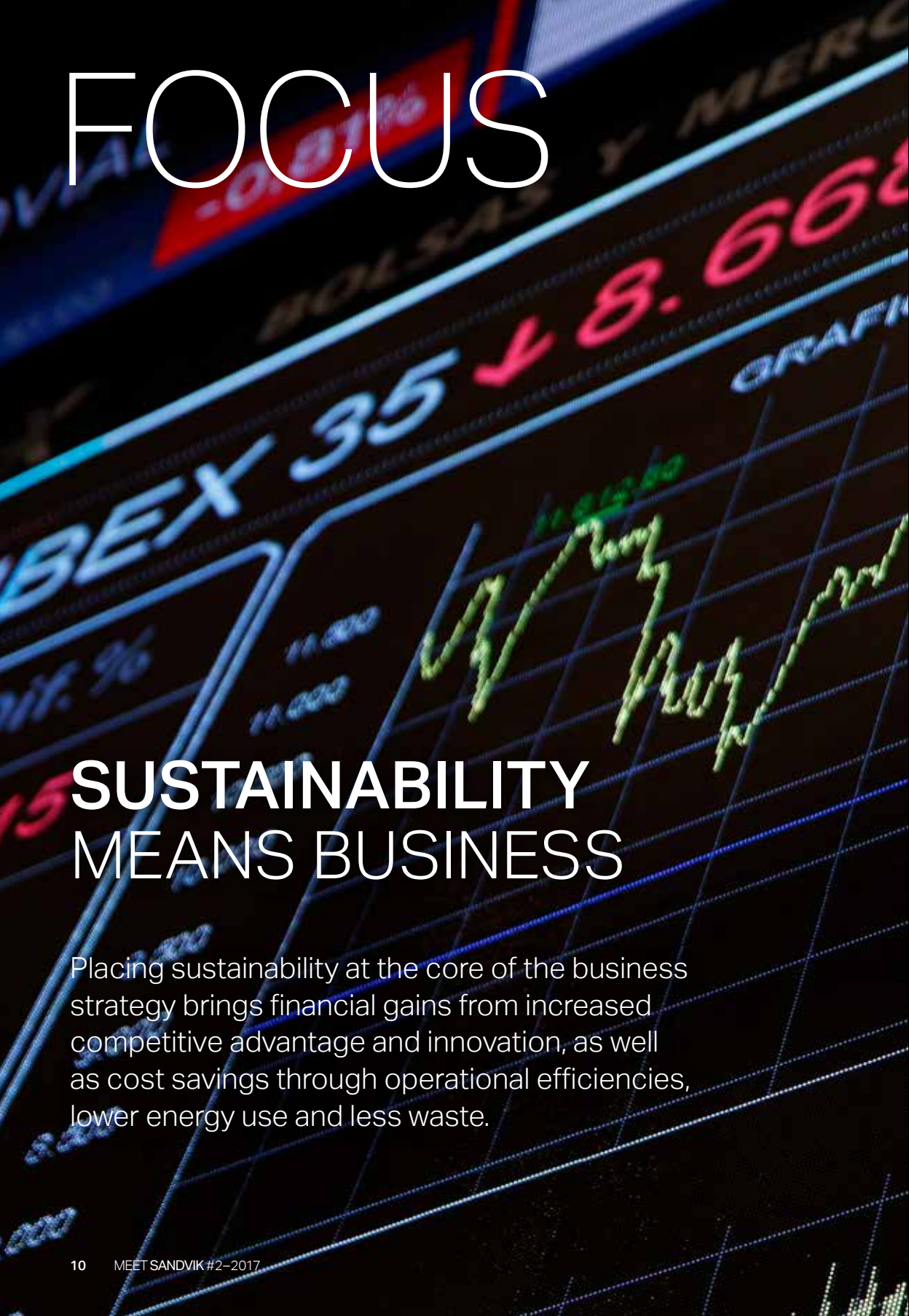
VEGETABLE OILS HAVE greater lubricating capacity than mineral oils, which helps to reduce cutting tool wear, improve surface finish quality and leads to shorter machining cycle times. But they perform poorly at high temperatures and pressures.

The Sandvik Coromant R&D center in Rovereto, Italy, has found a way to make vegetable oil standard for all its CNC (computer controlled) machining by using a new blend of vegetable oil.

"We tested emulsifiable vegetable oil for two years as a basis for emulsion used with alloy steels, stainless steels, cast iron and aerospace-grade aluminum alloys in addition to titanium and nickel alloys. We had no problems with emulsion stability in any of the materials we processed." says Maurizio Tardivo, Project Manager and responsible for the Sandvik Coromant test facility.

Vegetable oil is a greener choice than mineral oil and also better for the operators from a health and safety perspective.

FOCUS



SUSTAINABILITY MEANS BUSINESS

Placing sustainability at the core of the business strategy brings financial gains from increased competitive advantage and innovation, as well as cost savings through operational efficiencies, lower energy use and less waste.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Many companies remain reluctant to place sustainability at the core of their business strategy, partly due to the perception that the costs outweigh the benefits.

SUSTAINABILITY HAS BECOME one of the key business trends of recent years, driven by compliance factors such as climate targets as well as consumer demand.

"Those companies that proactively make sustainability their core business strategy will drive innovation and engender enthusiasm and loyalty from employees, customers, suppliers, communities and investors," says Tensie Whelan, Director of the NYU Stern School of Business's Center for Sustainable Business.

Whelan defines sustainability-based management as embedding sustainability in the core business strategy and using it to drive strategic business decisions.

However, although advances are being made, many companies remain reluctant to place sustainability at the core of their business strategy partly due to the perception that the costs outweigh the benefits. "There is still a perception that it is too costly, which in turn reflects a focus in the investor community on short-term results,"

TOP SCORE IN PRESTIGIOUS INDEX

Sandvik was included in the Dow Jones Sustainability Index (DJSI) for both 2015–2016 and 2016–2017, meaning that Sandvik is rated among the top 10 percent of the most sustainable companies in its industry. Sandvik was also included in the FTSE4Good Index Series for the 13th consecutive year. Sandvik's inclusion in these indexes confirms the Group's achievements in reaching its goals related to economic, environmental and social responsibility issues.

"Research shows that the millennials enter the job market with a strong focus on mission, purpose and work-life balance."

Whelan says. "But this short-termism is outdated. Sustainability can be both revenue-generating and can reduce costs."

Financial benefits can accrue from increased competitive advantage and innovation, she explains. Companies can also realize significant cost savings through sustainability-related operational efficiencies, such as better management of natural resources, lower energy use and minimizing waste.

A strong sustainability focus is also becoming increasingly important as a way to attract the best talent to a company. "Research shows that the millennials enter the job market with a strong focus on mission, purpose and work-life balance," Whelan says. "They want to work with companies that have a broader focus than the shareholder. Companies that embed sustainability in their core business strategy treat their employees as critical stakeholders, just as important as shareholders."

THE 2030 AGENDA

In 2015, the United Nations adopted 17 new Sustainable Development Goals (SDGs). These goals are universal, covering a range of different areas, such as the environment, human rights, governance and sustainable industry and production.

"One way is to look at the SDGs as business opportunities," Whelan says. "Achieving them will require lots of innovation and creativity. Regulation can actually serve to make us more creative in that it forces us to come up with new solutions."

Sandvik has published its contribution to the SDGs in its Annual Report 2016, as well as on the company website home.sandvik/unglobalgoals.

Read more about the SDGs on the UN website https://sustainabledevelopment.un.org. ■

Tensie Whelan
Title: Director of the NYU Stern School of Business's Center for Sustainable Business.

CUSTOMERS EXPECT **SUSTAINABLE SOLUTIONS**

A sustainable approach to business will contribute to ensuring long-term value creation, says Christina Båge Friborg, Head of Sustainable Business at Sandvik.

HOW DOES SUSTAINABILITY DRIVE BUSINESS AT SANDVIK?

First of all, our customers and our customers' customers demand it. Being sustainable is not an option for us, it is something our customers expect us to incorporate both in our products and in our own operations."

HOW DOES THIS HELP SANDVIK?

A sustainable approach to business will contribute to ensuring long-term value creation for our customers, our investors and our employees alike. Our biggest impact, from a sustainability perspective, lies with our customers. It is therefore mainly through our products and services that we can make a difference. For us, it is a competitive advantage to be able to sell, for example, more energy- or fuel-efficient products that have a lower impact on the environment than our competitors' products.

Christina Båge Friborg
Title: Head of Sustainable Business at Sandvik

"We spend a lot of resources on R&D to develop products that enable our customers to grow economically while limiting environmental impact, such as developing more energy-efficient solutions, safer products or buying back used cemented carbide products from our customers, which are then recycled."

WHAT ARE THE BIGGEST CHALLENGES TODAY FOR SANDVIK RELATED TO SUSTAINABILITY?

"Our societies and marketplaces are going through large changes due to digitization and globalization. There is a strong sustainability perspective related to energy use when more and more processes become automated. Sustainability issues are very important; climate change and access to clean water, for example, are becoming major challenges.

"At the same time, this represents a business opportunity for us as we deliver equipment to desalination plants, for example. Also, we recently launched battery-driven underground mining equipment that reduces CO_2 emissions and diesel particulates in the air to almost zero when in use." ■

"SOUND INVESTMENTS PAY OFF"

Investors are increasingly scrutinizing environmental, social and governance (ESG) factors when making investment decisions, a major pension fund analyst says.

INSTITUTIONAL INVESTORS ARE paying increased attention to sustainability issues as a factor in asset allocation, a trend driven by consumer demand, public opinion and the fact that more and more investors are convinced that it pays to have a holistic approach when analyzing a company.

"We are seeing large changes in this area, particularly over the past two years, and we are convinced that sustainability delivers good long-term returns," says Nadine Viel Lamare, Head of Sustainable Value Creation at AP1, one of the Swedish national pension funds with roughly 300 billion SEK in managed assets.

AP1 has committed itself to integrating ESG factors when evaluating investments and has signed the UN-backed Principles for Responsible Investment (PRI).

"We make long-term investments in companies that will do well over time and look at how well the company's management and strategy correspond to the environment in which they operate, in light of the large challenges posed by, for example, climate change and social issues," says Viel Lamare.

This means taking a holistic view of a company, where sustainability is not a separate issue, but something that permeates the company's vision and mission.

FINANCIAL MARKET SENTIMENT is often perceived as placing short-term gain ahead of longer-term benefits, and while more and more institutional investors are placing greater emphasis on ESG factors, there is more to be done.

"The financial market is not a homogenous market," Viel Lamare says. "There are short-term investors and those like us with a longer-term perspective. It is true that investments in sustainability may take time before they pay off, but I am convinced that they do so in the longer term. I think it is a real issue, and it is therefore important that companies talk more about why sustainability is important from a business perspective and that they invest in it because it is positive for the long-term business case." ■

Nadine Viel-Lamare
Title: Head of Sustainable Value Creation at the AP1 pension fund.

MISSION: IMPROVED SAFETY

Advances in automation, battery technology and digitization are transforming the mining industry – making mines safer and reducing their environmental impact.

MINING IS ONE OF the most hazardous industries in the world. Ensuring safety within mines is both demanding and time-consuming, and it affects the productivity of the mine. Automated mining equipment has done a lot to improve mine safety, not least because it reduces the need for people actually working underground. In the future, mining could be wholly automated.

"We are not there yet," says Patrick Murphy, President of the product area Sandvik Rock Drills and Technologies, which has a core mission to offer solutions to improve mine safety. "We still have people operating underground, but automation reduces the number of people needed in that environment and improves productivity."

Automation is also "climate smart" as it enables continuous operation, which in turn boosts productivity and reduces emissions. This is particularly important when it comes to diesel-fueled equipment.

Moving away from diesel-fueled equipment is, however, the great challenge going forward. Late 2016, Sandvik launched a new battery-powered drill rig – Sandvik DD422iE – with a green power system developed to limit pollution and designed to remove diesel particulate matter from underground environments to mitigate health risks.

"Using battery technology instead of diesel fuel greatly reduces hazardous gases and has a huge and immediate impact on air quality," says Murphy.

IN ADDITION TO automation and green power, Sandvik is investing in the analysis of data from mobile equipment and the mine environment.

"Today we have the ability to measure more on our equipment than ever before," Murphy says. "When we combine the onboard data with other data sets available from our customer processes we can get amazing insights to help customers immediately improve their operations." ■

WHERE WASTE BECOMES AN ASSET

In 2017, product area Sandvik Coromant set up a target of recycling 75 percent of tungsten carbide according to sold weight. They have developed a closed-loop recycling system that ensures that the material recycled is both ethical and sustainable.

RECYCLING IS AN important business driver for customers, says Jason Purcell, Global Services Manager at Sandvik Coromant. "We collect used carbide from customers' premises and pay the customer for it at market price", he says. "This gives them an incentive to recycle, improves their profitability and reduces the total spend on material."

The recycling program makes waste an asset, Purcell says. "Recycling is important for a brand, and a good brand image is associated with ethical ways of working. Also, only customers, not dealers of recycled material, are the sources of material; we are providing an ethical source of tungsten carbide."

Sandvik Coromant allows customers to recycle old tools from other manufacturers.

IN ADDITION, Sandvik Coromant allows customers to recycle old tools from other manufacturers. The collected waste material is collected by certified green transport and is recycled at our own plants.

"The solid material is sorted, purified and reground to powder and then used by our production plants," Purcell explains.

Sandvik Coromant uses approved, environmentally-sound recycling technologies. ■

"Recycling is important for a brand, and a good brand image is associated with ethical ways of working."

Will additive manufacturing be the preferred way in the future? Kristian Egeberg and Mikael Schuisky are looking ahead.

ADDITIVE MANUFACTURING – SUSTAINABLE BY NATURE

As an emerging manufacturing process, additive manufacturing not only has the potential to change the landscape for product development, manufacturing and logistics, it can also improve sustainability across a variety of industries.

IN THE LONG TERM, additive manufacturing might play a significant role in reaching the United Nation's Sustainable Development Goals (SDG), according to Eduard Hryha, researcher and project manager for the new Centre for Additive Manufacture - Metal (CAM^2) at Chalmer's University of Technology in Sweden.

"To reach the climate goals, we must make significant changes to the way we manufacture products. Additive manufacturing is one of those revolutionary methods."

There are two fundamental aspects that define sustainable manufacturing: the actual manufacturing process and the impact of the product produced. Additive manufacturing has significant effects on both levels.

When it comes to the manufacturing process, some of the sustainability advantages are obvious. In the Powder Metallurgy – Intrinsically Sustainable

report, the Metal Powder Industries Federation compares the 17 manufacturing steps that are required to produce a truck gear using subtractive machining with the mere 6 that are required using a powder metal process - with each less step bringing a saving in energy consumption".

Another major advantage is that the actual production can be undertaken locally; all you need to transport is powder. The printer can be placed at the customer site or very close by. This means that the number of transportations are reduced even more. Furthermore, additive manufacturing cuts down on material waste.

"When printing a component, approximately 95 percent of the powder you put into the process is used; the rest can be recycled in a new melt," says Mikael Schuisky, Operation Manager, Additive Manufacturing, at Sandvik. "Compare that to traditional manufacturing where you start off with a chunk of material and reduce large amounts of chips."

Even though the chips are collected and sent for recycling, the carbon footprint is substantially higher, due to heavier transportation and a much larger amount of material to recycle. This has a significant energy impact. Anna Douglas, Global Environmental Coordinator at Sandvik, explains that melting steel in the efficient scrap-based electric Sandvik steel mill requires approximately 500 kWh per ton. This is significant when compared to the resource efficiency of powder technologies.

ADDITIVE MANUFACTURING IS presently used mostly for producing components with complex designs or those benefitting from being light in weight. Weight reduction is a constant key issue for the aerospace industry, driven both by fuel cost and carbon footprint. The same is true for cars and trucks, and everything else that moves. Schuisky says that each kilogram of weight loss on an airplane saves 3,000 US dollars per year in fuel.

Despite all sustainability advantages offered by additive manufacturing, it is still a new technology that complements traditional, subtractive manufacturing. "Additive manufacturing is fantastic for certain applications, but for others subtractive manufacturing remains more productive," says Kristian Egeberg, Acting President of Product Area Additive Manufacturing at Sandvik. "We have in-house competence to offer both, which is unique and also means that we can give our customers unbiased recommendations in terms of optimal production method". ■

"Additive manufacturing is fantastic for certain applications, but for others subtractive manufacturing remains more productive."

POWDER METALLURGY MAKES **FURNACES ECO-FRIENDLY**

Sandvik's powder metallurgical materials, with their unique combination of high oxidation resistance and form stability, boost both productivity and energy savings. They also reduce maintenance needs for those customers with demanding high-temperature manufacturing processes.

EFFICIENT HEAT TREATMENT IS vital in the production of everything from integrated circuits for smartphones to solar cells and steel- and aluminum-based products. One challenge that manufacturers are constantly grappling with is that industrial ovens have to cope with the extreme heat required for these processes, often up to 1,250 degrees Celsius.

"A common problem is that the construction components within heating systems deform over the course of time," says Bo Jönsson, technical specialist at Kanthal, the part of Sandvik Group that develops products and systems for industrial heating. "For a material to function properly at high temperatures, two essential properties are required: good form stability and oxidation resistance."

MATERIALS THAT ARE traditionally used in these types of furnace applications are often nickel-based, which provide good form stability but limited oxidation-resistance," he explains. However, conventionally-produced materials – based on iron, chromium and aluminum – have excellent oxidation properties but relatively low form stability.

"We've put a lot of work into finding solutions that help customers with this dilemma," Jönsson says. "The Kanthal® APM™ and Kanthal APMT™ materials combine uniquely high oxidation resistance and form stability. The key to successfully developing these properties was the use of powder metallurgy to obtain an optimum microstructure in the materials."

JÖNSSON EXPLAINS THAT the powder metallurgy technique has made it possible to structure the metal with billions of small particles, substantially boosting its strength at high temperatures. The materials are now used in applications such as heating systems for industrial ovens, furnaces and other demanding uses.

"One example is furnace rollers for continuous annealing lines made from Kanthal APMT™, that eliminates the need for water cooling," Jönsson says. "This provides significant energy savings and environmental benefits. In many cases it has also been possible to reduce maintenance needs and boost productivity as a result of increased process temperatures and fewer shutdowns."

Jönsson sees significant opportunities for expanding the use of powder metallurgy materials. For example, Kanthal APMT™ has contributed to Sandvik now being involved in a number of projects relating to a future fossil-free energy supply.

"The combustion of bio-based fuels generates corrosive environments that our materials have demonstrated good abilities to resist," Jönsson says. "They could even be of use in the next generation of nuclear power plants. And for large-scale concentrated solar power to be cost-effective, new materials are needed that can handle and store solar energy at higher temperatures." ■

HUNDREDS OF PROJECTS **SAVE ENERGY**

Improved energy efficiency and productivity save money, while also reducing environmental impact and carbon dioxide emissions. Sandvik has hundreds of projects that combine to have a positive effect on energy consumption in its operating activities.

Improving energy efficiency and productivity are key focus areas within Sandvik.

ENERGY EFFICIENCY AND climate change mitigation are key focus areas for Sandvik. Achieving results requires commitment from the employees and the most efficient way to achieve this is by considering what is needed in the organization.

"Establishing a target that is possible in practice and translating this into specific actions encourages involvement," says Mats Alvem, Environmental Manager at Sandvik Machining Solutions.

So far, his business area has reported 320 projects, cutting energy consumption by about 14,000 MWh between 2014 and 2016. This equates to cost savings of around EUR 900,000 or 2.5 percent of the business area's energy consumption in 2016.

And other parts of the Sandvik Group are also working on energy-efficiency projects all over the world. Concentrating on Sandvik Material Technology's Sandviken operations in Sweden, including Sandvik's steel works, as this business area is the Group's largest consumer of energy. Since 2015, more than 50 energy-efficiency measures have been implemented, reducing energy use by around 20,500 MWh. This corresponds to annual cost savings of around EUR 1,286,000.

"These measures have also reduced carbon dioxide emissions," says Anna Douglas, Global Environmental Coordinator at Sandvik Materials Technology.

Sandvik's plants at Hallstahammar and Gimo in Sweden use surplus heat from production operations to heat their buildings, and the Hallstahammar plant even sells some of its surplus heat to the municipal district heating network. A similar solution is being installed in the industrial area in Sandviken, whereby buildings in the industrial area will be heated using surplus heat. ■

SMART PACKAGING IN DIFFERENT SHADES OF GREY

When Sandvik Coromant decided to redesign its packaging solutions nothing was left to chance. The new packaging is smart, user-friendly and developed to reduce environmental impact. It looks smart too.

LATER THIS YEAR, Sandvik Coromant customers will see the result of a thorough process to redesign the company's packaging solutions. The quintessential yellow-and-red boxes that have been around since the 1970s will soon be replaced with a new line of packaging that is sleek, modern-looking and user friendly.

"We are very proud of the results," says Claes Pålsson, Brand Specialist at Sandvik Coromant who, together with Bertil Isaksson, head of the project, have led the development work to realize the new packaging.

The result will encompass a line of own-developed plastic tubes designed in the polygon shape of Sandvik Coromant's product Coromant Capto® and cardboard boxes with smart inlay. It also includes a whole new line of torque keys that are smaller and lighter than the existing screwdrivers. Everything is designed in different shades of grey, in a unified, modern-looking design.

"We wanted a great-looking design but also worked to enhance functionality, user-friendliness and to limit climate impact", says Bertil Isaksson. "With the new cardboard solution, we can make the packaging smaller and yet secure the products in a better way. We use less material and everything is easy to recycle," he adds.

Aiming for enhanced functionality and user friendliness, Claes Pålsson and Bertil Isaksson at Sandvik Coromant have developed a new line of packaging.

The new patent-pending torque key was developed by Sandvik Coromant and designed to fit Sandvik products. The new tubes fix the torque key on the outside of the package, which means that the customer will have the right key to hand. Moreover, the new packaging provides more information for the customer, making it easier to find the right solution.

"We have included technical information and a product image on the box which we know will save time for the user," says Claes Pålsson. ■

NEW PARTNERSHIP BENEFITS COMMUNITIES

Sandvik has signed a long-term partnership agreement with Engineers Without Borders Sweden. The idea is to contribute technical expertise, project management skills and international experience to strengthen the NGO's volunteer projects.

STABLE INFRASTRUCTURE IS crucial to a well-functioning community, and it's this premise that lies at the heart of the non-governmental organization (NGO) Engineers Without Borders. Through many of its development projects, the NGO focuses on achieving sustainable solutions for energy and water supply.

"Above all, we're active in Africa," says Jan Byfors, former Chief Technology Officer at construction group NCC and voluntary deputy chair of Engineers Without Borders Sweden. "Around 20 projects are in progress, including building toilet systems in Tanzania, installing solar cell electricity to provide lighting in Kenyan schools, and generating energy from cow manure in Ghana."

Byfors has a long professional career behind him. Now, he says, he hopes to be able to contribute useful experience to an organization that to a great extent is run by working groups at Sweden's universities and institutes of technology. Out of approximately 1,100 members, 70 percent are students, and engaging senior people with professional experience has presented a challenge.

"This is why corporate partnerships are important to us," Byfors says. "We need partners with experience and expertise from different industries. The new agreement with Sandvik entails both financial support and support in the form of resources, which means that we can broaden and strengthen our voluntary operations with a greater undertaking in the field." He adds that Sandvik's extensive international network can greatly benefit the partnership.

Jessica Alm, Sandvik's Head of Group Communications, agrees. "We are, for example, active in South Africa and have sound knowledge of several

ENGINEERS WITHOUT BORDERS is a global umbrella organization with national affiliates across the world that run volunteer operations based on engineering expertise. The aim is to identify technical solutions adapted to the culture and values prevailing in the location in question. To guarantee a sustainable effect in the long term, the development projects are carried out in partnership with the local population. The focus is on sustainable energy and water supply, schools and education and hospitals and care. http://ewb-international.com

Sara Svensson and Rasmus Lundvik from Engineers Without Borders at the Technical University at Linköping University, Sweden, are upgrading the power system at a girls' school in Chonyonyo, Tanzania.

regions where local partners may be needed," she says. "As a global company, we want to provide technical expertise and create community benefit, while giving our own employees the opportunity to get involved in humanitarian projects and feel pride in the company. It also makes us an even more attractive employer, particularly among young people." Alm adds that a further positive aspect of the partnership with Engineers Without Borders is the organization's strong link to the universities of technology in Sweden.

Jessica Alm from Sandvik and Jan Byfors from Engineers Without Borders Sweden sign a partnership agreement.

JONATHAN BALSVIK IS group leader for Engineers Without Borders' student organization at KTH Royal Institute of Technology in Stockholm and will act as project manager for the organization's partnership with Sandvik.

"We're seeing great opportunities for our students to forge clear contacts with the corporate world via these joint volunteering projects," Balsvik says. "And as Sandvik has offices all over the world, we can also benefit from their professional contacts in countries where we help build infrastructure of various kinds. We often need to find solutions for transporting the equipment to the location, for example."

In addition to its international projects, Engineers Without Borders also works locally in its own surroundings. For example, Balsvik has been involved in volunteer work in socially deprived suburbs, where the organization provides children and young people with help with homework and programming workshops. "This is a way of generating interest in science and technology," Balsvik says. "In the long term, it may encourage more people to apply to these types of academic courses, even those from groups whose parents don't come from an academic background." ■

VISIONARY THINKER **TAKES OVER**

Since April 1, Klas Forsström is heading up Sandvik's largest and most profitable business area. As a forward-looking thinker with ambitious growth ambitions, he feels excited: "There are plenty of opportunities."

Klas Forsström became President of Sandvik's business area for systems for metal cutting, Sandvik Machining Solutions, after six years as President of the product area Sandvik Coromant.

WHAT EXPERIENCE DO YOU BRING THAT CAN CONTRIBUTE TO FURTHER SUCCESS?

I have about 25 years of experience with Sandvik in different functions and in different parts of the world, so I know the business fairly well. I also like to think that I can contribute with broad leadership capabilities and some forward-looking visionary thinking. To maintain our market leadership with profitable growth in a fast-moving industry, we will have to be open to new ways of working.

WHAT IS THE MAJOR CHALLENGE FOR YOUR BUSINESS AREA?

I think the biggest challenge for the whole metal-cutting industry is that it's not growing as fast as it has historically, and it won't be sufficient if we are to meet our own growth ambitions. We are excited and committed to managing that challenge, with plans on how to drive continued profitable growth.

HOW WILL YOU DO IT?

We are today basically seen as a supplier of solutions for metal cutting. To succeed in growing faster than the metal-cutting industry, we need to widen our market. We've already started that journey with additive manufacturing, and by offering products and services in a larger portion of our customers' value chain – from design and CAM-supporting processing through production to post-production, with data analysis and process optimization as well. This means that we have to build on existing competence and also add and acquire competence, by attracting new employees and through partnerships and mergers and acquisitions. Our arena is more complex today than even just five years ago, and it provides huge opportunities.

SO WHAT ARE THE GREATEST OPPORTUNITIES?

Oh, there are plenty. Compared with most companies, we have the benefit of being part of the industry we serve. By that I mean that we use our own tools and methods in our production, which provides credibility to our customers and gives us the chance to continuously improve our offering as well as how we create value – operational efficiency. Digitization is of course another indisputable opportunity that we are already embracing, and have to continue doing so. We can also deliver a wider offering to our customers by differentiating our brands more. Just to mention a few opportunities!

WHAT ARE YOUR THOUGHTS AROUND THE ONGOING DECENTRALIZATION OF SANDVIK?

It's a very welcome approach, and it gives energy and accountability. Decentralizing larger parts of the value chain will give the product areas increased control, which I know

will motivate people. In order to leverage on valuable synergy effects, however, a number of critical functions will remain on a shared business area level, such as distribution centers and basic research. To me, decentralization means delegated accountability, smart differentiation and efficient collaboration.

WHAT IS YOUR VISION AND FOCUS FOR TODAY AND TOMORROW?

We have a well-established strategy built on our individual strategies for each product area. That said, we have started working on an updated business area strategy, so the future vision is not yet clearly defined. But we are determined to achieve profitable growth and lead the industry forward based on a value-selling mindset with the customer in focus.

By streamlining and continuing to drive innovation in our core offering – products and services to the metal-cutting industry – we will have a good start. The round tools* offering is, for instance, one area where we can grow our market share.

In addition, we will aim at widening our market as I mentioned, and nourishing our innovative spirit – not only when it comes to engineering and patents, but also in reviewing ways of working, offering our customers new business models, and everything inbetween. ■

* Round tools are round solid carbide tools that can be used for drilling and milling, including tools for tapping and threading.

Klas Forsström
Age: 50
Family: Married to Marie, with four children, Matilda, 25, Lovisa, 24, Amanda, 22, and Erik, 17.
Lives in: Uppsala
Office location: Stockholm and Sandviken
Previous positions: 25 years at Sandvik in various positions, including President for Sandvik Coromant 2011-2017 and President for Sandvik Hard Materials 2009-2011.
Education: Master of Science in materials physics and an MBA in international business from Uppsala University, Sweden.
Personal strengths: "People say that I have an inclusive and inspirational leadership style, combined with strong industry knowledge."
Personal weaknesses: "Too fast sometimes."
Motto: "Win as a team. Good can always become better. And aim to live and behave in the same way as you expect from others."

STRONG OVERALL PERFORMANCE AND IMPORTANT **STEPS TOWARDS PORTFOLIO CONSOLIDATION**

HOW WOULD YOU SUMMARIZE THE SECOND QUARTER OF 2017?

We continued to improve the underlying performance of Sandvik with significant earnings and margin growth, driven primarily by strong performance in Sandvik Machining Solutions and Sandvik Mining and Rock Technology. For the third quarter in a row, we achieved adjusted operating margin at or above 15%, 15.8% for the second quarter, and looking at absolute earnings we reached the highest quarterly level in five years at 3.7 billion SEK.

We achieved good growth in revenues, +9%, supported to a large extent by deliveries of recent orders for mining replacement equipment but also good development for cutting tools and aftermarket business within Sandvik Mining and Rock Technology. Sandvik Materials Technology continued to struggle with profitability as a consequence of prolonged weakness in the energy segment but also increased competition especially from Asian players. We will now take actions to restore the profitability. Demand developed favorably in all major geographical regions and customer segments improved or remained on par with last year resulting in significant order growth of 17%.

WHY IS PORTFOLIO CONSOLIDATION IMPORTANT AND WHAT HAS HAPPENED DURING THE SECOND QUARTER?

During the quarter we made a lot of good progress when it comes to focusing on core and market leading businesses, hence divesting the parts that do not fit those criteria. We signed a contract to dispose Sandvik Process Systems, at a price of 5 billion SEK and anticipated closure no later than Q1 2018. The transaction entails a considerable cash injection in conjunction with closing.

Furthermore we announced an intention to dispose parts of the Wire business within Sandvik Materials Technology, namely welding and stainless wire, upon which we booked a cost of -450 million SEK in the quarter, primarily related to impairments of fixed assets. Last but not least, I am very pleased that Mining Systems has found new owners as we, after the second quarter end, have signed contracts with FLSmidth and Nepean Conveyors with expected closure end of 2017.

All of these are important actions to create financial and operational headroom to grasp future growth opportunities, not least for strategically important acquisitions within Sandvik Machining Solutions. ■

Tomas Eliasson, CFO

Q2 2017

REVENUES BY BUSINESS AREA

MSEK	Q2 2017	Q2 2016	Change %	Change % [1]
Continuing operations				
Sandvik Machining Solutions	9,071	8,235	10	5
Sandvik Mining and Rock Technology	9,450	7,540	25	17
Sandvik Materials Technology	3,755	3,389	11	7
Other operations	1,276	1,151	11	5
Group activities	1	6		
Continuing operations	23,553	20,321	16	9
Discontinued operations	893	715	25	14
Group total	24,446	21,036	16	10

1) Change compared with preceding year at fixed exchange rates for comparable units.

OPERATING PROFIT BY BUSINESS AREA

MSEK	Q2 2017	Q2 2016	Change %
Continuing operations			
Sandvik Machining Solutions	2,110	1,785	18
Sandvik Mining and Rock Technology	1,512	698	N/M
Sandvik Materials Technology [1]	–263	297	N/M
Other operations	124	141	–12
Group activities	–212	–216	1
Continuing operations [1]	3,271	2,705	21
Discontinued operations	13	–55	N/M
Group total [2]	3,284	2,650	24

1) Operating profit impacted by items affceting comparability of -450 million SEK for the second quarter in 2017. Adjusted operating profit for Sandvik Materials technology was 5.0% and for Sandvik group 15.8%
2) Internal transaction had negligable effect on business area profits.
N/M = non-meaningful

OPERATING MARGIN BY BUSINESS AREA

%	Q2 2017	Q2 2016
Continuing operations		
Sandvik Machining Solutions	23.3	21.7
Sandvik Mining and Rock Technology	16.0	9.3
Sandvik Materials Technology	–7.0	8.8
Other operations	9.7	12.3
Continuing operations	13.9	13.3
Discontinued operations	1.5	–7.8
Group total [1]	13.4	12.6

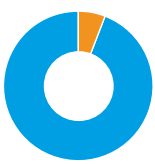
1) Internals transaction had negligable effect on business area profits.

REVENUES Business area share of Group's revenues for continuing operations

40%
Sandvik Machining Solutions

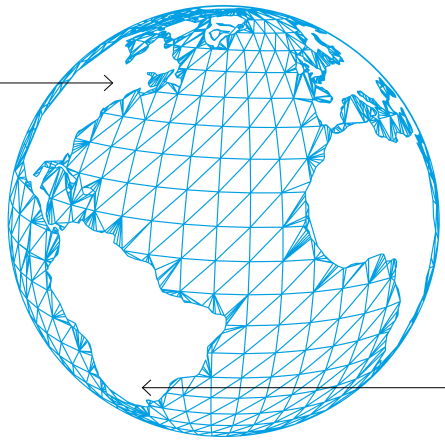
39%
Sandvik Mining and Rock Technology

15%
Sandvik Materials Technology



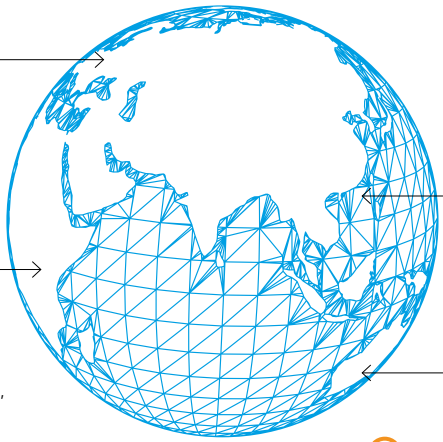
6%
Other operations

REVENUES DEVELOPMENT by market area



NORTH AMERICA
The invoiced sales for the North America region were 18,063 MSEK, a +23% change.
21% share *

SOUTH AMERICA
The invoiced sales for the South America region were 4,253 MSEK, a –7% change.
5% share *



EUROPE
The invoiced sales for the Europe region were 34,083 MSEK, a +2% change.
39% share *

ASIA
The invoiced sales for the Asia region were 17,536 MSEK, a +10% change.
20% share *

AUSTRALIA
The invoiced sales for the Australia region were 5,027 MSEK, a +27% change.
6% share *

AFRICA/ MIDDLE EAST
The invoiced sales for the Africa/Middle East region were 7,890 MSEK, a +16% change.
9% share *

→ Change Q2 2016 – Q2 2017
* Share of group's last twelve months' revenues for continuing operations

REVENUES by segment *

27% MINING
23% ENGINEERING
12% ENERGY
14% CONSTRUCTION
12% AUTOMOTIVE
6% AEROSPACE

* Share of the Group's 2016 total revenues; consumer goods, chemicals and miscellaneous total 6%.

NEW PRESIDENT AT SANDVIK COROMANT

NADINE CRAUWELS is new President of product area Sandvik Coromant, a role she assumed in May. She was previously Vice President and Head of Customized Solutions and Strategic Relations in the same organization.

"I am looking forward to this new opportunity to continue to develop this fantastic company. Sandvik Coromant is in a great position today, with leading products and solutions that deliver value to our customers around the world. Sandvik Coromant is driven by highly skilled and committed employees dedicated to supporting our customers. Together with the management team, I will make sure we will execute our strategy to lead the industry forward and together shape the future of manufacturing," says Crauwels.

Nadine Crauwels, President of Sandvik Coromant

NEW SUSTAINABILITY SPECIALIST

Mats W Lundberg

MATS W. LUNDBERG has been appointed Sustainability Specialist at business area Sandvik Materials Technology. In facing the challenge of helping the business area turn its corporate vision for sustainability into action, he says it is important to take a holistic approach.

"Sustainability is a prerequisite for good business, but many people wrongly define sustainability as only environment. Sustainability also covers the financial and the social aspects, and they are inseparable. The financial aspect is obvious to most people. Social responsibility means that you are a good corporate citizen in everything you do, for example, working ethically and safely. If you don't have a safe workplace, you are not sustainable and won't be seen as an attractive employer."

SANDVIK COMPLETES DIVESTMENTS

Sandvik has signed an agreement to divest Sandvik Process Systems to FAM AB, owned by the three largest Swedish Wallenberg foundations, at a price of 5 billion SEK. Sandvik Process Systems delivers advanced industrial process solutions based on high-end steel belts, steel-belt-based equipment and process solutions within adjacent technologies.

Sandvik has also signed an agreement to divest the conveyor components' parts of the Mining Systems business, including the closely related specialist conveyor systems business in Hollola (Finland), to NEPEAN Conveyors Pty Ltd, a privately owned Australian based company. Sandvik has previously signed an agreement to divest the project business in Mining Systems to FLSmidth. By divesting the conveyor components' operations the exit from Mining Systems will be fully executed.

OBJECT OF BEAUTY | Biodiversity cooperation favors threatened butterfly

When the Azuré du Serpolet (Large Blue), a threatened species of butterfly, was discovered at Sandvik's premises in Fondettes, France, the company initiated a cooperation with the departmental council, various environmental organizations and the local school of agronomy to develop a program to ensure its safety and propagation.

The results? Not only is the population of the butterfly increasing, but it has also spread to new surroundings.

The butterfly is well known in behavioral ecology as it exhibits a unique relationship with a single species of red ant. The development of the caterpillar requires both the presence of a host plant, oregano, and a host ant.