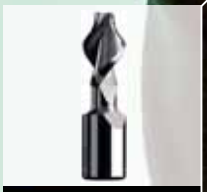
EDGE

A MAGAZINE
FROM SECO
#2.2011

BIONIC

A LOOK AT MEDICAL MATERIALS



PROSTHETIC devices for shoulder joints require advanced materials and tools such as Seco Feedmax™ solid carbide drills.

HOW TO CHIP AWAY THE HEAT

NEW TOOL SHAPES SCANIA ENGINES

SECO

EXTREME DRILL **MAKEOVER**

CROWNLOC PLUS is a new generation of Seco drills with exchangeable crowns. Featuring new geometry, coating and locking interface, Crownloc Plus improves chip evacuation and wear resistance in a variety of materials. Moreover, it requires no regrinding or resetting.

TEXT: **Åke R Malm** PHOTO: **Seco**

New relief angles: Open-edge geometry reduces feed force and improves chip evacuation.

Easy exit: Deep and wide flutes with a polished surface for efficient chip evacuation.

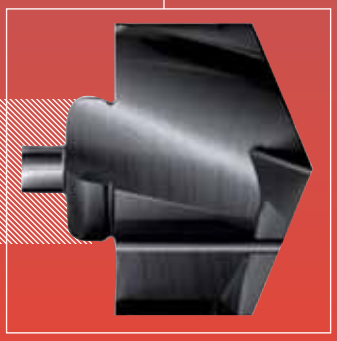
Cool flow: Internal cooling supply through the crown helps bring the chips out and improves chip flow.

1:25

1 drill body lasts up to 25 crowns. Big surfaces to handle axial forces and torque, and a 'hook' for safe tool withdrawal.

1/4

No wobble: A quarter of a turn, and the crown locks in position.



Tip-top: Centre geometry with low abrasive wear, in combination with heat-resistant periphery.

▶ **WWW.SECOTOOLS.COM/CROWNLOCPLUS**
Product availability: 2011–2012
Order & application data: Machining Navigator 2012

EDGE
SECO

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Coverphoto Getty Images , Eric Bean

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Scania engineers can tackle more truck engines with Minimaster®Plus.

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A historic composite comes back into favour with two improved grades from Seco.

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A plant manager in Sweden explains how his company benefits from Seco Point.

WHAT WE'RE MADE OF

IN VERY REAL and powerful ways, we in the machining industry shape the world around us. Of course, we make the equipment around us, whether it's a Scania engine block or a Wilfley centrifugal pump. That equipment, in turn, shapes our lives in countless ways.

But our tools can also shape us – literally. As you'll read on pages 18–21, the medical industry is developing new, sophisticated materials to create prosthetics, such as knee components, hip replacements and dental implants. And whether it's cobalt chrome or a carbon composite, Seco has developed the necessary tools to get those materials into their final, useful forms.

There's another way we shape ourselves, and it's a way that has no depth measurements or hardness calculations. We shape ourselves through commitment and ongoing improvement. The work we do is hard, and it keeps getting more sophisticated, but it also comes with great satisfactions – the precision of a perfect component, for example.

We hope this issue of *Edge* communicates some of that passion.

Enjoy,

paul löfgren
senior vice president, group marketing
edge@secotools.com

SUGGESTIONS? Do you have story ideas for *Edge*? Send them to edge@secotools.com.

KEEPS ON TRUCKIN'

TEXT **Alexander Farnsworth** PHOTO **Alexander Farnsworth and Johnér**

Truck manufacturer Scania uses Minimaster milling tools in its machine shop in Södertälje, Sweden. When the company tested the new Minimaster Plus on its engine blocks, the new tool lasted significantly longer.

IN TESTS PERFORMED by Scania in January 2011 on engine blocks for 16-litre V8 engines, the Minimaster Plus milling tool showed a working lifetime considerably longer than its predecessor.

"We used to change the tools once per day. In the tests we preformed with Minimaster Plus, we changed the tools every three days," says Henrik Svensson, process planner at Scania. "For us, the lifetime of the tool is critically important."

Scania manufactures five different engine platforms, or engine blocks, mostly from German cast iron. These blocks, which weigh about 450 kilos each, come in one piece and have precast holes for all the engine's appendages – carburetors, fan mounts, cylinders, axles, etc.

Because the casting process does not yield the desired tolerances and finishes to the cast iron, each engine block has to be additionally machined. Scania uses a Thyssen Hüller Hille CNC

The Minimaster Plus works on 90 engine blocks before requiring a tool change.

machine – which is itself roughly about the size of a Scania truck.

Each hole in an engine block requires different tools, depending upon what needs to be done – grinding, finishing, grooving or shaping. The Minimaster Plus is just one of up to 14 different tools used by each CNC machine to expand, shape and finish a small, palm-sized hole on the engine block. There are eight of these holes per engine block.

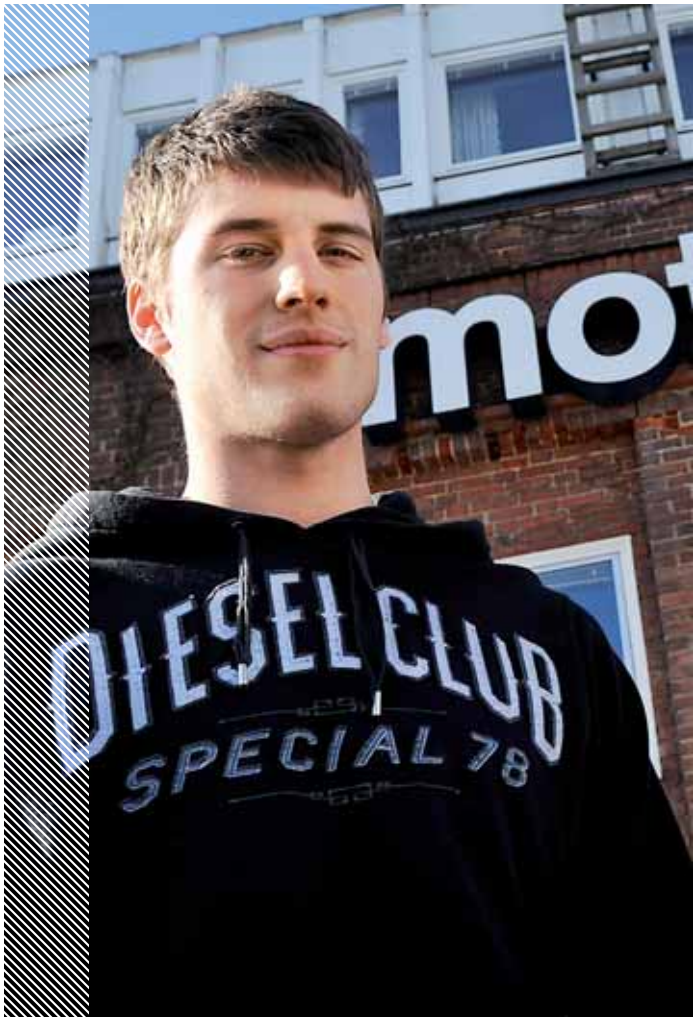
"With the Minimaster, we'd change tools after working on 30 engine blocks," says industrial engineer Anton Nilsson. "In our tests with the Minimaster Plus, we could work on 90 engine blocks before changing the tool. This increased productivity and precision is important given that Scania has the ambition to increase its truck production. Fewer tooling changes means that we can focus on producing more engine blocks."

Additionally, some of Scania's engines in the future will be cast from Compact Graphite Iron (CGI), a super-hard material to machine.

"But the Minimaster Plus works on CGI as if it's butter," says Nilsson. "Minimaster Plus is also quieter than its predecessor, and for Scania, which puts a high priority on health, safety and environmental issues in the workplace, this is very good."

Both Henrik Svensson, 32, and Anton Nilsson, 22, are quite young for being the two men responsible for testing and implementing the new Minimaster Plus tool.

"But it's cool to be able to make a difference," they both say. ■



“The Minimaster Plus works on CGI as if it’s butter.” **Anton Nilsson, Industrial Engineer, Scania (above)**

SCANIA

▸ Scania is a leading manufacturer of premium trucks, buses and engines for industrial and marine use.

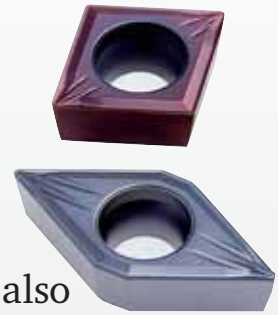
▸ The Swedish company operates in about 100 countries and has more than 35,500 employees. The head office is located in Södertälje, Sweden, where about 10,000 employees work in production, administration and research and development.

▸ The company is listed at the NASDAQ OMX Nordic Exchange Stockholm; its largest shareholder is Volkswagen.

More parts per tool

Component:	Engine block
Material:	Cast iron SS0125
Operation description:	Side milling
Machining objective:	Tool life and overall operation cost
Machine tool:	Machining Centre
Tool clamping:	HSK-100
Cutter:	MP16-16019R04Z4-M04, MP3000
Cutting data, detail 1:	v_c: 180 m/min
	v_f: 1 396 mm/min
	a_p: 6-8 mm
Result, detail 1:	Tool life: test tool (Minimaster Plus) achieved 440 details compared to 230 details with previous Minimaster (MM16-16019)
Cutting data, detail 2:	v_c: 220 m/min
	v_f: 1 160 mm/min
	a_p: 10-12 mm
Result, detail 2:	Tool life: test tool (Minimaster Plus) achieved 90 details compared to 30 with previous tool (Minimaster). Cutting data with previous tool: vc= 180 m/min, vf= 1 160 mm/min

A MINOR EDGE *with major innovations*



Cermet is back. Two new grades feature a minor trailing edge that provides predictable, accurate machining, and one grade also sports a nano-laminate PVD coating. TEXT: **Linas Alsenas/Mike Jewkes** PHOTO: **Joakim Abrahamsson**

AFTER DISCUSSIONS with customers, Mikael Lindholm, Product Manager at Seco, saw an opportunity. "We identified an area in which they sometimes used cermets," he says. "However, those composites still lacked the wear resistance and machining predictability needed for long machining runs, particularly at low RPMs and low feeds."

Combining the best properties of ceramic and metal materials, cermets were first patented in the 1920s. In the 1970s, however, the material fell out of use when coated cemented carbides were introduced.

With customers' needs in mind, Seco has developed TP1020 and TP1030, a new generation of cermet grades with improved wear resistance and edge stability. (TP1020 is uncoated, while TP1030 features an innovative nano-laminate PVD coating.) Seco eliminated nickel from the original cermet manufacturing process, creating exceptionally predictable wear resistance, and developed the minor trailing edge which determines the surface finish of the machined component.

"This edge is now the main attribute of our new cermet grades," says Lindholm. "It provides remarkable wear life security, surface finish and dimensional accuracy – providing 'the edge' for our customers' applications." The new grades can maintain machining dimensions and surface finishes in a wider range of workpiece materials.

Says Lindholm, "This really is where metallurgy meets metrology." ■

Customers wanted a cermet that produced high-quality surface finishes.

Cermet composites timeline

▸ **1920s:** First cermet patents are introduced. When developed, these materials have a mainly titanium-based hard phase instead of a tungsten-based version, as in cemented carbide.

▸ **1960s:** Cermet composites grow into a viable and market-usable innovation when the productivity demand for metal cutting becomes evident.

▸ **1970s:** Growth in cermet composites stalls significantly when coated cemented carbides are introduced.

▸ **2000s:** Seco develops its new 'Technology platforms' which includes a comprehensive examination of development opportunities available in the cermet concept. The new cermets have exceptionally predictable wear resistance.

▸ **2010s:** Seco launch of the innovative TP1020 and TP1030 cermet grades.

TRY HARDER

They weren't even sure that cutting a trapezoidal thread into an extremely hard proprietary metal was possible. But with Seco's help, a pump manufacturer in Denver, Colorado, found the perfect machining solution.

TEXT **Kyle Larson,** PHOTO **Trevor Brown**

Seco was asked to develop a tool that could replace carbide or ceramic inserts and machine 70 Rc material.

Link Wilfley, Director of Sales/VP, is a descendant of Arthur Redman Wilfley, who founded A. R. Wilfley & Sons in 1919.

SOON AFTER its founding in 1919 by Arthur Redman Wilfley, A.R. Wilfley & Sons distinguished itself as a leader in the centrifugal pump market by creating the dynamic seal, which prevents machine parts from rubbing against each other. Ever since, Wilfley has maintained its position as an industry leader by using advanced metallurgy to create robust and long-lived pumps.

The proprietary metal developed by Wilfley for its slurry and chemical pump parts, including both single and double dynamic seals, typically requires a five-part process to prepare. Casting and annealing are done at Wilfley's foundry in Longmont, Colorado, then sent to Denver for pre-machining, and sent back to Longmont to be heat treated. After heat treatment, the piece is sent back to Denver for final machining. In an effort to cut costs and streamline manufacturing, Wilfley's shop floor manager, Jeff Haugen, contacted Seco.

"The scope of this project was enormous," says Seco Product Manager – Advanced Materials Chad Miller. Wilfley had been using carbide and ceramic inserts to machine 42 Rc material for well over 30 years. They were now asking Seco to develop a tool that could replace carbide or ceramic inserts and machine 70 Rc material.

There was no published data to suggest that a tool capable of machining a trapezoidal thread in such hard material was even possible. Miller initiated a research process that included a global conference call with metallurgists and experts within Seco. During this period, cubic boron nitride (CBN) was suggested as an option.

CBN IS THE SECOND-HARDEST material known to man but is not naturally occurring. By combining boric acid and boric trioxide, BN is initially made into an amorphous powder. Heating this powder in nitrogen flow at temperatures exceeding 1500°C and under pressure above 5 GPa converts BN powder into crystalline CBN.

CBN's thermal stability can exceed 1600°C, and it is insoluble in acids. "Its machining capabili-

CBN surpasses even diamond in mechanical operations – but the process required for its creation is expensive.

ties are off the chart," says Wilfley's Director of Sales/VP, Link Wilfley. Due to its chemical and thermal stability, CBN surpasses even diamond in mechanical operations – but the process required for its creation is expensive.

From 2008 to 2010, Miller, along with Seco's threading and turning product managers Don Halas and Don Graham, worked closely with Wilfley to develop a special CBN insert that would allow trapezoidal threads to be machined at Wilfley's Denver-based plant.

"I WAS THERE three to four times a year doing R&D work," says Miller, who is based in Troy, Michigan – but his work didn't stop there. Theories were developed and tested at Seco's Technical Center in Troy; it took more than three months to develop the trapezoidal thread alone. While in Colorado, generally for three to four days at a time, Miller focused entirely on Wilfley, working with programmers and machine operators at the Denver site to develop programs specifically for Wilfley's machines. Determining speed and feed rates required several modifications, but ultimately led to success.

This project took two years and untold man-hours but has ultimately been worth the effort; Wilfley is now able to machine all of its parts in Denver. "This has reduced lead time to customers by several weeks," says Wilfley's lead engineer, Jack Postuchow. The trapezoidal insert is about 15 times more expensive, but the price is offset by an increase in productivity and tool life.

> ***Its machining capabilities are off the chart."***
>
> **Link Wilfley, A. R. Wilfley & Sons**

"CBN inserts last 50 times longer than carbide inserts," says Wilfley, "and the 60 passes needed to complete the thread take about 3 minutes."

Haugen says, "Seco supported us from day one. That's just not something you see in a manufacturer." Developing tools specifically for Wilfley is an ongoing process that still sees Miller in Denver on a yearly basis. With increased productivity, a more reliable end product and faster lead time to customers, Wilfley's partnership with Seco helps guarantee that A.R. Wilfley & Sons remains an industry leader for years to come. ■

After succeeding with the trapezoidal thread, Seco produced an additional special thread milling tool for an internal thread. The result was a "two-tooth" thread mill (a roughly 1-inch diameter shank tool holding two CBN200-tipped threading inserts in the UN 6 geometry).

Longer tool life

Component:	Slurry pump component
Material:	White cast iron 24% Cr
Operation description:	Indexable thread milling
Machining objective:	Produce #6 UN thread in hardened material
Machine tool:	Vertical Machining Center
Material:	White cast iron 24% Cr
Hardness	745 HB (65 Rc)
Cutter:	Special
Insert:	CBN200 special
Cutting data:	v_c: 150m/min
	f_z: 0.1 mm/tooth
	a_p: 65 mm
Coolant:	Airblast thru tool
Result:	4 passes to produce thread

TAKING THE HEAT

Patrick de Vos, Seco's Corporate Technical Education Manager, explains some basics of heat and temperature in metal cutting.

METAL CUTTING IS a process that deforms workpiece material until it tears off. That deformation process generates a lot of heat, dwarfing the amount generated from friction between the chips, cutting edge and workpiece. Heat accumulates in the cutting zone, and if the temperature (concentrated heat) rises too high it can deteriorate the capabilities of the cutting edge (tool life) and transform the workpiece material structure. For efficient cutting, we want to keep the temperature at acceptable levels by generating less heat and removing it as much as possible from the cutting zone. Let's take a look at some of the most important factors.

There are several ways to reduce the amount of heat that cutting generates. From the cutting tools side the ***geometry of the cutting edge*** is important. Sharper cutting edges 'cut' the workpiece material more and 'deform' it less, generating less heat.

Cutting speed also plays a role, as higher cutting speeds deform the material faster, generating more heat. A word of warning, though, about reducing cutting speed to generate less heat: the speed needs to be high enough to 'soften' the workpiece material in the cutting zone (higher temperatures make the workpiece material softer). Also, higher cutting speeds produce more chips per time unit, and that means more material volume to absorb and remove heat from the cutting zone. In fact, the most effective way of evacuating heat from the cutting zone is through the chips.

Higher feed can also improve heat evacuation, as higher feeds produce thicker chips (more volume to take heat away).

We must also consider the workpiece material's properties. For example, the thermal conductivity of the material (how it transports heat) affects how much heat can be absorbed by the chips. With low thermal conductivity, more heat remains in the cutting zone, increasing the cutting temperature.

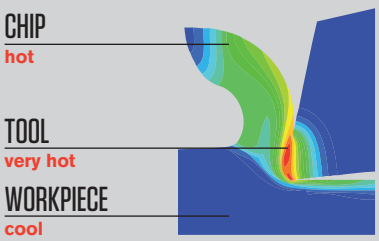
Hardness is another important consideration. The harder the workpiece material (i.e. the more it resists deformation), the more heat is generated during cutting. Related to this is strain hardening, which occurs when a workpiece material becomes harder when it is deformed. Materials with high strain hardening tendencies generate more heat because they become harder at the cut.

Of course, I haven't mentioned a very important element in evacuating heat from the cutting zone: ***coolant.*** But let's save that for a later article…

Patrick de Vos

Chips ahoy!

The most effective way to remove heat from the cutting zone is through the chips.



SUGGESTIONS? Do you have any questions for Patrick de Vos about machining? Send them to edge@secotools.com.

Customers always come first for Lenny Tai, whose dedication to his job has always prompted him to go the extra mile to satisfy his customers.

TEXT: **Sonia Kolesnikov-Jessop** PHOTO: **Norman Ng** ILLUSTRATION: **Istockphoto**

Racing against THE CLOCK

CHINESE NEW YEAR 2011. While most Singaporeans are enjoying an extended four-day break for the annual family reunion celebrations, Lenny Tai is already back at work on the second day with most of his team. The manager of Seco Tools' Asian Distribution Centre (ADC) in Singapore, he is taking over from one of his staff, who worked on the first day of the New Year. "Every year, we take turns," says Tai. "Next year, I will be the one working on New Year's Day. We have customers in Australia, India and other countries that don't celebrate the holiday. For them it's just another day, and orders have to be met."

Flexibility and adopting a customer's perspective are all in a day's work for Tai. The 49-year-old Singaporean has been heading the ADC ever since it opened 10 years ago, and he believes the key to his success has been his work attitude and a commitment to his customers.

For the ADC, customer service is all about teamwork and being prompt, meeting clients' requests within 24 hours. "Lenny is a role model when it comes to reliability and responsiveness," says Jonas Sjödahl, Group Logistics Project Manager. "He and his team always put in what is required to get the shipments out to our customers on time."

This means keeping a close eye on the clock – or in Tai's case, on his thick black sports watch. He says he looks at it "sometimes every minute" when it gets close to a deadline.

"When we started back in 2001, we had 300 to 400 order lines a day," Tai says. "Today we have 1,500 to 1,800 order lines a day."

AS BUSINESS HAS GROWN, so too has Seco Tools' ADC team, from the three original employees to nine full-time and three part-time employees. The centre's purview has also grown from a few countries (Japan, Australia, Malaysia, Thailand and Taiwan) to encompass the entire Asia region – until recently, that is, when Seco inaugurated a new China Distribution Center in Shanghai.

Head of Seco's Asian distribution hub, Lenny Tai manages a team that has grown from three to 12 employees.

PUTTING CUSTOMERS FIRST

Name: Lenny Tai
Age: 49
Career: Started working in logistics in 1984 as a store assistant with Flextronics Pte Ltd. Moved on to become a storekeeper and then store supervisor with Twin Arrows International, a contractor for Mitsubishi Electric Asia. In 1996, he joined Seco Tools as a shipping coordinator. While working at Seco Tools he completed a computer sciences degree from the Singapore Institute of Management in 2001.
Outside interests: Tai is an avid basketball player and regularly shoots hoops with his neighbours.

"When it comes to customer service, it's important to walk in the shoes of your clients."

Handling customers in six different time zones has its challenges, including how to best respond to customers still working after your day in the office is finished. "Different countries have different deadlines," says Tai, so every day is like a race with the clock to meet the orders."

Tai regularly works well beyond the centre's 5:30 p.m. deadline for the last regular pick-up of parcels by DHL Global Forwarding. "Sometimes we get 100 line orders five minutes before the last pickup," he says. "Even if we package everything very quickly and get everything ready, we might still have to wait another three to four hours in the office for a DHL courier to come again, because pickups can be very erratic after that time."

Tai says he always stays behind to make sure the orders go out, because he understands the business implications a delay could have for clients.

"We try our best to fulfill an order and ship it out within the same day," he says. "It's not as easy as it looks, because customers can place an order at any time, and we never know how many orders they will place."

Although long hours can be grueling, Tai says that he gets a real sense of achievement when all the orders have been met and successfully dispatched at the end of the day. He also enjoys the challenge of unexpected situations – the problem-solving aspect of his job, whether it is a customer changing the contents of an order that has already been packaged or a parcel that needs to be recalled after it's been dispatched.

"When it comes to customer service, it's important to walk in the shoes of your clients," Tai explains. "After all, your clients' success is also your own success." ■

Lenny Tai's three tips for great customer service

- Think of yourself as the customer. You must understand where your customer is coming from in order to serve him well.
- Be flexible. There is always a solution to a problem. Think outside the box.
- Understand that the customer's success is your success. If you keep your customers happy, they will keep coming back.

DROP CROP

At its production facilities in India, Seco practices rainwater harvesting to conserve the limited water supply and minimize environmental impact. Now the strategy is spreading across the group.

TEXT **Anna Mc Queen** ILLUSTRATION **Zara Picken**

WHEN THIERRY CROS was Managing Director of Seco's Pune site in the Indian state of Maharashtra, he saw firsthand the problems created by a diminished water supply. Now Seco's Sales and Marketing Director in Bourges, France, Cros is encouraging the plant to adopt strategies similar to those used in Pune to ensure access to water.

"In India, there are regular droughts, and the water table is very low, so many companies have to resort to bringing in their water by truck," Cros explains. "This is expensive financially and also costly in terms of CO_2. But each year the monsoon brings huge quantities of water for free, so it seemed obvious to us to harvest that resource."

In parts of India, rainwater harvesting is mandated by law, although this isn't the case in Maharashtra. Nevertheless, every new building constructed for Cros and his team was built with a collection tank underneath to collect rainwater. "We are now storing about 400,000 litres of rainwater, which is enough for all our coating, blackening and sintering needs, for coolant oil and – when filtered – for all our sanitation and drinking water needs for six months of the year," he explains.

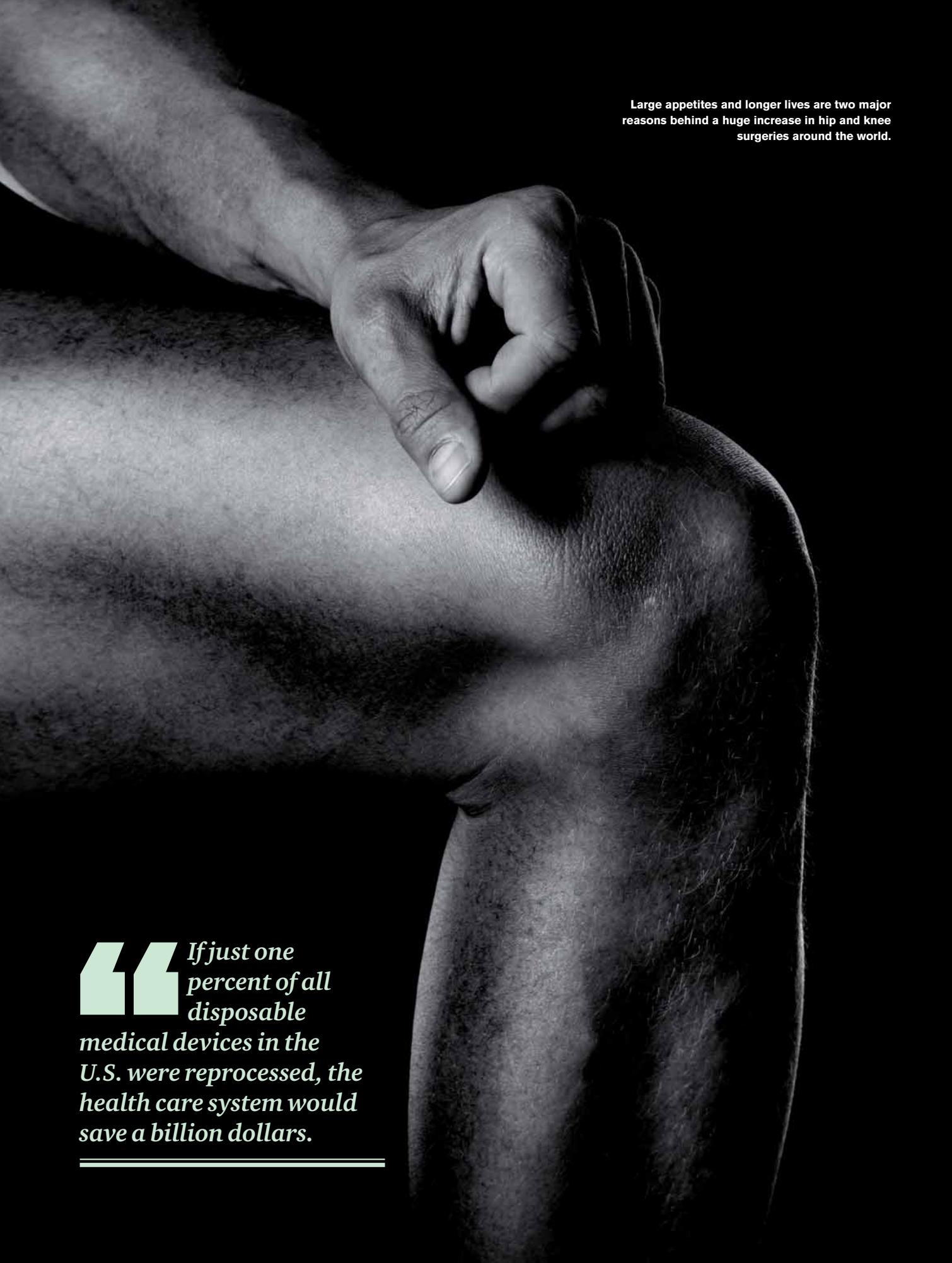
Similar systems have been installed in Seco's Sorocaba plant in Brazil, along with a solar-powered water-heating system. The company's plant in Bourges has a rainwater harvesting system with a capacity of some 24,000 litres.

"We are clearly not subject to the same water restrictions everywhere as we are in India," Cros says, "but nonetheless we are very concerned about environmental issues and are determined to do everything we can to reduce our impact on the environment." ■

A green plant

Environmental initiatives at Seco's Pune plant:

- A reverse-osmosis plant to generate soft water from hard water
- A waste-coolant treatment plant
- A sewage treatment plant
- Rainwater harvesting
- Improved waste management
- A solar water-heating plant
- A heat-recovery system for heating water.



Large appetites and longer lives are two major reasons behind a huge increase in hip and knee surgeries around the world.

> *If just one percent of all disposable medical devices in the U.S. were reprocessed, the health care system would save a billion dollars.*

TEXT **Cari Simmons** PHOTOS **Getty Images, Joakim Abrahamsson and Folio**

Body BUILDING

Three million people had a hip or knee replaced in 2010, with plenty more candidates waiting for surgery. This may be putting a strain on hospitals, but it isn't hurting the medical technology industry.

A special form cutter is used for knee prostheses.

DESPITE THE RECENT RECESSION, the global orthopedic market is predicted to grow between 11 and 12 percent this year alone from an industry already valued at 40 billion U.S. dollars. Last year 3 million people had hip or knee replacements, with more waiting for their turn.

This growth in hip and knee surgery can be largely attributed to people living longer and more people being overweight – factors that are putting an extra strain on people's joints and increasing the need for prosthetic devices to replace the damaged body part.

Prosthetics come in many shapes, sizes and materials. Today a prosthetic device is likely to be a hip, knee or shoulder joint; dental implants are also increasingly common.

There are a number of orthopedic metal alloys, but the two main materials being used for prosthetics today are titanium and cobalt chrome.

Both materials are lightweight, durable, nontoxic and readily accepted by the body. All materials undergo a rigorous cleaning process to ensure that they are impurity-free before insertion.

STRENGTH IS ESSENTIAL when it comes to prosthetics. Titanium, besides being lightweight, is extremely strong. It is also highly compatible with human bone, making it easy for bone tissue to assimilate and integrate. Although not as

flexible as bone, it is fairly elastic and reacts well under stress.

Cobalt chrome is not quite as flexible as titanium, but it is also very strong and resistant to fatigue. The base metals of cobalt and chrome are generally mixed with smaller quantities of other metals to form the material.

Composites offer more flexibility and higher tensile strength than either cobalt chrome or titanium and are increasingly being used, especially in spinal replacements, where flexibility is crucial. These are mainly carbon-fibre-based and are extremely expensive to produce.

HIGHLY POROUS TITANIUM, with around 70 percent porosity, is also being used. "The advantage of porous titanium is that it fixes into the bone a lot quicker, and it is lighter, too," says Phil Russell, International Key Account Manager at Seco.

"Machining titanium and cobalt chrome requires cutting forces only slightly higher than those used in steels," he says. "But the metallurgical characteristics of titanium and cobalt chrome make them more difficult to machine than steel."

Orthopedic devices are designed to conform to the complex shape of bones and joints, so the machining of these parts is also complex. Machining devices from bar stock involves removing a lot of material, which makes the process expensive. As a result, some parts are cast to near-net shape. This process often requires fixturing, which is complex and costly. Another issue that adds to the complexity of machining is the tight tolerances required for most devices.

On the medical technology horizon, Russell anticipates an increase in automation to cut down on labour costs. Another trend is towards reclaiming medical devices – or at least reusing parts of them. "If just one percent of all disposable medical devices in the U.S. were reprocessed, the health care system would save a billion dollars," he says, "not to mention the positive impact this would have on the environment." ■

"The advantage of porous titanium is that it fixes into the bone a lot quicker, and it is lighter, too.

Phil Russell,
International Key Account Manager, Seco

Seco Feedmax solid carbide drills are especially suitable for machining titanium and other alloys.

Knee replacements are becoming increasingly common.

Jabro MINI 900 series provides standard tools for dental applications.

Solutions for the medical industry

▸ Seco provides machining solutions and cutting tools specifically designed for the medical industry.
The wide range of turning inserts combined with **Jetstream Tooling™** is ideal for difficult-to-machine materials. **Seco Feedmax solid carbide** drills are especially suitable for machining titanium and other alloys used in the medical industry.

Jabro™ solid carbide end mills are also ideal for the demands of machining medical components. "We use a lot of solid carbide, and the advantage with our end mills is that the grade of the carbide we use, incorporated with the grinding process, gives us excellent performance compared with our competitors," says Phil Russell, International Key Account Manager for Seco.

Solid carbide is, for example, also used for machining a bearing surface on polyethylene knee tray inserts. With a Premier finishing tool, which is very sharp, this produces a surface finish and form that is free of lines or marks, with a very polished look which is extremely important in the operating room. "If the surgeon doesn't like the look of the finish on a bearing insert," Russell says, "he'll discard it."

Apparently, aesthetics play a role even where they can't be seen.

▸ **www.secotools.com/Medical-Solutions**

More parts per tool

Component:	Acetabular
Material:	CoCr - Bar stock
Operation description	Profile milling Acetabular
Criterion:	Cycle time and tool life
Tool:	JH930080R050
Cutting data:	n: 3000 RPM
	v_f: 635 mm/min
	a_p: 0.63 mm
Coolant:	Flood coolant
Result	Seco removed 45 minutes of cycle time and increased parts per tool by 75%

Reduced cycle time

Component:	Knee tray
Material:	Ti 6Al-4V
Operation description	Rough mill Knee Tray
Criterion:	Increase tool life and cycle time reduction
Tool:	JH930080R050
Cutting data:	n: 2040 RPM
	v_f: 533 mm/min
	a_p: 3.81 mm
Coolant:	Flood coolant
Result	Dominated the competition with a cycle time reduction of 35%. Tool life increased from 40 parts per tool to over 170.

TEXT: **Nina Asimus** PHOTO: **David Magnusson**

A PLANT *that keeps growing*

Roger Berggren, plant manager for Fårbo Mekaniska machine shop in Fagersta, Sweden, tells us about his job and work philosophy.

ROGER BERGGREN
Age: 40
Occupation: Plant manager for Fårbo Mekaniska machine shop
Location: Fagersta, Sweden
Family: Wife and three children, aged 15, 10 and 8
Hobbies: Cars, golf and spending time with his family.

I'VE BEEN WITH Fårbo Mekaniska for a long time. Two months before finishing vocational high school, I signed an employment contract with the head of the company, who visited our class to find talented young people. When I started at the shop, there were four employees; today we have 25 and sales of approximately 40 million Swedish kronor.

"I took over the shop in 2005 with startup capital I earned by working two jobs. Our recipe for success involves daring to invest and keeping tight control of costs. I am usually involved in all of our new business. I also track operations closely and am familiar with all of the machinery.

"Now my role is to serve as plant manager and ensure that production flows smoothly. That is why we have acquired two Seco Point tool dispensers. This system has freed up an incredible amount of time. Now we are never without a tool, and as a result production never stops. We have minimized idle machine time, and our profits continue to increase.

"We invest approximately 6 million kronor each year in new development and machinery, including several robots. I think the fact that new developments are constantly emerging on the technical side is exciting." ■

Seco Point
Seco Point is an automated storage system that ensures that the shop never has idle machine time because of a shortage of materials. Once the system has been programmed with all of the necessary information, Seco Point keeps track of how much material has been used in production and automatically orders the right amount at the right time.

▶ **www.secotools.com/secopoint**

IN THE ZONE

Seco's updated website offers customers a number of helpful features that help increase efficiency in the workshop.

SECO'S CORPORATE website features a new Customer Zone, where customers can find a number of services and interactive applications to help find and use Seco products more easily. The applications are kept up-to-date and are continually upgraded with more functionality.

"We wanted to make things easier for our customers," says Carl Enarsson, who is responsible for the content of the Customer Zone. "Previously our applications were not as easy to find; in certain cases, you had to download applications to your computer. Now we have gathered them all in a comprehensive environment, and you can run the programs directly from a web browser."

Customers can trust that the applications' data about products are always up-to-date, regardless of the application. Also, a personal login feature enables users to see the prices of all standard products. Moreover, the applications that do not require online access can be used offline without logging in, which allows users to bring laptops to the shop floor and use the programs there. ■

TOOL CHOICE

Seco Guide gives you the possibility to choose the right tool for your needs. You can search by product group, cutting method or by material group.

PROGRAMMING

With the new Threading Wizard you can do complicated programming and calculations to create a perfect thread from the first cut.

▶ **WWW.SECOTOOLS.COM/CUSTOMERZONE**

PHOTO: JOAKIM ABRAHAMSSON

Advanced geometry

FF2 IS A NEWLY DEVELOPED chipbreaker geometry for negative turning inserts. It is specially designed for long-chipping, ductile materials like low-carbon and stainless steels. Intended for finishing applications with low feeds and small cutting depths, FF2 offers reduced cutting forces compared to its predecessor FF1. Covering the same applications, FF2 is an all-round geometry that also serves as a complement to MF2 in finishing.

The new chipbreaker geometry is available in the most popular insert grades, including Duratomic® coated grades, and a number of insert types. FF2 is adapted for use with the Jetstream Tooling line of toolholders.

STAY SHARP

SECO EXTENDS ITS RANGE for machining composites with a selection of standard PCD (polycrystalline diamond) tools, including both Jabro cutters and Seco Feedmax drills. These solid carbide bodies with PCD cutting edges offer excellent wear resistance, resulting in fewer tool changes, higher part quality and increased productivity. Featuring cutting geometries developed specifically for composite machining, PCD edges are extremely sharp, which is necessary to prevent delamination in the workpiece.

The Jabro-PCD cutters are available in diameters from 6 to 16 millimetres, and for increased flexibility, with neutral, positive or negative helix angles. All PCD cutters have internal through coolant channels for efficient cooling.

The brand-new range of Seco Feedmax drills with PCD cutting edges boasts a 120-degree point angle and extremely sharp and durable cutting edges. Designed to avoid delamination during drilling, Seco Feedmax PCD drills allow higher cutting speeds with increased output and application security compared to other cutting edge materials. The drills are available in diameters from 4 to 25 millimeters.

The most common dimensions will be stocked standard, with others available on request. For more capabilities, Seco offers extended custom tooling solutions (an example of which is pictured below).

PHOTO: JOAKIM ABRAHAMSSON

PHOTO: JOAKIM ABRAHAMSSON

IDEAL FOR SMALL BORES

SECO'S LINE OF FULL-FACE polycrystalline boron nitride (PCBN) inserts with C-lock hole has expanded with a new range of small inscribed circle (IC) inserts. The main application is machining of small features such as small-diameter internal bores in hard or abrasive materials. Small IC inserts are available in two grades covering hardened steel, hardened iron, grey cast iron and PM-materials.

The full-face PCBN layer offers several advantages over tipped products, such as reduced risk for de-brazing, no tip size limitations and more cutting edges per insert. This makes it a cost effective alternative that can also be used for plunging.

THE TOUGH GET TOUGHER

SECO HAS DEVELOPED CBN500, a new polycrystalline boron nitride (PCBN) grade for machining of white cast iron. CBN500 replaces CBN350 and has a new patented binder that gives increased toughness. With the latest synthesis technology and an excellent cubic boron nitride (CBN) particle distribution, wear resistance is also significantly improved.

The benefits include increased tool life, reduced risk of edge failures and better performance consistency. CBN500 is also suitable for machining manganese steels and hard steels. The applications include turning, threading and milling of steel mill rollers, large pump components and rock crushing cones.

PHOTO: JOAKIM ABRAHAMSSON

Shouldering the work

TURBO10 is a new high performance cutting tool for square shoulder milling, with improved tool life and precision. This is achieved through optimised cutting properties that reduce heat generation and cutting force, and a new insert geometry that mills corner angles to 90 degrees.

This makes Turbo 10 very flexible and suitable for most milling operations, including roughing, semi-finishing, finishing by slotting, contouring, helical interpolation and ramping. Initially it will be available in diameters from 16 to 100 millimeters with 0.4 and 0.8 millimeter insert radii, two geometries and eight insert grades. Turbo10 can be mounted with cylindrical shank, weldon, arbor and combimaster.

PHOTO: JOAKIM ABRAHAMSSON

PHOTO: JOAKIM ABRAHAMSSON

HIGHER SPEEDS FOR FEEDS

HIGH FEED™ 2 is a new tool generation intended for very high productivity in modern CNC machines. Its oblong inserts combine strength with a maximum number of teeth in relation to the diameter.

The close pitch allows very fast feed rates with stable cutting performance even in interrupted cuts. A well balanced design of both body and inserts gives a free chip flow in copy milling of cavities with long overhang. Designed for very high feed rates with small cutting depths, High Feed 2 is available in diameters from 16 to 35 millimeters for a wide spectrum of materials.

PHOTO: JOAKIM ABRAHAMSSON

DOWNSIZED Square6™

FOLLOWING UP ON THE SUCCESS of Square6-08 for square shoulder milling, Seco is adding a smaller version to the product line: Square6-04 in diameters from 20 to 63 millimeters.

Well-suited for small- and medium-size machines, Square6-04 has a maximum cutting depth of 4 millimeters. The inserts are double-sided with a total of six cutting edges optimised for low cutting force. Altogether this results in improved cost-efficiency and increased productivity.

Square6-04 can also be used for face milling and plunging, and it is available in geometries and grades for a wide range of materials.

PHOTO: JOAKIM ABRAHAMSSON

INNER STRENGTH

THE CHIPBREAKER FAMILY for positive centre lock turning inserts has a new member, the M5. With a stronger cutting edge than its siblings F1, MF2 and F2, the M5 offers a high material removal rate. It was designed to handle parts with rough skin or interruptions, for example in cast or forged workpieces, which present a risk for edge chipping or complete tool failure.

Compared to the F2 chipbreaker, the M5 generates lower cutting forces. In unstable conditions this prevents vibrations and improves part quality. The M5 is available in a variety of grades, including Duratomic. Its geometry is adapted for Jetstream Tooling toolholders.

PHOTO: JOAKIM ABRAHAMSSON

IMPROVED **GRADES**

SECO'S EXCHANGEABLE head reamer Precimaster™ for high-volume production is now available in two new grades. RX2000 is made of coated carbide and RX1500 of coated cermet. Both offer 30 percent increased hardness compared to CP20, which extends tool life and allows higher cutting speed. In addition, both grades' lower friction coefficient improves chip evacuation and production safety.

RX2000 is a newly developed grade intended for mass production in all materials except non-ferrous ones. It is especially reliable in stainless steel. RX1500 replaces C200R and is suitable for extreme cutting speeds in cast iron and steel applications.

PHOTO: JOAKIM ABRAHAMSSON

ON THE BALL

THE VERSATILE JABRO™-SOLID² range of square shoulder mills has added a ball nose option in diameters from one to 25 millimetres. This improves an already flexible general machining solution that cuts a wide range of materials – from carbon steels and grey cast iron to stainless steels and superalloys – with the same tool.

Jabro-Solid² ball nose is mainly designed for roughing and finishing in 3D copy milling applications. It offers improved cutting data and increased tool life compared to the earlier generation and many other alternatives on the market. Altogether, this translates to better productivity and cost efficiency. Jabro-Solid² ball nose is available in two-, three- and four-flute versions and three different lengths.

PHOTO: JOAKIM ABRAHAMSSON

PHOTO: HANS NORDLANDER ILLUSTRATION: ISTOCKPHOTO

ON THE RIGHT TRACK

THIS SOLID RAILWAY wheel is destined for a freight train on the Iron Ore Line (Malmbanan in Swedish), a track that connects the iron mine in Kiruna, Sweden, to the Atlantic port of Narvik, Norway. Each wheel weighs 500 kilos, and it must be able to cope with heavy loads and extreme temperatures from Arctic weather and the heat generated during braking.

Lucchini's

Italian steel group Lucchini's workshop in Surahammar, Sweden, specializes in the production of railway wheels and the assembly of complete wheel sets for the Scandinavian market. The company uses Seco inserts for turning.

25 tons

Each wheel is forged in steel, machined and heated to 200° C before being fitted to a 25-ton axle. With four axles, each train wagon is able to carry a load of 100 tons.

Tools

RCMX 20, 25, 32; grade TP0500; geometries R2/RR94/RR97
SNMM 250924; grade TP0500; geometry R7

SUGGESTIONS? Do you use Seco tools to make a compelling product? Contact us at edge@secotools.com.

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