EDGE

A MAGAZINE FROM SECO ISSUE 2 – 2017

COLLABORATION IN FULL FLIGHT

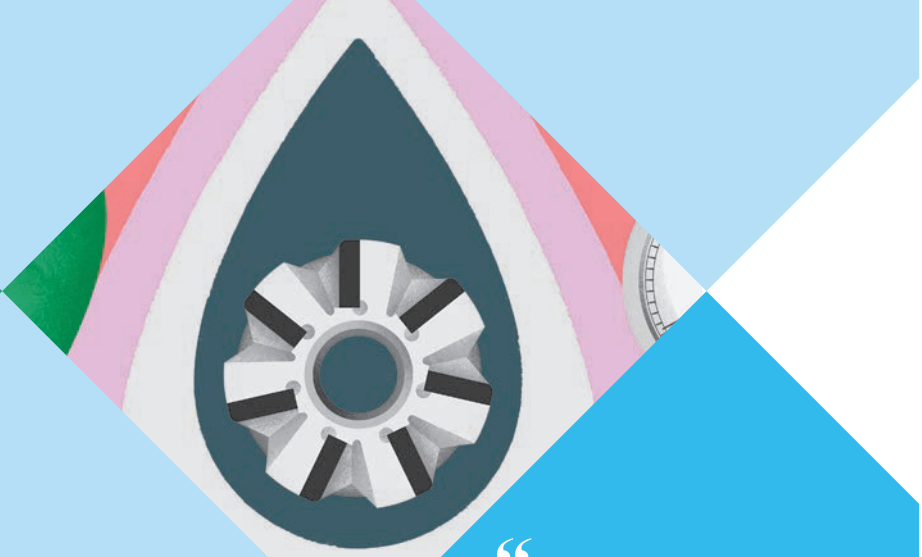
LIGHTWEIGHT TRANSPORTS REDUCE EMISSIONS

SUSTAINABLE IDUN NOT JUST A MYTH

Contents

EDGE ISSUE 2 – 2017

“We are on our way to finding new tooling concepts, built on boron nitride and synthetic diamonds.”
Jan-Eric Ståhl



“The large-scale production of carbon fiber composites didn’t really exist until very recently.”
Malin Åkermo

A sustainable future

The importance of sustainability in the modern economy cannot be overstated. Businesses are developing sustainable solutions in response to demand, and in the recognition that sustainability can mean greater profitability and efficiency for their companies in the longer term. A good example of the impact of sustainability is the automotive industry, where advances with carbon fiber and other composite materials are helping to cut vehicle carbon dioxide emissions.

We at Seco are working hard to develop our own sustainable tool solutions. The most obvious evidence is our constant effort to extend tool life: our new corrosion-resistant stainless steel IDUN provides longevity and durability, but is also environmentally-friendly due to the elimination of the nickel-coating process.

Sustainability is an integral consideration in our work to develop the cutting-tool material of the future. With the help of our long-term collaborator Jan-Eric Ståhl, we are searching for non-critical commodities that can be used instead of the likes of tungsten and cobalt, which are only getting rarer and thus less sustainable as time goes on. At Seco, we never stand still. We are always looking to the future.

ANDERS ELLER
VP MARKETING & PRODUCT LINES
EDGE@SECOTOOLS.COM

EDGE is a customer magazine from Seco Tools published in 25 languages worldwide.
Seco Tools AB Marketing Department, 737 82 Fagersta, Sweden. **Phone** +46 223-400 00 **Fax** +46 223-718 60
Internet www.secotools.com **Publisher** Hans Hellgren
E-mail hans.hellgren@secotools.com **Managing editor** Jennifer Gauffin **E-mail** jennifer.gauffin@secotools.com
Editorial production and layout Appelberg Publishing Group
Project manager Lena Nilsson **Editor** Andrew Montgomery
Art director Cecilia Farkas **Print** Elanders
Cover image Getty images

NEWS FROM THE TOOL EXPERT

ANDERS WICKMAN has been involved in the development of the Seco Advanced Material Portfolio for nearly 20 years. He began in R&D, became a product specialist in 2002 and in 2007 took over the role of corporate product manager for this business area.

SHORT FACTS

Position: Corporate Product Manager Advanced Material (PCBN, PCD and Ceramics)
Education: Upper secondary technical school and Seco cutting technology school
Career: More than 30 years at Seco, working in Quality, R&D and various Marketing positions. For the past 16 years he has worked in Advanced Material.

EFFICIENT CUTTING WITH JABRO JC876 AND JC877

◆ **Seco's new Jabro JC876** and JC877 cutters overcome the challenges of machining carbon fiber reinforced plastic materials (CFRP), as they are designed to push rather than pull when slot and side milling (routing) large, thick panel forms. Because the pushing action directs cutting forces downward into the workpiece, the cutters prevent parts from being pulled loose from their fixturing, while also minimizing chatter and material delamination.

The innovative designs bring the highest possible CFRP material machining process reliability – even when using gantry machines and vacuum clamping. Their left-hand helix/right-hand cut geometry directs cutting forces downward. In addition, the cutters feature edge serrations, an optimized coating and a compact design that minimizes overall tool length. This combination of features minimizes tool overhang and maximizes stability to ensure quality surface finishes.

PHOTOMONTAGE: GETTY IMAGES IMAGES/APPELBERG

New website with increased functionality

◆ **The new secotools.com** website was launched at the end of May, giving users full access to product information, and providing advanced search functionality via filters, videos and company information.

Once you register for an account you will be able to calculate advanced cutting data and access My Pages for calendar bookings, order history and your Seco contacts.

PHOTO: SECO TOOLS

Open Days in China

◆ **Seco China held** an Automotive Open Day in the Shanghai office in April. The event aimed to show Seco's capability for the automotive segment, and to encourage a deep dialogue with customers in order to understand their needs. In total, 100 automotive customers participated. Gilles Jolivet, a Seco global automotive expert, and Seco China's technical team presented component solutions. Partners Liebherr and Makino were invited to present complete customer solutions.

A month later, it was time for an Aerospace Open Day, also in Shanghai. The event showed Seco's advantage in aerospace, and 140 VIP aerospace customers participated. Bengt Strand and Tom Massey, regional aerospace experts, introduced the latest aerospace solutions and conducted demo's for difficult-to-machine materials together with Seco China's technical team.

PHOTO: GETTY IMAGES

Training ensures succession

◆ **The machine tool** manufacturing industry has a growing lack of young professionals, but for the past few years Seco Tools Denmark has been doing its best to reverse this trend. In 2013, it started collaboration with KTS Copenhagen Technical School to educate young technical students. The idea caught on, it has taken place across Denmark since, and today Seco Tools has been guest lecturing in 18 different schools.

The educational program is based on STEP material, and has been developed to support the students' development and learning. There are four courses, ranging from basic technical knowledge to more advanced learning with an economic element. By adjusting the complexity and time of the program the material can support different educational needs.

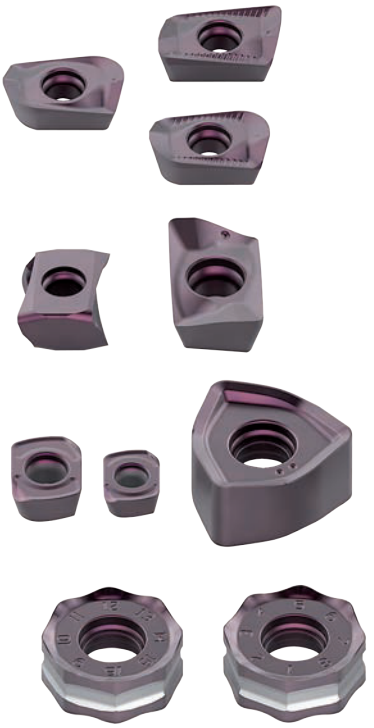
It can also be used independently of the producer and is continuously maintained and updated with the latest knowledge. The initiative sees Seco bringing practical experience and the latest market know-how to the students, with the bonus of establishing a network with future stakeholders.

SHORTER CYCLE TIMES THROUGH HIGHER MILLING FEED RATES

◆ **Shorter cycle times** and more parts can be produced by incorporating new ceramic grades and cutter bodies that put more inserts in the cut. Seco's new CS300 ceramic inserts and RN/RP cutter bodies have been specifically developed for nickel-based superalloy materials such as those used in the aerospace and power generation industries. Users will gain immediate and significant cutting data increases over standard carbide milling tools.

Designed to run only ceramic inserts, the new cutter bodies use Seco's compact wedge locks instead of conventional insert clamps. As a result, you get more inserts per cutter body diameter and higher feed-rate capability. In addition, optimum chip evacuation and heat control are assured because each wedge lock features internal coolant channels that pinpoint jet streams of air precisely into the cutting zone.

Pairing Seco's new CS300 ceramic milling inserts with the new cutter bodies gives the user the toughness, strength and process stability necessary for aggressive milling of tough-to-machine superalloy materials. The flat, solid round inserts are custom-designed.



NO INSTABILITY, ONLY PREDICTABILITY FROM THE NEW MP2050

◆ **Seco's new MP2050** insert grade allows the user to effectively machine high strength, heat-resistant materials with a perfect balance of toughness and wear resistance. The insert grade was originally developed for turbine blade machining, but it also excels in aerospace applications and makes easy work of milling materials such as titanium, austenitic and martensitic stainless steels.

Unstable machining conditions such as those involving interrupted cuts, long tool overhangs and weak fixturing are all avoided when using MP2050 inserts. The user is also able to eliminate cutting-edge build-up due to the new substrate and a post treatment applied to its coating that effectively prevents chip adhesion. The grade also allows cutting parameters to be increased, especially in dry machining conditions, while maintaining high reliability.

The insert's very reliable substrate also means better wear predictability. Even if the insert coating wears off, the substrate prevents the immediate, unexpected failure of the entire insert.

THREE IS THE

JOINT APPROACH HAS DAWNLOUGH FLYING HIGH

Precision engineering company Dawnlough is carving out a niche in aerospace components, supported by Seco Tools and technical partner Premier Machine Tools.

BY ANDREW MONTGOMERY PHOTOS BY BRAD ANDERSON

PHOTOS: CULTURA CREATIVE, JOHNER

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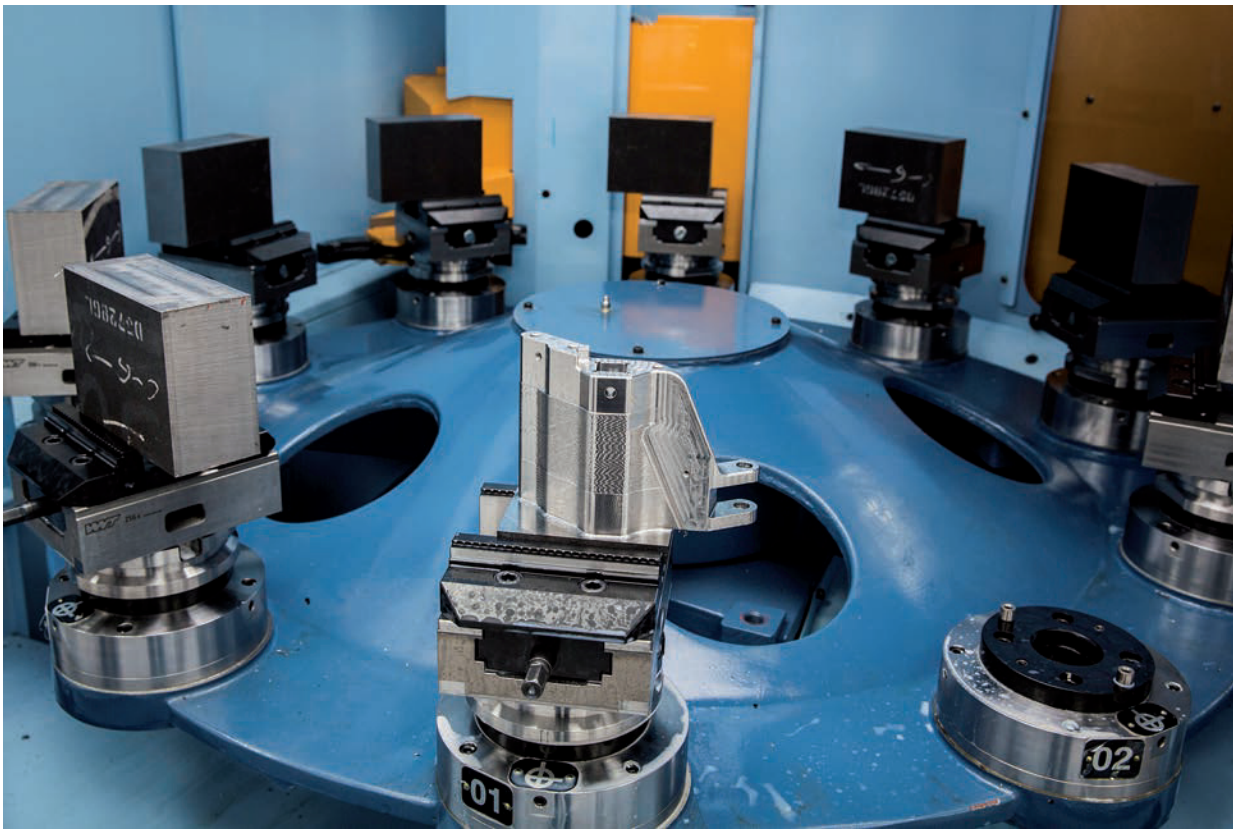


Collaboration has helped Dawnlough deliver a machining solution for the aerospace industry.

WHEN A MAJOR player in the aerospace sector orders a flight-critical component from your company, there are crucial factors to consider: The part is integral to the aircraft, turnaround time will be tight, it will be high volume and it will need to be precision-engineered to a degree of accuracy that outstrips even your usual high standards.

This was the situation recently faced by Irish precision engineering business Dawnlough, which had just four weeks to get a machining solution in place for a high-volume order for the aerospace industry.

Far from being daunted, the company rose to the challenge, with help from Seco and its technical partner in Ireland, Premier Machine Tools. The three have now laid the foundations for a highly productive working relationship they hope will continue to pay dividends.

Dennis Ross is Key Account Manager at Premier Machine Tools (PMT) and dealt with the initial enquiry:

"The owner of Dawnlough, Brian McKeon, approached me to ask if we could provide a three-axis machine. The contract was for an aerospace part that was of pre-hardened stainless steel up to 46 Rockwell, with a lot of different features on it. I recommended a Matsuura VX-1500, a sturdy, stable machine that can deal with heavy cuts and to the degree of pinpoint accuracy required.

Brian McKeon, owner of Dawnlough.

Dawnlough Ltd

Based in Galway, Ireland
Founded in 1997
Provides special purpose tooling to the aerospace and medical industries.

"I suggested we get Seco involved and we could do it as a turnkey project, where we made all the recommendations for the tooling and devised a tooling strategy. Then we'd get the Seco engineers to stand beside the machine until the part was proved out and Dawnlough was happy."

THAT APPROACH FOUND favor with Dawnlough, so Ross duly contacted Seco Technical Sales Engineer Tony Gillan, who travelled from the UK to present the method of manufacture drafted by him and Technical Manager Jon Shipley. It got the go-ahead.

"The turnkey solution that PMT was offering was a key factor in them getting the contract," says Brian McKeon. "It came out

David Kearns (above) is toolmaker and CNC programmer at Dawnlough.

From the left Mike Alsina from Seco Tools, Brian McKeon, owner of Dawnlough, and Dennis Ross from Premier Machine Tools.

"I suggested we get Seco involved and we could do it as a turnkey project."

DENNIS ROSS

Equipment used for aerospace contract

→ Supplied by Premier Machine Tools.
→ Matsuura VX-1500, 3-axis
→ Matsuura MX-850 5-axis
→ Matsuura MX330 PC10 5-axis x 2
→ Zeiss Contura CMM
→ SecoPoint vending machine.

very well because the machining process is smoother than we had anticipated. Even the tool life has been extended beyond what we thought it was going to be, so we've won in that area as well, through working the strategy with Seco."

It also helped that McKeon's engineering and design teams had the particular skills to carry out the work.

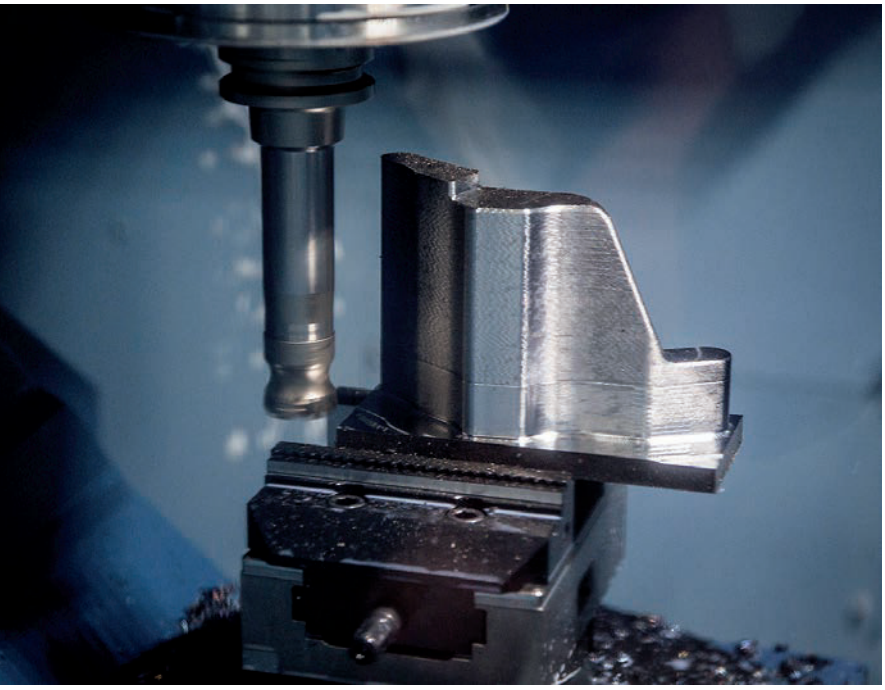
"We were able to win the work because we are cost-competitive. And our engineering and design teams have the work holding and accuracy skills to get the repeatability that is such a challenge with extremely high tolerances such as these."

Seco's Application Engineer Mike Alsina was also key to the project's success.

"Mike Alsina's knowledge and experience of the technology was important," says McKeon. "There were some large-diameter disc mills that he brought which we'd never have thought could have attacked the part the way we are attacking it. He maximized the ability of the machine. He also stayed for more than a week afterwards to help us optimize the process. He's been excellent."

While turnkey solutions are nothing new, the after service that the PMT/Seco package offered stands out.

"There are a lot of companies that will ▶



Dawnlough is now machining faster and with a longer tool life.

Brian McKeon and Dennis Ross checking details.

come in and offer that kind of solution but, although the technology might be the same, they don't have the experience and the knowledge that Mike has. That's a winner for Seco."

Also important was the provision of a SecoPoint vending machine for Dawnlough's supply refills. Seco CET engineer Adrian Walker provided support for this installation.

WITH THE FOUR-WEEK deadline being met and the whole process going more smoothly than expected, more business is in the pipeline. Dawnlough has now purchased three more Matsuuras – an MX-850 5-axis and two MX-330 10 pallet 5-axis machines. Seco is tooling all of them and Dawnlough has also asked Alsina to provide advanced training in cutting strategy to its engineers.

It's been win-win for Premier Machine Tools too.

"Seco is involved in everything we do now. We are their Technical Partner for Ireland and we're always looking for new business for them," says Ross. "The key is to replicate what we've done with Dawnlough and use it as the model for working with other businesses."

"We're making components now that I didn't think would be possible."

BRIAN MCKEON

And Brian McKeon is a happy customer.

"We're making components now that I didn't think would be possible. The technology has advanced so much that, even three years ago, I don't think we would have been able to manufacture what we're doing.

"But now the technology has caught up, we are machining faster and we have longer tool life; that's making us cost-competitive. We're now winning a lot of contracts back from low cost countries such as China, India and Turkey. Seco is helping us to become even more competitive.

"Ultimately, Dawnlough doesn't want to be ripping aluminum anymore. We want to be going towards hard metal machining with high tolerance. I think we're really pushing the boundaries now."

Seco's Tony Gillan is happy that his customer is happy, and says, "It just shows the strength of the collaboration between the three of us and Seco's ability to respond quickly, no matter the challenge." ◆

The lighter side of HEAVY TRANSPORT

Composite materials such as carbon fiber have a crucial role to play if we are going to meet the challenge of lowering vehicles' carbon dioxide emissions. Vehicles made of composite materials weigh less, which means lower energy use.

BY JOHAN WALLÉN PHOTOS BY JOHAN KNOBE

PHOTO: JOHNÉR

COMPOSITE MATERIALS HAVE been around for a long time. In the aviation industry, carbon fiber composite has been an integral part of the airplane hull for many years, along with steel, aluminum and other materials. The boatbuilding industry has been constructing fiberglass vessels for decades.

The definition of a composite material is that it has an overall structure with properties that are better and stronger than the sum of the individual components.

Composite materials come in different shapes and sizes, but the most common composite consists of a load-bearing fiber reinforcement surrounded by a protective material. In carbon fiber composites, the carbon fiber threads are weaved in different patterns depending on the desired properties of the material, and then reinforced with plastic that protects the fiber and holds the material in place.

"Most of the time, the desired end result when you use a composite material is to bring down the weight in a moving structure to lower energy consumption," says Malin Åkermo, Associate Professor of Lightweight Structures at the Department of Aeronautical and Vehicle Engineering at KTH Royal Institute of Technology, Stockholm.

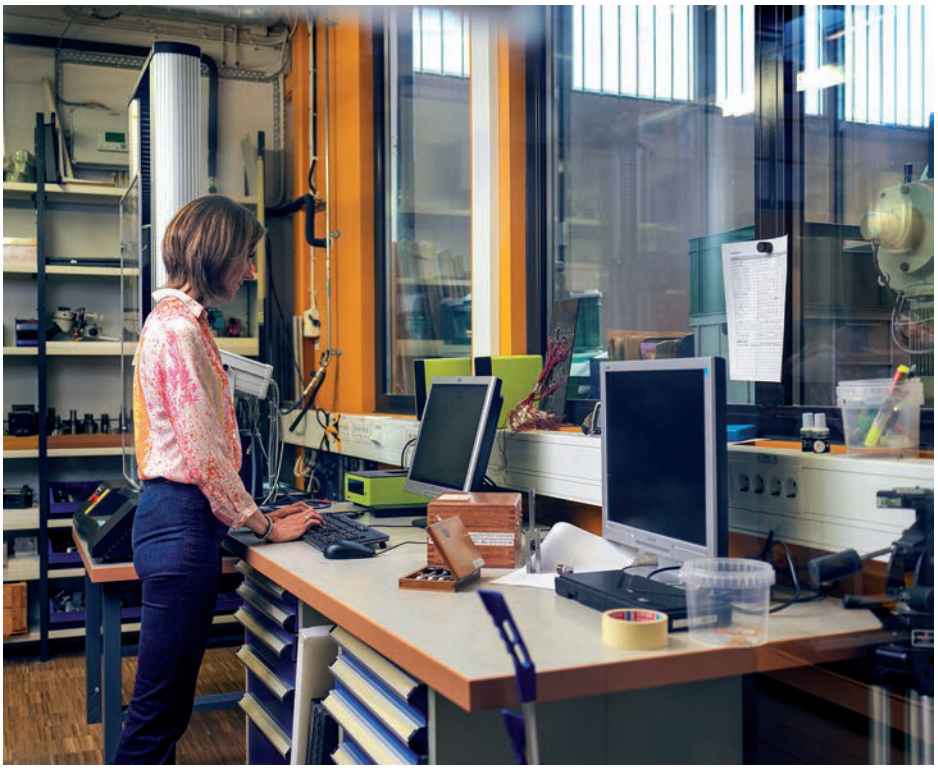
Historically, the problem with the likes of carbon fiber is that the raw material is costly, which in turn makes the finished composite material expensive compared to most metals. But, as of late, production techniques have been developing so that costs are reducing in line with the increase in usage in high-volume products in different parts of the world.

"The large-scale production of carbon fiber composites didn't really exist until very recently," says Åkermo. "But lately, there has been a rapid development in production in countries such as Germany and the UK. Manufacturers in Sweden are also beginning to produce car components in carbon fiber."

Åkermo explains that low demand is one key reason for construction costs of carbon fiber remaining high.

"So far, the reduction of fuel consumption hasn't been enough to motivate the cost of lowering the weight of the car for the producers. But with tougher EU regulations on fuel emissions we will see an increase in production."

Yet lower weight is only one of



FAST FACTS

Name:	Malin Åkermo
Age:	47
Title:	Associate professor
Family:	Husband and three children
Education:	MSc Engineering physics, from Uppsala University, PhD Lightweight structures from KTH, Stockholm
Hobbies:	Skiing, both downhill and cross country, preferably in northern Sweden.

the many benefits of composite materials. When constructing a material from scratch, you have the opportunity to add more functionality directly into the material.

"The most exciting 'future application' right now is using multi-functional materials," says Åkermo.

"A good example that I often use is structural batteries. Carbon fiber can be charged with lithium ions and, with the right kind of plastic, you can make a material that is both load-bearing and works as a battery at the same time.

"Another example is energy harvesting. We can embed actuators into the composite material that convert vibration and movement into energy. During a flight, the wings of an airplane move slightly up and down. We could use that energy to run the air conditioning in the plane, for example. This way, you build smartness into the product."

The construction methods required for composite materials and those used for steel and aluminum differ greatly. For example, drilling in a composite material is a more delicate matter.

"When drilling into a composite material you drill through plastic and fiber at the same time," explains Åkermo. "The materials don't have the same rigidity so it's very easy to damage the softer plastic. And if you apply too much pressure, you will get cracks between the layers."

> "Most of the time, the desired end result when you use a composite material is to bring down the weight in a moving structure to lower energy consumption."
> Malin Åkermo

Multi-functional materials are the future. Costs are reducing in line with the increase in usage.

THE SOFTNESS OF the plastic material also means that nuts and bolts cannot be used in the same way as they are with steel or aluminum.

"When connecting two pieces of metal, you commonly use a torque wrench to apply a certain pressure on top of the hole. But creep [slight movement] means that you can't guarantee such a pressure with composites, so you will have to use a screw joint with nuts and washers that will support the structure without friction on the material."

The car industry is among those who choose to glue the material together instead of drilling into it. Another solution is to make bigger and better integrated parts to avoid the need for joining them together.

Indeed, researchers from Volvo are looking into how to find the perfect balance between part complexity and size to make it cost-effective.

"There have been experiments with making the body of the car all in one piece, but the problem is that you will need a very large press," says Åkermo.

For car manufacturers, a viable way towards making carbon fiber cars is to introduce carbon fiber parts in premium cars to learn and refine the production process.

"BMW built the i3 which is comparatively very expensive but was mainly made from carbon fiber composites. Now they are incorporating carbon fiber into the pillars of some of their other cars," says Åkermo.

In the rapidly-changing world of transport, there's no doubt that making vehicles smarter and more sustainable is imperative as part of the effort to cut emissions and energy consumption.

If the growing use of composite materials is anything to go by, we're looking at a future with smartness built in. ◆

CLEANER STEEL CUTS THE CHAIN

With its new stainless tool steel IDUN, Seco is making the leap towards a more environmentally, economically, and socially sustainable value chain. IDUN has fewer production steps and a more predictable production chain. Customers can also expect quicker deliveries.

BY JOHAN WALLÉN
ILLUSTRATION BY
MARTIN NICOLAUSSON

THE NEW STAINLESS STEEL quality IDUN is the next step in the evolution of Seco Tools insert carriers. IDUN is a martensitic stainless tool steel, developed in cooperation with Uddeholms, a producer of high alloyed tool steel. It is developed from the material Mirax 40, which, with some minor adjustments, was turned into IDUN. The main advantage of IDUN compared to a traditional material is its corrosion resistance, which in turn brings a lot of benefits.

"When I realized what the new material will mean for us and how much it will contribute to our sustainability work, I was very pleased," says Susanne Evegård, manager of sustainable business at Seco Tools.

"Usually, you talk about three dimensions of sustainability: social, economic, and environmental sustainability. The benefits from IDUN fall under all three of these categories."

The standard material used in Seco's other tools need several processing steps

before the material becomes the final tool. The most crucial step is nickel coating to make the tool resistant to corrosion. This is normally done by sending the tool off to an external facility, which requires additional transportation and adds to the overall lead time.

However, IDUN does not require nickel coating or blackening (the process that was used before nickel-coating). This has a lot of benefits. The most obvious one is that you get rid of nickel in the actual tool, which means that the people handling the tool don't run the risk of having an allergic reaction to it.

Another benefit of IDUN is the shorter production time. Fewer steps in the process means that the process from raw material to finished tool is almost halved. This is especially true when it comes to custom tooling, the department of Seco that makes tools based on specific customer requirements.

"In custom tooling, it's very important that the customer gets the tools fast, and on time," says Evegård. "Having fewer production steps makes the process quicker and more predictable. The produced products are ready directly after machining. No extra operation, like nickel-coating, heat treatment, or sandblasting, is needed. With IDUN, we can minimize negative environmental impact from energy usage, transportation, and hazardous substances. This way, we can create a more sustainable value chain."

David Romlin

Susanne Evegård

Harry Väyrynen

"Having fewer production steps makes the process quicker and more predictable."

SUSANNE EVEGÅRD

In February this year, the only commercially-available tool made with IDUN , the R220.88 face milling cutter, was released. Designed for roughing and semi-finishing applications, the R220.88 is suitable for machining cast iron and steels in the general machining and automotive segments. But the development of the IDUN material has been underway for several years.

"WE STARTED LOOKING for alternative steel qualities about four years ago. We tried different materials from different suppliers, and found the Mirax 40 from Uddeholm", explains Harry Väyrynen, who is an R&D engineer with technical responsibility for Seco's tooling materials. "We tried some different hardnesses and with some adjustments based on our requirements Uddeholm came up with IDUN."

In 2016, IDUN was approved for production by Seco. But even though there is already one IDUN-based tool in the product portfolio, IDUN is still considered to be in a test phase.

"So far, we have had very positive results from IDUN, and the plan is to move the production more and more towards using it," says Väyrynen. "I think that over time we could produce between 50 to 60 percent of our milling cutters, and maybe one-third of our tools overall, from IDUN."

However, it's not only inner qualities that make it superior to other materials. Soon, Seco will start to polish the tools made from IDUN, making the tools stand out even more from those of the company's competitors.

"This material is made for polishing. It will give the tools a beautiful and more uniform look compared to the ones that are nickel-coated or blackened," says David Romlin, corporate product manager for indexable milling at Seco Tools.

"IDUN is also a very pure material with very low levels of impurities, which reduces the risks of cracks."

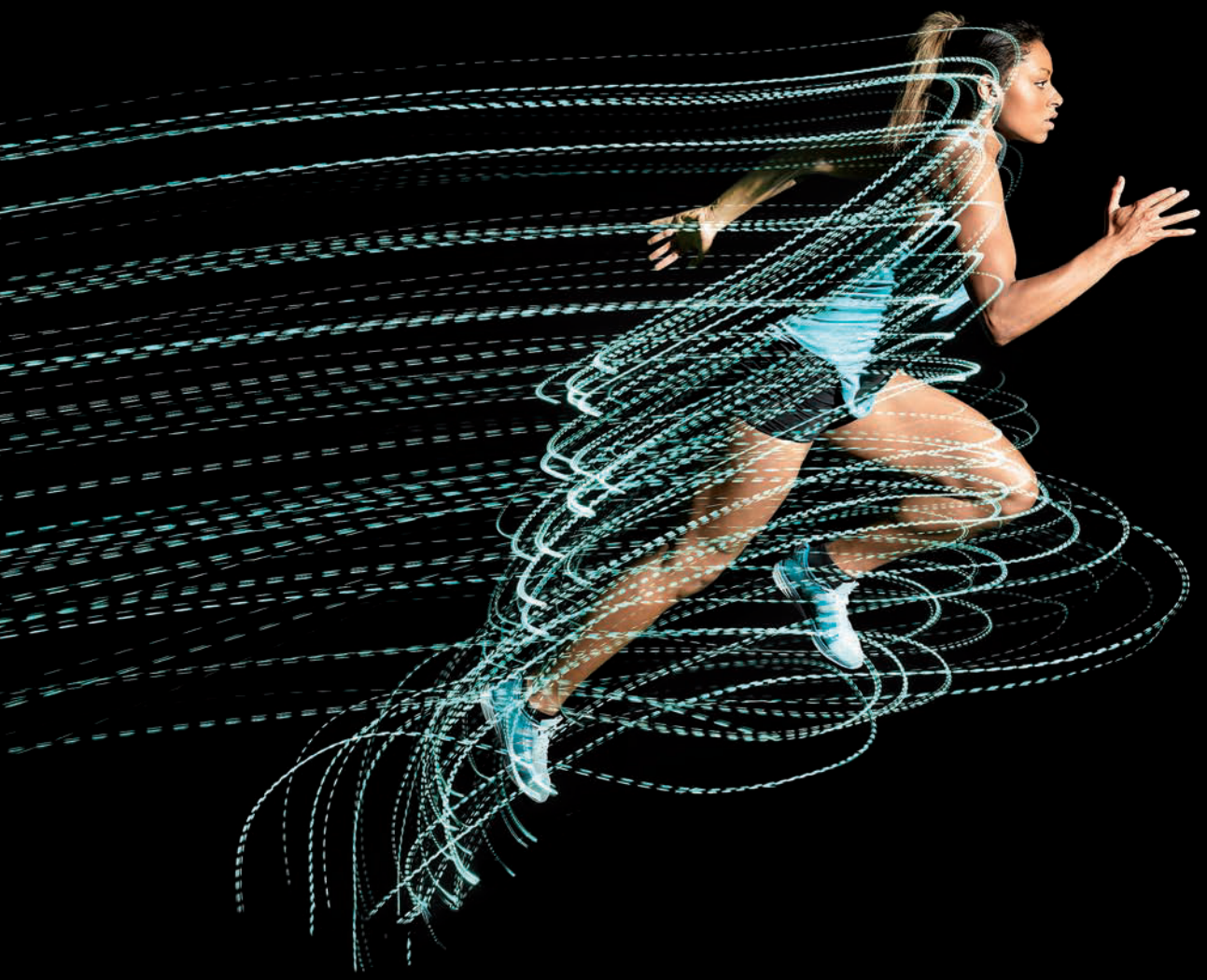
Romlin believes that in the transition towards a more environmentally and socially-sustainable production process, it is important to talk about the work that is yet to be done.

"We still use nickel-coating, but we are working on minimizing it. We shouldn't shy away from talking about the benefits of the new material, while still using the traditional materials. We should always strive to improve our products and be transparent about the improvements." ◆

This is IDUN

→ **IDUN is a martensitic** stainless tool steel, developed in cooperation with Uddelholms. Its natural resistance to corrosion eliminates the need for nickel-coating.

→ **That means savings** in lead time, production cost and environmental impact, as well as reduced exposure to hazardous material for people working with the tools made from IDUN rather than coated with nickel.



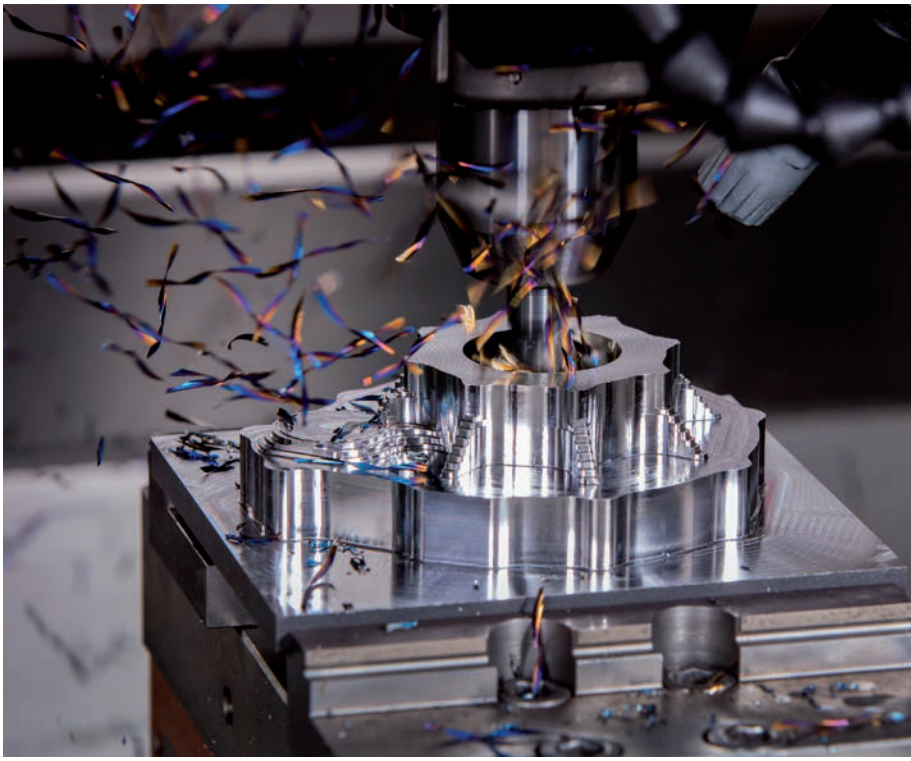
Top result

with improved acceleration

Increased tool speed and longer tool life play a key role in helping profit margins. But even the most idealized projections of machine manufacturers are being surpassed by the new tool efficiency parameters.

BY MICHAEL LAWTON PHOTOS BY SOLIDCAM

PHOTO: GETTY IMAGES



Since SolidCam introduced iMachining, manufacturers have improved speed, acceleration, precision and control to match, says Gürsel Demircali.

INEFFICIENT TOOL PATHS are a common issue for machine manufacturers. When materials are tough to machine, it often means that cutting tools cannot be used to their full functional depth, which in turn can sometimes affect the quality of the machining and take up valuable time and money.

There are many companies that have squeezed out a bit more speed or prolonged tool life in a bid to bolster their margins. But German company SolidCAM boasts that it can improve performance to such an extent that its figures regularly outpace the ideal performance projections of machine manufacturers. In fact, the result is a 70 to 80 percent improvement in machining speed, with up to five times the tool life too.

As Gürsel Demircali, SolidCAM's Regional Manager Western Germany, says, "If the customer doesn't believe our claim that we can do a job 80 percent faster, our representative just shows them directly on one of their own machines."

So what's SolidCAM's secret? The answer is a piece of very smart software that can maximize the potential of Seco's cutting tools, as well as a strategic partnership with Seco that calls on the tool manufacturer's unrivalled experience in helping to refine this cutting-edge technology and boost its efficiency still further.

FOUNDED IN 1994 in the small south German town of Schramberg, SolidCAM patented its iMachining software in 2011. iMachining is a single program that brings all the various machining operations together. Not only that, it also goes so far as to optimize each operation so that the tools involved can be used in the most efficient way possible.

For example, by deploying advanced roughing, cutting tools like the Seco Jabro-Solid² end mills can be used to their full functional depth. This means that time isn't wasted on inefficient tool paths. The software puts the tool on the right path by calculating a G-code based on a patented morphing spiral, and this gradually conforms to the geometry of the work piece being machined. This maximizes the time that the tool is actually in the cut, offering high machining efficiency for the end-user.

"We've developed specific features which allow tools to work at higher speeds."

RUUD ZANDERS

"We are especially good on materials which are difficult to machine or are very hard, such as 65 HRC," says Demircali.

He also claims that SolidCAM's limitations come mostly from the machines, many of which are not dynamic enough. However, he does add that the market is responding: "Since we introduced iMachining, manufacturers have improved speed, acceleration, precision and control to match."

TOOLS FOR ADVANCED roughing have to meet high specifications. Cutting depth can be increased, since smart toolpaths allow deeper machining; chip handling must be optimized with chip splitting since more and larger chips are produced; the front geometry has to be designed to optimize entry angles; coatings have to be able to deal with the new parameters.

That's no problem for SolidCAM, though. Dirk Klinge, Sales Director at SolidCAM explains, "We offer modules for milling from 2.5D up to 5-axis-simultaneous, turning and mill-turn, even wire-cutting, so that we can provide customers with precisely the right software for their needs."

SolidCAM enjoys working with Seco's Jabro-Solid² products.

"Seco is a good partner," says Demircali. "They already have the high-performance tool solutions and work with us to develop new technologies. We have good personal relations, sharing ideas about new development projects, and we're pleased that they bring so much to the relationship."

RUUD ZANDERS, Product Range Manager at Seco Jabro, says that the new range of Jabro end mills, the JS564 and JS565, were developed and tested together with SolidCAM.

He adds, "We've developed specific features which allow tools to work at higher speeds: taper cores are designed to increase strength, a new frontal tooth design allows faster helical interpolation, our chip-splitter geometry prevents quenching of the material, and our new NXT coating offers versatility in a wide range of materials."

SolidCAM now has over 20,000 operating licences in over 50 countries. Of its 75 staff, 30 are application technicians who are deployed around Germany, and all of them have plenty of experience in operating machines. That explains the readiness to show incredulous customers precisely how the software can work to their advantage.

But the key to SolidCAM's success is the simplicity of the programming.

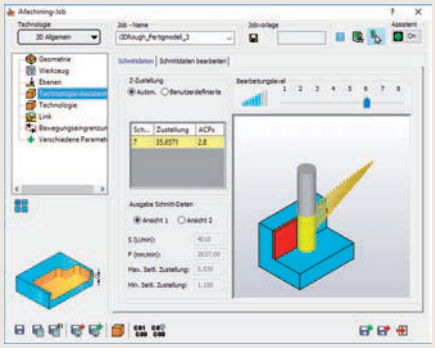
"The really unique aspect of iMachining is that operators themselves can set the programs – you don't need specialist programmers," says Gürsel Demircali.

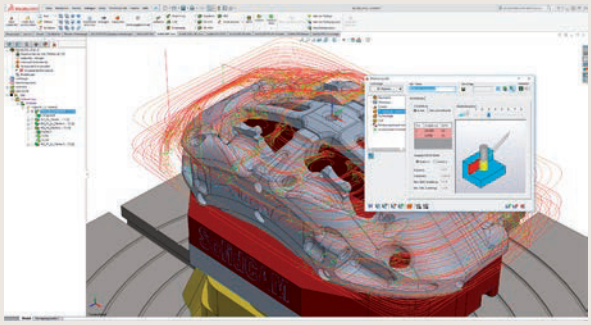
Dirk Klinge adds, "We have scientifically determined optimal conditions, and so the system always works. You never have to throw a scrap part away."

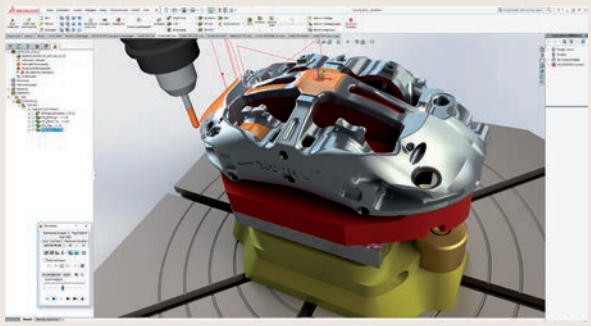
Certainly Seco is convinced, and sees the collaboration with SolidCAM as highly significant for the future.

"We think that smart toolpaths like this, that allow tools to cut with constant cutting action, will make up 25–50 percent of all solid milling applications within the next four or five years," says Ruud Zanders. ◆

Extreme high metal removal rates with optimised tool paths. By optimising tool engagement angle and cutting speed for the whole machining process, extremely fast milling in deeper cavities can be realised.







Advanced roughing

- → Advanced roughing with Jabro Solid² JS564 and JS565
- → Universal NXT coating makes it suitable for all work piece materials
- → High stability means long tool-life, even with deep cutting
- → Extremely high cutting rates thanks to the use of the entire cutting length
- → Reduced tool costs and tool wear
- → Secure processes thanks to optimized chip handling

Tool range:

- → Solid carbide milling cutter JS564-2C with APMX 2,5 x DC, z = 4, cylindrical shaft and weldon shaft, with chip breaker
- → Solid carbide milling cutter JS564-3C with APMX 3,5 x DC, z = 4, cylindrical shaft and weldon shaft, with chip breaker
- → Solid carbide milling cutter JS565-2C with APMX 2,5 x DC, z = 5, cylindrical shaft and weldon shaft, with and without chip breaker
- → Solid carbide milling cutter JS565-2C with APMX 3,5 x DC, z = 5, cylindrical shaft and weldon shaft, with and without chip breaker


SPU 75

Born to ride

Mike Parker is Director of Seco's National Sales Organization in the US. It's a high-powered job, but he has a high-powered hobby that helps him relax: collecting, fixing and riding motorbikes.

BY ANDREW MONTGOMERY PHOTOS BY ERIC MULL

IN THE AREA of Michigan in which he lives, Mike Parker is known for collecting motorbikes. That's understandable – he has amassed a collection of them in the last 17 years, during which time he has worked in the US for Seco Tools as Engineering Director, Marketing Director and now Sales Director.

But to anyone who expresses surprise at the size of his collection, the 58-year-old Englishman says: "Nobody ever asks their wife how many pairs of shoes she's got."

Parker joined Seco in 1981. He has worked in the UK, Sweden and the US. Despite many years stateside, he has not lost his native 'Brummie' (Birmingham) accent.

He got into motorbikes at 14, competing in off-road motocross between the ages of 15 and 24. But it was a moment as an engineering apprentice that really changed things.

"When I was 16 and working in a factory in

England, one of the older guys had a brand-new Triumph Trident 750cc triple cylinder, and for some reason he wanted to swap bikes for the night with my Honda 125.

"So I borrowed his Triumph and took my girlfriend out for the night on this monster bike. The girlfriend subsequently became my wife, Fiona."

Parker's collection really took hold when he came back to the US in 2000. He started with a rare Triumph Trident (like the one in the factory all those years ago), before moving on to motocross and superbikes, painstakingly fixing up each one. He won't say exactly how many he has, but it can be measured in the tens.

"I borrowed his Triumph and took my girlfriend out for the night. She subsequently became my wife."

HE REVISITED his youth by recently competing in the US National Vintage Motocross championship.

"A couple of years ago I convinced myself I could do it again, so I bought the best of the bikes I used to race – a '79 Maico 440 - and rebuilt it.

"I prepared physically with intense circuit training , and I came in second overall! Being on the starting line after 30-odd years – the adrenalin was unbelievable," he says. "Fiona says that I came home like an 18-year-old and woke up like an 80-year-old the day after the event."

Parker's reputation for collecting motorbikes even led to a rare find.

"Last fall, a guy cycled up to my house and said he had a friend who wanted to sell a rare British motorbike. It turned out it was a Vincent, and only just over 3,000 of those were ever made. The owner sneaked it into the US in the 1980s but never registered it, so it was under a blanket all that time.

"It was still in really good condition and only needed a bit of fixing up. I think I paid too much and he thinks I got it too cheap!"

All's well that ends well – Mike and the seller of the Vincent motorbike will be present with the bike at a classic car rally in Michigan in June. ◆

FACTBOX:

▸ **Thirty-six years with Seco:** three different spells in the UK; twice in Sweden (a year in Fagersta and a year in Norrköping), and two spells in the US, where he has been Director of Manufacturing at Seco's Tennessee factory, Director of Marketing, Director of Engineering and, since 2015, Director of Sales.

▸ **Wife Fiona.** Has a son Alexander and a daughter Elizabeth. His son was born in Sweden, his daughter in the US – his son is getting into off-road bikes, but Mike is keeping his children away from road bikes as he says they're too dangerous.

Patrick De Vos high-lights current technical challanges and answers reader's questions.

Industry 4.0: the NEXT STEP?

ASK PATRICK

Do you have questions? Send them to:
patrick.de.vos@secotools.com

MSc
Global Business Manager
Consultancy Services
Corporate STEP Educational
Services Manager

TODAY'S MANUFACTURING industry is typified by High Mix Low Volume (HMLV) production, and this presents specific challenges. HMLV is characterised by small batches of different workpieces, but the machining cost and productivity must be equivalent to those for a big batch production, and there must be 100% yield and quality. The biggest issues with HMLV are having enough skilled people and ensuring that planning and scheduling are accurate.

The latest answer to the challenges posed by HMLV is Industry 4.0, an organisational concept that can tap into the possibilities of modern IT tools.

Unfortunately, however, most companies that want to use Industry 4.0 start with the digitalisation process, and forget about the first step – Operational Excellence.

Operational Excellence in a machining production is attained by controlling and balancing the core processes with knowledge of machining technology, reducing waste through an optimised production system and production environment, and ensuring production economy, where cost, productivity, yield and final quality considerations inform the whole production process.

That's where Seco's NEXT STEP concept comes in – combining machining technology, production economics and waste reduction in one equation.

NEXT STEP IS AT the heart of the new Consultancy Services that Seco is offering to the manufacturing industry. We want to work with our customers in their journey towards effective and efficient HMLV production, from Operational Excellence to the internal and external digitalisation processes.

Our STEP technical courses train customers' production and engineering staff in the right skills and knowledge to operate in a HMLV environment.

IMPROVED WEBSITE

Seco's new and improved website assists our customers with external digitalisation, via functions such as:

A BETTER SEARCH FUNCTION

◆ Searching for a specific product gives the user videos, PDFs and product details such as parameters, 2D DXFs, 3D-models and cutting data.

A BETTER PRODUCT TREE STRUCTURE

◆ If you are unsure about a specific product, use the product tree and navigate to the area that you want to focus on.

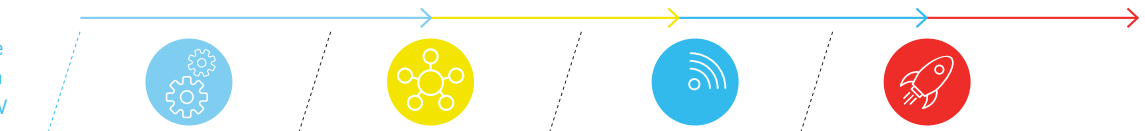
A MORE INTUITIVE LAYOUT

◆ The new site is easy to navigate. You'll always get a suggestion of where to go.

THE SUGGEST SEARCH TOOL

◆ Seco now offers more than 41 million solutions for machining operations. By using Suggest the user has the possibility to quickly home in on the tools that best fit your purpose.

INDUSTRY 4.0 is the modern approach for efficient HMLV production



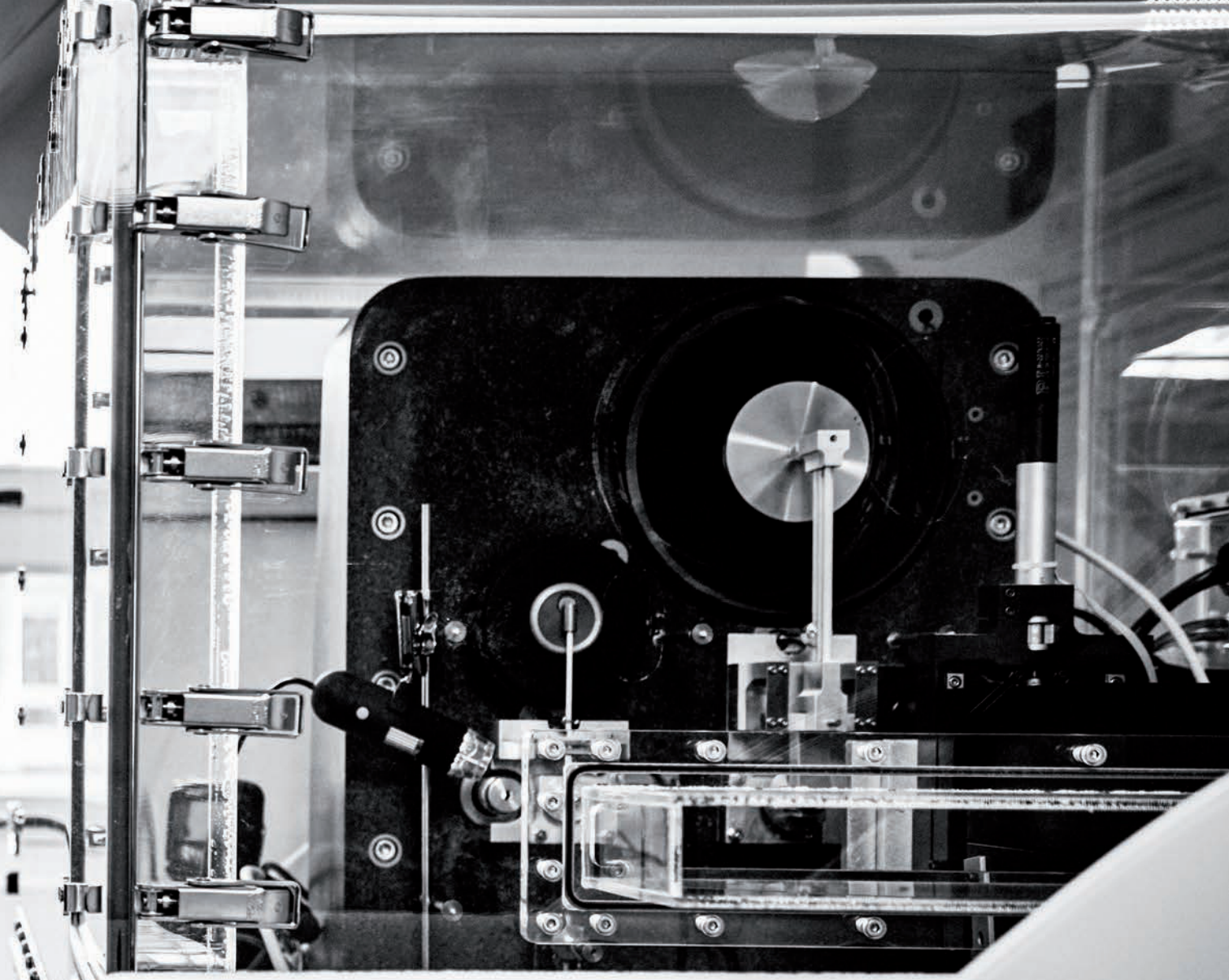
Operational Excellence 01
Machining process
Manufacturing system
Manufacturing environment

Internal digitalization 02
Information
Smart machines and equipment
Data Analytics

External digitalization 03
Integrated supply chain to suppliers and customers
Supply and demand fully connected

Machining Industry 4.0
Customized products
Cost of 1 piece batch is same as 1 million batch
Delivery as from stock
Guaranteed yield and quality
Collaboration and transparency

Mutual gains *for academia and industry*



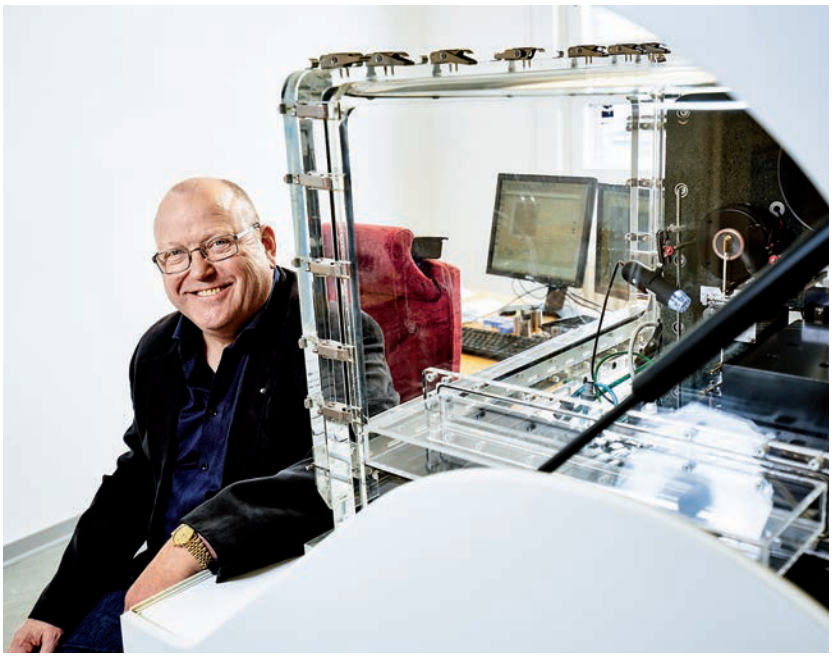
Professor Jan-Eric Ståhl has been collaborating with Seco over two decades, feeding research results into the development of cutting-data software and training engineers in metal-cutting theories.

BY JOHAN WALLÉN
PHOTOS BY PETER WESTRUP

THE PARTNERSHIP BETWEEN Professor Jan-Eric Ståhl and Seco has lasted longer than many modern marriages. For 17 years, they have collaborated in a wide range of research areas, large and small, which have had a substantial impact on Seco's products and services offering.

Both parties see the advantages of a long-term relationship.

"The relationship with the manufacturing industry is important to me. I want to have an impact, change and contribute with my know-how and research results, while balancing this with always guaranteeing my objectivity as a professor at Lund University. That objectivity is both an asset and an opportunity for me as well as for Seco," says Ståhl, who is a Professor at the Division of Production and Materials Engineering



The first major joint project for Jan-Eric Ståhl and Seco started in 2000. It was called 'ShortCut'.

at Lund University, Sweden. "Overall, the purpose is to strengthen the competitiveness of Seco Tools and its customers."

Seco certainly sees the collaboration as a fruitful one:

"The results from the research projects are very useful to us, providing knowledge that can be used in the development of our products and that can act as a basis for models to describe our products' performance," says Sören Hägglund, Group R&D Specialist, Cutting Data, Seco.

The first major joint project for Ståhl and Seco started in 2000 and was called 'ShortCut'. The research team created process descriptions, explanations of how tools work and theories of cutting machining.

"We also worked with test methodology and test technology – how to perform tests in the product development process," Ståhl explains.

Four years after 'ShortCut', 'ShortCut II' began. In this project the team focused on machinability in difficult-to-machine materials, such as duplex stainless steels, high-strength superalloys (Alloy 718) and titanium alloys.

"We developed a methodology based on polar diagrams, where we look at five material properties of the workpiece material, which allows us to classify the severity of the material."

Several of the models developed in ShortCut I and II have been implemented in Seco's software. "It's very satisfying that our research is used in software applications such as 'Suggest'. Seco is a leader when it comes to user-friendliness, flexibility and the ability to use the applications in a varied way," Ståhl says.

ABOUT A YEAR AGO, a big new project started that could well change the future of the whole cutting-tool business. The EU-backed 'Flintstone2020' project has nine partners and a budget of 47 million Swedish kronor. It aims to find the cutting material of the future, with the proviso that it must be built from non-critical commodities.

Tungsten and cobalt are the two most important raw materials when manufacturing cutting tools. In Europe they are scarce commodities, but a solution is in sight.

"We are on our way to finding new tooling concepts, built on boron nitride and synthetic diamonds," says Ståhl, who is coordinating the project with Dr Volodymyr Bushlya, and working with research teams in Sweden, France, Germany, the Netherlands, the Ukraine and the UK.

The collaboration between Seco and Jan-Eric Ståhl extends to literature and training. In

The Division of Production and Materials Engineering at Lund University is a link between academia and industry. From left students Filip Lenrick, and Rebecka Lindvall, Jan-Eric Ståhl , and student Slava Kryzhanivskyy.

FAST FACTS
Name: Jan-Eric Ståhl
Born: in 1957 in Kristianstad, Sweden
Lives: in Lund, Sweden
Works: at the Division of Production and Materials Engineering at Lund University
Family: Wife and two daughters
Favorite hobbies: Tennis and gardening
Education: MSc and PhD in materials engineering from Lund University
Most proud of: "I've managed to integrate technology, economics and materials into my theories about production development."

2012, Seco Tools published Ståhl's 'Metal cutting, theories and models', a comprehensive overview of the field that is widely used in Seco Tools' educational program 'STEP'. The book has much more life in it too.

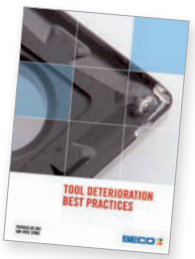
"THE PLAN IS to make a major revision of the book, but also issue a series of seven smaller books in cooperation with Seco's Corporate STEP Educational Service Manager Patrick De Vos," explains Ståhl. Three of the smaller books have already been published: 'Metal cutting theories in practice', 'Tool deterioration – best practices' and 'Applied metal cutting physics – best practices'.

Over the past ten years, Ståhl has trained more than 100 engineers at Seco – operators, developers, researchers and testers – in the latest theories of metal cutting and how to put those theories into practice.

"What is interesting about cutting tools is that in most cases the cost of the tool is of minor importance while the result of the tool is prioritized," Ståhl says. "The understanding of the cost-performance ratio is vital; that is the only instrument that describes the value of using different tool technologies."

The Lean philosophy is well established within production. It tells you to follow certain principles to obtain a good result.

> "The understanding of the cost-performance ratio is vital; that is the only instrument that describes the value of using different tool technologies."
> Jan-Eric Ståhl



Tool deterioration – best practices, by Patrick de Vos and Jan-Eric Ståhl.

However, Ståhl wants to clarify the relationship between technology and economy, which he does in the production development concept 'Next Step'. He says there needs to be a link between manufacturing processes, materials engineering and manufacturing systems.

"Next Step is about putting euros and cents on technology," he says. "We have developed a cost model to break down manufacturing costs for separate factors. This way, we can make a manufacturing economics scenario analysis that shows how a company's competitiveness is affected."

Despite being officially due to retire in five years, Ståhl says it takes ten years to build up the trust between academy and industry, and anticipates the partnership with Seco continuing for a lot longer.

"It's very stimulating and interesting to work with such a successful company as Seco Tools. We will continue our collaboration for at least ten years. There are still so many things to do." ◆

With no less than 18 design improvements between them, Seco's Feedmax-P and Perfomax drills have been vastly improved. Perfomax will work in all materials because of its strength, and the unique wave pattern on the body ensures that hole quality is not jeopardised. Feedmax-P is the fastest drill on the market, it cuts through steel at a cutting speed of 200 m/min. It may be adapted for steel, but can still work in other applications.

Perfomax

LASER HARDENING
The high hardness of Hrc60 to the front of the flute, increases the tool life of the drill body up to 140%.

WAVE TECHNOLOGY
The flutes now feature a wave pattern that generates an 'anti friction' surface, minimizing contact between the chip and the flute, resulting in higher application security.

NEW FLUTE DESIGN
The design features a larger helix, a smoother chip flute exit and larger centre chip flute area leading to the creation of smaller chips and easier evacuation.

Feedmax

COOLANT HOLE PLACEMENT
The coolant holes have been placed closer to the cutting edge making them more efficient and the drill stronger.

STRAIGHT CUTTING EDGE
Makes the cutting edge and corner stronger so you can drill at higher cutting speeds.

NARROW LAND MARGINS
The width of the land margins is reduced, which leads to less friction and reduced wear of the connection between the land margin and the corner chamfer.

OPTIMIZED FLUTE DESIGN
The flute design provides better chip evacuation, especially when drilling with high cutting speeds.

Want more?

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Your digital portal to everything Seco.

YOUTUBE CHANNEL
Check Seco's channel on Youtube to watch videos on how our products shape the metal parts that build your world.

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