HOW VOLKSWAGEN CONQUERED THE WORLD

SMOOTH RESULTS AT ALFA LAVAL

TAKE CONTROL OF TOOL CHANGING

FLEXIBILITY IS THE KEY

ON THE FAST TRACK TO THE BIG TIME:
SPORTS TECHNOLOGY — THE WINNING FORMULA

NEUMAN & ESSER IN GERMANY:

Alexander Peters, managing director, Neuman & Esser.
WHEN PROFESSIONAL GOLFERS in the early 1990s switched to hollow, over-sized driver heads made of titanium, their game improved vastly. Thanks to titanium, the ball simply went farther, gaining a lot of distance for the players – more in fact than had been gained previously through practice and technique.

Sports technology has helped numerous star athletes hit balls longer and harder, run and swim faster and jump higher and farther. We will likely see some of the results at the 2008 Olympic Games in Beijing, the event that thousands and thousands of athletes are currently gearing up for.

On the surface, star athletes and manufacturing engineers may seem like two different breeds, but they have one thing in common: the realization that challenging borders is a big part of improving performance.

WHEN VOLKSWAGEN CHINA was named official automotive partner of the 2008 Olympics, it initiated an internal Olympic improvement programme aimed at increasing sales, lowering costs and strengthening the brand. The programme challenged suppliers to present more efficient solutions, and for Sandvik Coromant, a supplier to Volkswagen China since 1989, it led to the introduction of new, more durable insert grades for cylinder block cutting tools.

IMPROVING PERFORMANCE requires both knowledge and presence. It involves pushing the envelope to see what can be done. “Problems happen, and you have to be prepared to deal with them quickly and efficiently,” says Mario Salinas, tools supervisor at the Volkswagen Centro Industrial Cordoba plant in Argentina, which manufactures gearboxes for the automotive industry. Different challenges require different solutions, and in Cordoba, Sandvik Coromant has its own office inside the manufacturing plant. The close cooperation between Volkswagen and Sandvik Coromant has resulted in a dynamic, fruitful relationship. For athletes, it may be that the winner takes all, but at Sandvik Coromant we want everyone to be a winner.

In this issue you can read about our presence across three continents – South America, Europe and Asia – and how that presence has enabled companies to meet their goals. As professional prognosticator Patrick Dixon puts it: “The greatest winners in the future combine brilliant engineering with real needs.” And that’s what Sandvik Coromant is all about.

I hope this issue of Metalworking World brings you pleasant and productive reading.

KENNETH V SUNDH
PRESIDENT SANDVIK COROMANT
METALWORKING WORLD #3/2007

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Correction: In Metalworking World #2/07, Ivan Spolaor was incorrectly identified. His correct title is regional sales manager for Sandvik Coromant Brazil. MWW regrets the error.

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How do you make sure that an insert remains fixed exactly in its position? Preventing micro-movements benefits both performance and quality. iLock, a broad interface concept developed to tackle insert instability at its source, has been applied to applications such as high-speed machining where tools are sensitive to insert micro-movements and where process quality consistency is a prerequisite.
VENDING SOLUTION PUTS UNIVEL BACK ON TRACK

Business was booming for South African driveshaft manufacturer Univel Transmissions (Pty) Ltd when tooling shortages caused a loss of productivity and subsequent setbacks. The higher production volumes had put pressure on tool and inventory cost control that the company’s then current system was not able to handle.

The productivity loss coupled with time constraints forced Univel to look for a vending solution that would ensure that it had the right tooling at the right time. Sandvik Coromant South Africa came up with the appropriate solution, which puts the user in total tooling control. The vending solution has thus far generated a tooling cost savings for Univel that over the initial six months translates to approximately 264,000 US Dollars. Further savings are expected as the tooling costs continue to decrease, despite an estimated 7 percent production increase. Based on the initial good results, the two companies are planning to continue to work closely together to ensure further savings in the future.

The new vending solution consists of 67 line items and has a three-level security system that puts Univel in total control of its tooling. Based on the customer’s requirements, Sandvik Coromant designed reports on AutoTAS, Sandvik Coromant’s simple and easy-to-use software-based tool management system. AutoTAS, which puts the user in total tooling control, was also interfaced with BAAN to ensure that all information would be live and available around the clock.

VENDING SOLUTION PUTS UNIVEL BACK ON TRACK

LOCAL TALENT REWARDED WITH MATERIAL SCHOLARSHIP

Johan Bratberg, PhD in engineering, has won the 2007 Sandvik Coromant Material Award for his theoretical and experimental research on complex thermodynamic and kinetic phenomena in carbide-containing systems. The award was presented to Bratberg by Magnus Ekbäck, vice president, R&D, Sandvik Coromant, at a ceremony at the Royal Institute of Technology – Bratberg’s alma mater in Stockholm.

“Johan’s work is of the highest scientific quality,” says Ekbäck. “He’s managed to create a larger correspondence between models and reality, increasing the amount of knowledge within this field. His work is closing the gap between academic research and industrial applications, and the results are of interest to Sandvik Coromant and other companies involved in material development. This knowledge is important when developing new materials, including cemented carbide, and Johan’s research has already been put to valuable use in our product development.”

Sandvik Coromant’s Material Award was instituted in 1989 to promote research within the field of material technology. It is presented annually and amounts to 35,000 Swedish kronor.

Bratberg has a special connection to Sandvik Coromant. “Johan originally comes from Sandviken, our company’s place of origin,” says Ekbäck. “To my knowledge, that’s a first.”

TIME TO RECYCLE OLD INSERTS

Now it’s easy to recycle your worn-out carbide inserts.

The focus on environmental issues has intensified recently. This makes it all the more important for the manufacturing industry to prove that its business causes as little strain on the environment as possible.

Sandvik Coromant can help you achieve this.

The Sandvik Coromant Recycling Concept was introduced 10 years ago and is certified at all levels according to the international environmental management standard ISO 14001.

“This means that we collect worn-out carbide inserts, regardless of their brand,” says project manager Lars Hallberg.

The manufacturer gets rid of the inserts in a practical way, while also being able to use a system that is environmentally certified at every level.

“This is a service to our customers that is easy to use and available all around the world, wherever they conduct their business,” says Hallberg.
Sandvik Coromant prides itself on going the extra mile to ensure productivity and profitability for its customers. It also prides itself on having a strong humanitarian focus, which is why New Orleans was the location for Sandvik Coromant’s Distributor Information Days 2007.

On arriving in the Big Easy, Sandvik Coromant employees and distributors were treated to a live performance by a New Orleans brass band, dinner at the world-renowned Antoine’s restaurant and a motivational speech from Rocky Bleier – a Notre Dame graduate, a Vietnam veteran and a four-time Super Bowl champion running back. But the true impact of being in New Orleans was not felt until a two-hour bus tour through the city’s most devastated areas. Bearing witness to the difficult conditions inspired many to take an active interest in bringing the city back to life.

The Sandvik Coromant team and channel partners teamed up with the New Orleans Area Habitat for Humanity (NOAHH) to help the Musicians’ Village, a budding community created by jazz legends Branford Marsalis and Harry Connick Jr. After providing home-replacement services that ranged from framing and hanging drywall to painting and roofing, distributors joined Sandvik Coromant in a donation-matching programme resulting in 10,000 US dollars going to NOAHH to purchase tools.

“Eighteen months after Katrina, New Orleans still resembles a war-torn country rather than a city on the mend,” says John Jacobsen of Sandvik Coromant US. “Bringing musicians home is the first ingredient in the remedy, and we are committed to helping make that possible, be it through physical aid or monetary donations.”

For Sandvik Coromant, Distributor Information Days was more than a chance to display new initiatives and plans for 2007 to its family of channel partners; it was also an opportunity to go the extra mile for a city in great need of good will. By making this project a matter of conscience and action, the Sandvik Coromant team not only helped provide musicians and their families with new homes but also helped efforts to bring music back to New Orleans, a key component in the city’s revival.

CHERY AUTOMOBILE NAMED BEST SUPPLIER

Chery Automobile, one of China’s largest automakers and the largest independent auto manufacturer in the country, named Sandvik Coromant “best supplier” in the cutting sector for 2006. Chery cited high-quality products and outstanding solutions as reasons for the award, presented at the Common Material Supplier Conference in Wuhu City in January 2007. This is the fourth year in a row that Sandvik Coromant has won the award. Chery Automobile, famous for innovations in car manufacturing, has become the top car manufacturer with independent intellectual rights in China. It leads the national auto brands in the Chinese market. Since its start in 1997, the key to its success has been its focus on independent innovation and production efficiency. As one of its close strategic partners, Sandvik Coromant established a stable and intensive cooperation when Chery constructed their engine plant in 1998.
BE A TIME BANDIT: MAKE TOOL CHANGING QUICKER

A quick-change system can add hours of productivity to turning operations.

**Challenge:** How can you shave precious time off of tool changing?

**Solution:** Consider replacing conventional tooling setups with a quick-change system.

For most component manufacturers, productivity is an obsession. The average actual processing time in a machine can be as little as 36 percent of the total production time for a typical turning operation, so getting the maximum use out of an expensive machine tool is a particular challenge.

Companies using conventional tool setups in turning centres lose time in a number of ways – changing workpieces, batch setup and gauging, insert indexing, changing tools and service tasks.

One of the ways to cut time – by as much as 25 percent – is to invest in a quick-change system, thus raising overall processing time to 45 percent and reducing overall machine downtime. With the Coromant Capto quick-change tool concept, tool replacement time drops from an average of more than eight minutes to less than one minute. For every tool in a turret, as much as 50 hours of production can be added. This results in a payback time of just a few months on a new machine tool investment.

This is possible because of the modularity of the system and the simplicity of the clamping system, compared with a conventional tool-holding setup. The Coromant Capto quick-change tool concept can be applied on most types of turning machines, thanks to various solutions for different turret designs and concepts. There are a number of clamping alternatives available, ranging from add-on clamping solutions to integrated turret configurations. For standard machines, conversion is easily carried out through the use of standard clamping units, without any modification to the turret. In addition, Coromant Capto has an integrated turret design that offers space savings, compared with external clamping.

In essence, the quick-change system allows faster and more efficient tool changing, and inserts can be changed outside the machine. The use of sister tools is faster because it is faster to change a complete tool holder than a single insert. In addition, the quick-change system offers pre-setting possibilities, since measurements can also be carried out away from the machine. As it has high positional accuracy, it requires few or no measuring cuts.

The clamping and unclamping of the tool can be carried out with less than a 180-degree turn for both procedures. A quick-change system offers particular advantages to manufacturers that have operations that require frequent insert changes or for those running small-batch productions where they can benefit from faster setup times.

**For More Information:** Contact your local Sandvik Coromant representative.
“Plug and play” best describes Coromant Capto, a quick-change system for turning centres. It shortens machine downtime, raises overall production availability and helps raise processing times.

Quick-change systems offer the best economics for small-batch productions, where quicker setup times are important, or for operations where frequent inserts changes are needed.

Because Coromant Capto is a quick-change concept that can be applied via a set of versatile clamping options, it can be implemented on all types of machines and turrets. The practical results are real-time savings that can be transformed into productive parts machining. This is of particular importance for those manufacturers and subcontractors that need to offer a rapid, flexible and responsive service to their customers.

**SUMMARY**

**TECHNICAL FACTS**

- Machine suitability: All types of turning machines.
- Clamping options: Clamping units can be used to adapt most machines.
- Repeatability: +/- 2 microns.
- Performance: Tool changing can be cut to less than 60 seconds.
- Standardization: Can be used for the full range of tools.

**CASE STUDY**

In the world of subcontracting, fast changeovers between jobs are necessary to ensure that as much time as possible is productive time. Faced with a huge variation in components manufacturing ranging from small to medium numbers of pieces in a batch, one contract machine shop opted for a Coromant Capto quick-change system for its CNC lathe.

The flexible nature of the company’s business meant that there was a need to minimize setup time and, consequently, non-productive time. The company chose Coromant Capto because of the ease with which the modification to the tool turret could be achieved through clamping units. Another factor in Coromant Capto’s favour was the rigidity of the coupling, compared with other modular systems, and the ease with which cutting heads could be changed.

Overall, the introduction of the quick-change concept has been of benefit, due to the speed with which machine setup can be changed, the availability of an extensive range of standard and special cutting tools and the simplicity and cleanliness of tool changing.

**THE BENEFITS**

- 25 percent more cutting time
- Improved profitability
- Greater machine availability
- Shorter machine downtimes
- Simple setups
- Repeatability.

**THE BENEFITS**

- 8.5 MINUTES
- Short setup time. Segment clamping makes it possible to change tools five times faster than with conventional tools. Exact positioning and pre-setting possibilities mean few or no measuring cuts.

- 0.5 MINUTE
- It is easy to convert a conventional shank tool turret to Coromant Capto.

- With Coromant Capto in the turret, it takes minutes instead of hours to tool up a machine.

- Turret for Coromant Disc Interface.
FLEXIBILITY CREATES INCOME

Outsourcing service and production functions is a trend among manufacturers. Neuman & Esser has chosen a different path, taking control of the entire production process required to machine its large-scale piston compressor. The reward? Greater flexibility – and competitiveness.

THE CITY OF ÜBACH-PALENBERG, near Aachen, Germany, lies in the middle of a landscape that has been shaped by coal mining. Sharply angled hills overgrown with grass create a bizarre silhouette on the horizon, which serves as a constant reminder that the small city lies at the edge of the West German hard-coal-mining region. The local inhabitants are well acquainted with the ins and outs of producing energy. A few kilometres down the road, in the soft-coal-mining region, people are used to the idea that the series of strip mines working their way through the landscape may well force motorway exits – or even whole villages – to move.

Übách-Palenberg is where Neuman & Esser (NEA), a producer of large-scale piston compressors, has its headquarters. Among other things, the compressors are used for compressing hydrogen gases in refineries, as well as, increasingly, compressing natural gas. “For instance, we have just received a big contract from a German utility company for storing natural gas in underground caverns,” reports Norbert Winands, head of technology for NEA. Compressors are also used in the food industry in the production of bottles made of PET, which requires large-scale blowing machines, and in processes using industrial gases (oxygen, hydrogen and nitrogen, for example).

The total worldwide market for compressors is estimated at between 1.5 and 1.6 billion euros. And with 800 employees, NEA holds third or possibly second place in that market. “Our principal markets are the United States and the Asian markets, especially China, as well as the Middle East – wherever the petrochemical industry and refineries are located near oil wells,” says Winands.

The logic of the sales plan behind the piston compressors is appealingly simple. NEA sells its customers ready-to-use systems. The core of these installations, the compressor itself, which normally accounts for about a quarter to a third of the value of the contract, is manu-
Transport of a compressor housing.
factured in Germany. The larger machines of this type, which weigh up to 160 tonnes, are manufactured at the main plant in Übach-Palenberg. Smaller compressors are made at a second plant in Wurzen, near Leipzig, Germany. Independent subsidiaries in Germany, Italy, India, Thailand, Brazil, the US and other countries then see to it that additional components “complete” the compressors to create made-to-order systems. Everything that is needed for the process that services the compressor, from pulsation dampers to tubing and oil systems, is purchased in the country where the installation is ultimately assembled.

“The great advantage is that the system automatically meets the norms for each particular country,” says Winands. “At the same time, we solve the problem that some countries require a certain percentage of local content – parts that have been manufactured in that specific country.”

It’s a good system, but one that depends on a reliable supply of crankshafts or forged crankshaft blanks for the compressors, which the company was buying ready-made and processing to completion. However, a few years ago, says Winands, NEA realized that supply could be a problem, in particular for larger crankshafts. “At that time, two large crankshaft manufacturers in England had just gone out of business,” Winands recalls. “Around Europe, you could count on one hand the number of companies that manufactured such large components.”

THUS NEA FEARED that it would become overly dependent on a few suppliers. So the company decided to invest in its own CNC machining centre in which crankshafts could, if necessary, be manufactured from start to finish out of forged round bars. But the plant’s need for crankshafts was limited, so the machining centre also needed to be able to manufacture other components.

Achim Hoch, head of production for the NEA Übach-Palenberg plant, and Willi Tetz, a workshop supervisor, set off on a search. “We wanted a machine that would manufacture the crankshaft completely, with a minimum of clamping,” recalls Hoch. “In addition, it had to be able to produce at least three other workpieces.”

Regional tool services provider and Sandvik Coromant distributor KFW Team (Kornel Fohn-Werkzeuge-Team) was involved from the very beginning in the planning. KFW had already introduced the Sandvik Coromant modular Coromant Capto system throughout the production process at NEA. Now it was charged with making sure that the new investment would reflect the opportunities and requirements inherent in the standard tools. Three machine tool producers were shortlisted, and a Mazak Integrex e-650-H won the final round.

MAZAK HAD NOT been among the original vendors considered, as the Integrex was not generally available in the necessary six-metre bed length. However, says Hoch, “We talked to some of the top people at Mazak and described our project, and Mazak offered us a machine that met our requirements. The six-metre Mazak Integrex at NEA is the first of its size and type to be set up in Europe.”

A crucial element in the success of such a multi-task machine is the accompanying set of tools. Again NEA considered three suppliers. They were given the task of developing plans for tools and manufacturing operations not only for the crankshaft, but also for a
crosshead, a connecting rod and a cylinder. Sandvik Coromant got the job, because amongst other reasons – the company had the most extensive competence in turnmilling crankshafts. Following six months of testing and training, the machine officially began operations. At present, it has been running for more than a year with no malfunctions whatsoever, reports Winands.

“Thus far, we have not had to alter or modify a single tool,” he says. “It has worked flawlessly right from the start.” Between 50 and 60 crankshafts are manufactured each year. “These are shafts with two, four and sometimes six cranks, weighing from 500 to 600 kilograms for the smallest models up to 3.5 to 4 tonnes for the largest models. The length range is from 2.3 to 4.3 metres.”

**IT USED TO TAKE** between 80 and 90 hours to manufacture one of the smallest crankshafts using conventional equipment. “A shaft makes its way through the machine today in 25 to 30 hours,” says Winands. Thus, with this machine, NEA has eliminated the possibility of crankshaft delays and can do business secure in the knowledge that it can meet delivery targets. It can use on-time delivery guarantees to help secure contracts and can avoid the expense of penalties for missed delivery dates – which can run 1 percent per week of a 4 to 6 million euro contract.

“Delivery times are a big issue in this business,” explains Winands. “If the compressor isn’t ready, then much of the work in the refinery comes to a halt. So it’s important that we can be flexible and that we can produce a crankshaft to meet a delivery date, even if a supplier of forged crankshaft blanks has difficulties with on-time delivery.”

That’s the kind of flexibility that this machine offers, as well as the ability to manufacture the other parts as required. “This machine makes us more competitive,” says Winands. “That’s the decisive advantage.”

Machine manufacturer Neuman & Esser Aachen has been in business for more than 175 years. The company was founded in Aachen, Germany, in 1830 under the name JL Neuman & Cie Maschinenfabrik and produced hydraulic presses, rolling decating machines and, later, steam engines and shearing machines. “The machines were used in the local textile industry,” explains Norbert Winands, head of technology at NEA. In 1840 the company was renamed Neuman & Esser Aachen, which it is known by today. In 1891 Oskar Peters, an ancestor of the current owners, took over the business. In 1900 Peters expanded the product mix to include piston compressors, which at that time were used to produce compressed air in underground mines.

Under the current CEO, Klaus Peters, NEA moved in 1972 into spacious new quarters in Übach-Palenberg. Since then, it has grown and become the global enterprise that it is today.

Within the structure of the Neuman & Esser Verwaltungs- und Beteiligungs-gesellschaft there are two holding companies. The group employs about 800 people, of which about half work in Germany. Manufacturing operations are carried out at three locations in Germany: Übach-Palenberg, Wurzen and Stassfurt, at the recently acquired supplier Stasskol Kolbenstangendichtungen. Marketing is carried out by 10 independent trading companies in Germany, Italy, India, Thailand, Brazil, the United States and other countries. In addition there is the globally positioned service company NEAC and the division of milling and classifying technology.

The most important product line at the company is the compressor, with up to 100,000 m³/h volume flow, 12,000 kW output and 700 bar ultimate pressure. The big models come into operation in a underground storage facilities for natural gas, in cracking installations at refineries, in desulfurization installations and in the chemical industry. The smaller models are used in breweries or to form PET bottles in stretch-blowing machines.

Despite its global reach, NEA is a typical family enterprise with deep roots in the area where its headquarters are situated. This can be seen in the company’s involvement in training young people. “We employ a higher-than-average rate of trainees,” says Winands. “Of about 330 employees here in Übach-Palenberg, 50 are trainees. It is very important to the owners, the Peters family, that Neuman & Esser should demonstrate responsibility here in the region and employ more than the average number of trainees.”

The fact that NEA is a family-owned company is also evident in the way it does business, says Winands, especially when it comes to decisions on investments such as the new Mazak Integrex machine. “In NEA few people have to sign off on decisions, and so a decision to invest in such a machine can be made rather quickly,” he says. “At the same time, the owner of a family business takes on a business risk in a very different manner than a corporation does. The outcome isn’t always a sure thing. But, as the saying goes: Only those who are willing to take a chance have a chance of winning.”

**LUISE STEINBERGER**
CAREFUL PLANNING – DO IT RIGHT FROM THE START

With the decision to purchase a new machine, Neuman & Esser (NEA) was looking to implement a whole new manufacturing process. Thus it began planning for tools and operational processes at a point when it was still unclear who would supply the machine. Sandvik Coromant experts were part of the process, focusing on tool sets and manufacturing plans for the complicated turning, grinding and drilling operations.

“One can only buy such a machine if it comes with the right technology,” says Norbert Winands, head of technology for NEA. Thus, the technology team at NEA began to think about tools early on. Walter Rehahn, field representative at the local Sandvik Coromant distributor KFW Team, explains, “Most of the time, the choice of tools isn’t taken into account early enough in the process when an investment in machinery is planned, and this leads to high costs for special tools. We were able to avoid that problem in this case through early cooperation between the investor, the seller of the machine and the tool specialists.”

Three suppliers were asked to submit proposals. When NEA requested proposals for the equipment for the new multi-task machine, Rehahn asked the Sandvik Coromant office in Düsseldorf for advice. “This was new territory for us at the time,” recalls Rehahn, who has personally handled the NEA account for 28 years and is well acquainted with conditions at the company. NEA wanted Sandvik Coromant to equip a kind of “miracle machine” that could manufacture at least four different workpieces: crankshafts, crossheads, connecting rods and cylinders.

Günter Wermeister, head of the Sandvik Coromant Competence Centre for camshaft and crankshaft manufacturing in Düsseldorf and one of the few experts in the turnmilling process, took over the project himself. Together with his team, he developed an impressive plan.

“Sandvik Coromant offered the most advantageous package,” says Achim Hoch, head of production at NEA and the person in charge of the request for proposals. Since a relatively high percentage of special-purpose tools (about 40 percent) would be necessary and NEA had already been using the modular Coromant Capto system from Sandvik Coromant, it made sense to start with what was already there and thus achieve flexibility amid all the complexity.

“With this project, as with every project, the groundwork was very important,” says Wermeister. Focusing on the workpieces to be manufactured and working on computers, team members designed, drew, tried out, rejected, drew again, tested and eventually finalized a list of tools and tool paths. “We allowed ourselves time in order to avoid making mistakes, because it was clear to us that mistakes during the planning process could lead to high costs later on,” says Wermeister. That approach paid off. No modifications or alterations of any of the tools have been necessary.

However, even with the detailed planning, it wasn’t possible to simply put the machine together and push a button to begin operations. “Turnmilling – the combination of a turning tool and a turning workpiece – takes some getting used to and presents a high level of complexity,” explains Wermeister. “That has an effect on the programming of the tool paths.”

NEA itself does not employ anyone in the CAD-CAM field, so a condition of the proposal bid was that the programming would be performed at the machine, with the help of modules that would be delivered by the machine manufacturer. However, in this case the machine manufacturer Mazak, Sandvik Coromant and three of the most experienced machine operators at NEA worked together intensively to complete the project. Development, trimming in and training took place all at once.

Machine operator Rainer Dietzel recalls, “We were a team of three operators, and it took about six months before we were reasonably skilled at using the machine and until the operations were a 100 percent successful.”

Wermeister says: “We went step by step, from the easiest things to the most difficult. We manufactured a sample crankshaft from a solid bar in order to impart the skills necessary to carry out orthogonal turnmilling as well as the manufacturing process with a tilted B-axis, which is necessary if one wishes to realize an undercut groove without damaging a surface that has already been machined.”

Today, the machine runs without any trouble, and the three operators are able to handle it on their own. Or, more precisely, says Dietzel, as a team. “We work for up to 100 hours on a big shaft, in three shifts,” he says. “The preparatory work and the work together as a team have to be on target.”

Dietzel, who has worked at NEA for nearly 30 years, sees his new tasks as a challenge, but a good one. “The work has become more comprehensive, but also more interesting,” he says.
Volkswagen Centro Industrial Córdoba in Argentina believes that there is always room for improvement. It’s a philosophy that has earned the company both investments and awards.
THE TWO SENIOR MANAGERS of Volkswagen Centro Industrial Córdoba are scrupulously diplomatic as they explain the standing of the Córdoba gearbox plant in the worldwide Volkswagen organization. After all, they are competing against colleagues in other plants where Volkswagen manufactures gearboxes for its wide range of cars and utility vehicles. And Volkswagen runs similar plants in Germany, China, Slovakia, South Africa and Spain.

The “Volkswagen Excellence Award,” recently granted by the Volkswagen Group to Centro Industrial Córdoba that names the company the best car component manufacturer within the group, bears testimony to it.

“We see this prize as a reward for a long and sustained effort,” says Juan Cantarelli, production manager for the MQ250 gearbox plant. “We have been working on the quality and efficiency of our processes for years, and we are happy that they considered that we have achieved top results. We strive for continuous improvements, and we knew we were on track, but we do not monitor other plants in the group and do not take any awards for granted.”

“I have worked at this factory for 20 years,” says Carlos Testa, production manager for the MQ200 gearbox plant. “When I started we were producing about 300 gearboxes a day. Now we are producing 2,500, and next year we hope to reach the 3,500 mark. We will be producing a modern, high-quality gearbox every 20 seconds, any time of the day, any day of the week. I am proud to have been part of this industrial journey.”

CENTRO INDUSTRIAL Córdoba manufactures two models of manual gearboxes, the MQ250 and the MQ200, which are fitted in various midsize Volkswagen, Seat, Skoda and Audi cars. Only a small share of the production stays in Argentina, in a local Volkswagen car plant in Pacheco, on the outskirts of Buenos Aires. About 95 percent of the factory’s output is shipped to the Volkswagen Group’s car plants in Brazil, Germany, Mexico, Slovakia, South Africa and Spain.

“Our big industrial revolution, our transforming act, is behind us,” says Testa. “The great change was in 1991, when we built the MQ250 gearbox plant, and we went from four to 150 CNC machines and targeted a global market. Since then, we have never ceased growing, and we have always used all of our capacity.”

Getting to the top is one thing; staying there is something else. Lower costs, higher quality and improved reliability are always goals in any action taken by plant management. That’s why Sandvik Coromant was chosen to make a contribution in the field of tooling and has played a starring role for the past five years. In 2002 Sandvik Coromant was selected to supply all the inserts and tooling accessories required by the plant, along with technical support and service. The tooling management agreement included the assessment and supply of tools from other manufacturers as well.

“We had a number of reasons for deciding on one supplier to manage our tooling needs,” recalls Cantarelli. “An important one was that we wanted to have our own engineering resources focused on our core business and leave the tooling management to a specialist.”

SANDVIK COROMANT contractually committed itself to achieving savings in overall tooling costs over a period of three years, a goal that was exceeded.

“We have two engineers working in the plant full time, providing daily assistance to
“We wanted to have our own engineering resources focused on our core business and leave the tooling management to a specialist.”

the Volkswagen staff as well as overseeing processes and permanently trying to optimize them,” says Juan Monzó, the manager at Sandvik Coromant in Córdoba who is responsible for the tooling management operation. “Through the years – and now we have completed our fifth year at the plant – we have seen how this close cooperation has brought improvements and savings. This kind of agreement allows us to use all the engineering muscle of our organization. It is not just about our products but also about the know-how, the support and the resources that we are able to mobilize and provide. Tooling might be a small concern for Volkswagen, but it is our job, and we put all our effort into it.”

“The concept is simple,” explains Jorge Calderón, engineering manager at Centro Industrial Córdoba. “We give the supplier, in this case Sandvik Coromant, the status of a preferred supplier, which implies they have the right to address problems and provide their own products whenever they match specifications and prices. By granting that, we also get the technical assistance – permanent and on site – in a way that it would be very expensive for us to develop.”

SANDVIK COROMANT has an office inside the Centro Industrial Córdoba plant from which it manages a small stock of tools and accessories. The yellow shop coats of the Sandvik Coromant engineers have become a part of the daily scene on the plant floor, where they work closely with engineers and machine operators.

“It is my perception that the nature of our contribution has changed through the years,” says Monzó at Sandvik Coromant. “At the beginning we acted more as problem solvers, addressing the questions that popped up in daily work. But now, in addition, we anticipate problems and work for the long term.”

Mario Salinas, tools supervisor at Centro Industrial Córdoba, works in close contact with Sandvik Coromant and has seen how cooperation has evolved.

“My boss used to say that a factory without problems is a factory that is not running,” he says. “Problems happen, and you have to be prepared to deal with them quickly and efficiently. But we also know that too much focus on the

Volkswagen Centro Industrial Córdoba is situated in the outskirts of Córdoba, Argentina’s second largest city, about 700 kilometres northwest of Buenos Aires. Its origins date back to the early 1960s, when American carmaker Kaiser established a production plant in Argentina. Kaiser Argentina built this component plant in 1963. Ford later acquired the plant, and for about a decade, under the name “Transax,” it served major carmakers operating in Argentina. In the mid 1980s, in an attempt to bridge a very troubled period for the regional car industry, Volkswagen and Ford merged their South American operations into Autolatina. But in 1995 the partnership disbanded, and the plant stayed with Volkswagen. The MQ250 gearbox production facility, inaugurated in 1991, brought a great change in terms of quality and increased production, from 300 to 1,300 daily units. Until then, the plant had been something of a do-it-all in the industry, manufacturing brake components, gearboxes, transmission lines, differentials and even small diesel engines. But the new gearbox plant meant a fast track to the industry’s top division.

Since the start of operations seven years later in a second plant for the MQ200 gearbox, Centro Industrial Córdoba has belonged to an elite group of the world’s most modern car components plants, a position the company is aiming to hold for many years to come.

José Correa Rebelo is the general director of Centro Industrial Córdoba, which has production plants and service facilities covering approximately 80,000 square metres. About 1,500 people, working in three and four shifts, keep production running non-stop all day, every day.

Centro Industrial Córdoba recently received an award for being the best car component manufacturer in the Volkswagen Group. In addition it won the 2006 National Industrial Award of Argentina. The plant has obtained ISO 9000 and 14000 certifications. It meets the German VDA 6.1 and 6.3 car industry standards and complies with the OHSAS 18001 standards for health and safety. About 95 percent of the output is exported and fits midsize Volkswagen, Skoda, Seat and Audi cars.
Centro Industrial Cordoba, Volkswagen Argentina SA, is Sandvik Coromant Argentina’s main client, and the partnership settled on with the company is the second Sandvik Coromant has signed with a top Argentine manufacturer.

The facilities at Centro Industrial Córdoba are state-of-the-art, based on a cell-line concept with completely automated material transport and handling. All the machines at the MQ200 plant are equipped with Coromant Capto Tooling Systems, and the customer is gradually upgrading from the GC4025 grade to the new generation GC4225 in all its turning applications.

“The challenges at Centro Industrial Córdoba are not the materials they use nor the geometry of the components involved, but rather the volume of the series, the quality requirements and the constantly increasing demands on productivity and reliability,” says Juan Monzó, Córdoba manager at Sandvik Coromant Argentina. “From the beginning we were able to show Volkswagen that they could rely on the expertise we have both locally and worldwide in terms of economy of fabrication.

“Optimized tooling as well as the standardization of systems and the reduction of stock has allowed Volkswagen Argentina SA savings of about 1.4 million US dollars over a five-year period,” he continues. “It’s like saying ‘Sign a four-year contract, and you get your fifth year of tooling for free.’”

The agreement signed in 2002 set savings goals of 11 percent for the first three years. It described the teams that Sandvik Coromant and Volkswagen would build and the way implementation would be evaluated and new objectives established.

“Quick wins are not the main goal of a tooling agreement, even if they occur,” says Horacio Bisi, the head of Sandvik Coromant Argentina. “A Tooling Management Agreement is a concept that requires mutual confidence and a long-term goal. Cooperation is the key factor. Our customers must see that we are there on the plant floor, working together for better results. We feel we can help our customers increase efficiency and competitiveness.

“Now and then I hear people doubting the wisdom of putting a single supplier in charge of all a company’s tooling needs,” Bisi continues. “But I can show the great results of our cooperation with Volkswagen in Córdoba. We believe that letting Sandvik Coromant handle all the tooling will improve a company’s chances of optimizing its metalworking processes. Tooling might be a small post in a table of costs, but it is the heart of our business and what we know best.

“We put 100 percent focus on what a lot of people consider a small issue in the manufacturing process, and this is one of the success factors in this kind of agreement,” he says. “The second one is the confidence between both managements, customer and supplier, running quarterly action plans and a close follow-up.”
day-to-day work can jeopardize the long term. This tooling cooperation has reduced bottle-
necks and given us a greater perspective.”

As Salinas sees it, tooling management has a number of advantages. “There is a kind of
know-how that is not printed in a contract or in the technical specs,” he says. “It goes along with
cooperation and being there, on the plant floor. We work as a team for solutions rather than try-
ing to assign responsibilities.”

Adds Calderón, “Having the supplier on site allows a better and quicker response. They
can react immediately when a problem occurs and can also act proactively, so we can achieve
our goal of minimizing downtime and optim-
izing productivity.”

THE CÓRDOBA gearbox plant is in a privileged
position, since it benefits from ever-growing
demand. Any increase in production is imme-
diately absorbed by Volkswagen Group’s car
plants around the world. But this too creates a
lot of pressure.

When it comes to testing new inserts, tool-
ing solutions or tool holding systems, there is
no room for improvisation – or for stopping
a machine to run a test. Any change in the
process is rigorously evaluated, planned and
executed, always in authentic production
conditions. Two months of computer-assisted
modelling and simulation is required before
a new insert or accessory gets the green light
for a test run on the plant floor. And once on
the plant floor, documented industrial tests
in all the positions and relevant machines are
required before a new tool is considered.

That meant a heavy burden for Volks-
swagen’s tooling experts until Sandvik Coromant
provided them with a better way of handling
the offerings of new technologies.

“Before, we had to deal with several suppli-
ers and devoted a lot of time and resources to
assessing the new products and solutions they
brought us,” recalls Calderón. “Now we have
centralized those efforts, and we count on the
assistance of Sandvik Coromant to assess new
products and solutions and to plan all the test
activities together with our staff. Getting back to
a situation where we would have to deal with all
the suppliers and coordinate the tests ourselves
is something we wouldn’t like.”

COMMENTS TESTA: “There are no universal
solutions in the industry, and supply manage-
ment may not always work. This cooperation
was not about putting the supplier’s tools on the
machines but rather about working together for
improved productivity. There is no mystery in
it. Our business is gearboxes, not tooling, and
we have a plant to run. How better to do it than
by letting a specialist look at what they can do
to optimize the performance of the tools and
squeeze the best out of our machines?”

MQ250 production manager Cantarelli
sums it up: “We consider this tooling manage-
ment the right way to go. Tooling is not the
main factor in our productivity performance.
Nevertheless this management has resulted
in significant improvement in terms of the
amount of pieces by tool, of pieces by ma-
chine and overall savings. We see that we are
not running behind problems and that we can
deal with the long term in a way that was not
possible before. Of course, I think there is still
a lot more to accomplish in the future, and we
rely on our supplier for that.”

ERICO OLLER WESTERBERG
SHANGHAI VOLKSWAGEN — A SHINING EXAMPLE

A new solution for inserts at Shanghai Volkswagen’s engine factory has led to a productivity boost and cost savings.

ANTING IS A BUSTLING auto-manufacturing town in the Jiading District in northwestern Shanghai, touted by many as China’s Detroit. Car manufacturers, suppliers and sub-suppliers have all flocked to Anting and the surrounding area, and R&D centres, exhibition centres and trade zones have sprung up, along with China’s first Formula 1 circuit.

All this activity had its beginnings more than 20 years ago, when Volkswagen — a pioneer among foreign car manufacturers in China — decided to start production in China through a joint venture with the Shanghai Automotive Industry Corporation (SAIC). This joint venture, Shanghai Volkswagen (SVW), became one of two cornerstones in Volkswagen’s China strategy. The other was a joint venture in Changchun in Jilin Province in northeastern China with First Automobile Works, called FAW-Volkswagen.

Apart from its investments in the two manufacturing joint ventures, Volkswagen and its partners have also built engine factories, a transmission factory and China’s largest sales and service network.

CHINA IS THE WORLD’S fastest growing automotive market. In 2006, it surpassed Japan to become the world’s second largest auto market after the United States. For the Volkswagen Group, the development has been so rapid that China today is its most important market outside Germany. For the Volkswagen brand,
China is already the biggest market.

In 2005, Volkswagen China’s CEO, Winfried Vahland, launched the Olympic Programme, a restructuring plan to increase sales, cut costs and strengthen Volkswagen’s position in China. Volkswagen is the sole official automotive partner of the 2008 Beijing Olympics.

As a result of the programme, all units in the Volkswagen Group initiated a hunt for savings. For suppliers, such a programme can be critical, since it can put pressure on prices. However, it can also be beneficial.

SANDVIK COROMANT is one of Volkswagen’s many suppliers. Its cooperation with Shanghai Volkswagen (SVW) dates back to 1989, when the company built its first engine factory. Sandvik Coromant began providing SVW with cutting tools and inserts for cylinder blocks, cylinder heads and crankshafts for Audi-designed engines (Audi is part of the Volkswagen Group).

“Over the years, Sandvik Coromant has been an outstanding supplier to Shanghai Volkswagen,” says Tang Jianguo, technology and quality manager at SVW’s second engine plant, which was inaugurated in 1996 and produces engines for the Volkswagen models Santana, Passat and Polo. “The company has shown that its products have a very good performance.”

For example, Sandvik Coromant has won both Gold and Silver awards from SVW in the general material suppliers category.

In 2006, in order to save on costs and increase productivity, SVW decided to replace some of the inserts used in cutting tools for the cylinder blocks.

“Shanghai Volkswagen provided us with detailed data and asked us to come up with a better solution than the existing one,” recalls David Zhu, sales engineer at Sandvik Coromant in China.

“After discussions, we suggested that our customer change to two new grades,” says Zhu. “These were tested, compared with products from other suppliers and then evaluated.”

SVW soon realized that the quality and durability of the new insert grades meant that the company could make substantial cost savings and increase productivity.

“For one of the new insert grades, the life expectancy of the tool increased by 80 percent, and for the other it increased by 25 percent,” says SVW engineer Hu Zhengguo. “The updated products from the previous supplier could definitely not reach those figures.”

Says Tang: “Cutting tools and inserts only account for 3 percent of the total cost in our production, yet productivity and quality are of great importance for our factories. For example, one of the inserts from Sandvik Coromant helped to improve productivity and reduce our cost by some 300,000 renminbi [29,000 euros] on an annual basis.”

The new inserts went into production earlier this year, and both the customer and supplier are satisfied with the improved levels of performance.

“For SVW, it means that the engine factory has made another contribution to the Olympic Programme. And for Sandvik Coromant, the company is happy to have helped its customer with a new solution.

“Shanghai Volkswagen is a key client, and they have continuously expanded production,” says Zhu. “We look forward to being part of their expansion in China.”

And that expansion seems to be on track, according to the head of Volkswagen China, Winfried Vahland. He recently told the China Daily: “There’s still a lot of work to do, but we are well on our way to becoming the gold medal winner among carmakers in China.”

JAN HÖKERBERG

THE SUCCESS OF SANTANA

Volkswagen has conquered China by being one of the first foreign car manufacturers to establish itself in the country and building what have become long-term relationships with its local partners. The company’s first car model in China was the Santana, developed and marketed there exclusively. It was also China’s first mass-produced car, and more than 90 percent of the car’s components are manufactured in the country, which means that spare parts are readily available and repairs are relatively inexpensive.

In Shanghai, Santana dominates the taxi market. In Beijing, both Santana and Jetta are popular among taxi companies.
NOT AS HARD ANY MORE

As a process, hard part turning has moved ahead and is now able to accommodate both conventional and new demands.

**CHALLENGE:** HOW DO YOU RE-OPTIMIZE THE TURNING OF HARD COMPONENTS?

**SOLUTION:** APPLY THE LATEST INSERT GRADES AND GEOMETRIES CORRECTLY, BASED ON THE OPERATIONAL FACTORS AT HAND.

Since its introduction on a broader scale in the mid 1980s, hard part turning (HPT) has evolved considerably as a machining process. Developments in machinery, component materials, hardening processes, cutting tools and the complete HPT setup have made it an efficient process, accessible to any machine shop.

There are several benefits to HPT, which justifies analyzing the majority of applications involving the machining of round hard parts. Although HPT should not be seen as an alternative to all grinding operations, there are applications where the two processes complement each other.

**THE MAIN ADVANTAGES** of HPT are:
- Easy adaptability to complex part contours
- Quick changeovers between component types
- Ability to perform several operations in a single setup
- High metal-removal rate
- Ability to use the same CNC lathe as for green turning
- Low machine-tool investment
- Environmentally friendly metal chips
- Elimination of coolants in most cases
- Minimal tool inventory and machine-shop floor space
- Often advantageous surface finish.

**CUBIC BORON NITRIDE** (CBN) is the most widely used HPT tool material because it fulfills the requirements made in most applications. It is very hard — second only to diamond — and combines into insert grades that have varying degrees of toughness. Today, there are various newly developed CBN insert grades available that cover different and growing operational demands such as cutting speed, feed, continuous and interrupted cuts, surface finish and various conditions.

Tool wear in the form of craters on the cutting edge dominates in HPT, as a result of the high pressure from large cutting forces combined with high temperatures in the concentrated machining zone. The hard cubic boron nitride is the only tool material that stands up to these demands and offers a reasonable amount of toughness. The recent CBN grade development has provided the means to limit wear further, while at the same time improving edge security, extending the application area and allowing a rise in cutting speeds of some 20 percent.

Productivity, quality consistency and process reliability are the essential criteria for HPT today. Now that HPT has evolved into a broadly applied process with the advantage of finishing components after heat treatment, demands are now being made on machining efficiency.

**AS PRODUCTIVITY** is an increasingly important factor for HPT today, tool developments play an important role. Trends include elevating cutting speeds (to well above 200 m/min with some grades) with longer, more predictable tool lives. Feed rates have also been pushed higher to achieve shorter cutting times through insert strength and geometry developments.

Insert grades are becoming ideally positioned to meet today’s operational demands in cuts. CBN grades are the first choice generally, backed by a ceramic grade, optimizing different application demands:
- CB7015 for continuous to occasional
HPT (hard part turning) is the single-point turning of workpieces with high hardness. Typically, the process concerns hardnesses of 58 to 68 HRc. The workpiece materials include hardened alloy steels, tool steels, case-hardened steels and heat-treated powder metallurgical parts. It is mainly a finishing process, but it can also be a semi-finishing operation, where high dimensional form and surface finish accuracy are to be achieved. Previously, these surfaces were usually ground.

WHAT IS HARD PART TURNING?

HPT (hard part turning) is the single-point turning of workpieces with high hardness. Typically, the process concerns hardnesses of 58 to 68 HRc. The workpiece materials include hardened alloy steels, tool steels, case-hardened steels and heat-treated powder metallurgical parts. It is mainly a finishing process, but it can also be a semi-finishing operation, where high dimensional form and surface finish accuracy are to be achieved. Previously, these surfaces were usually ground.

As regards insert geometry, HPT inserts have relatively dull cutting edges because very high edge strength is necessary. This, however, does not mean that geometrical issues are less important. Although chip breakers are not part of the insert face, edge chamfers, honing, nose radius, wiper edges and lead angle combinations are critical to performance and results.

For some years, wiper insert technology has revolutionized finish turning in general. It has also improved HPT. There are now specially developed wiper inserts for HPT for both finishing and semi-finishing operations. The feed rate capability is considerably higher than for conventional noseradius inserts.

The Xcel insert geometry is a further optimization of feed rate/surface finish capability for HPT. It entails a carefully balanced blending of a straight cutting edge at a very large lead angle with wiper technology. The large lead angle takes over from the main insert lead angle just above the depth of cut value for the insert. It provides a chip-thinning effect, allowing higher feed rates to be applied. This is beneficial in terms of productivity and helps to reduce the insert wear at the depth of cut boundary. The Xcel concept leads to lower cutting temperatures and a considerable rise in productivity.

SUMMARY

Hard part turning (HPT) can be optimized much more extensively today. As a process, it has moved ahead and is now capable of handling both conventional and new demands. More options to achieve higher performance and a new generation of cutting tools make this possible. With a new range of improved CBN grades, insert geometries and tool-path strategies, HPT achieves new, higher levels of competitiveness.
MACHINED TO SMOOTHNESS

An Alfa Laval decanter centrifugal factory in Copenhagen, Denmark, installed a one-of-a-kind, productivity-enhancing machine tool to keep up with increasing demand for its products. Two more WFL complete machining centres, each about the size of a semi-trailer, are on the way.
“THE MARKET IS EXPLODING” at the moment, and ethanol producers need decanters like ours,” says Jørgen Henrichsen, production engineer at the Alfa Laval decanter factory in the Northern Søborg section of Copenhagen. “Our clients want bigger and bigger – and more – decanters, which is a capacity problem for us.”

The numbers tell the story. In 2005, the Alfa Laval decanter factory, which employs 170 workers, manufactured some 85 decanters centrifugal for the ethanol industry. The volume of decanters for the ethanol industry has increased threefold from 2005 to 2006.

In the beginning of 2006, the Alfa Laval decanter factory installed a gigantic, multifunctional CNC machining centre, a millturn from WFL in Linz, Austria, to work on the large cylindrical parts of a decanter such as the large outside cylinder. The fully automatic and programmable millturn added important capacity and saved time for the factory. Previously, most of the machining steps were done on a manual lathe, which still works but is far from optimal.

THE ADVANTAGE OF the millturn is the integrated, programmable and damped boring bar fitted with a Sandvik Coromant Capto C8 hydraulic clamping unit in the front end, with the same interface as the B-axis spindle, which makes it capable of working with an overhang of 1,980 millimetres. In addition, 72 different cutting tools can be changed automatically, saving time. The millturn complete machining centre is basically a one-stop shop for turning, boring, milling, drilling and threading.

The millturn solution for Alfa Laval was a product of the close cooperation between WFL and Sandvik Coromant and the use of Silent Tools, which resulted in the two-metre-long boring bar. (See sidebar.)

Alfa Laval’s decanter factory will install two more of these millturn machines by mid 2008 to accommodate expected increased production and to redraw approximately 8,000 machining hours from sub-suppliers to the factory in Søborg.

“We can see the result of the increased interest in alternative fuels right here on the factory floor,” says Kim Bjørnstad, manager, production engineering at the Alfa Laval decanter factory.

Bjørnstad and his team are currently studying the schematics of the 10,000-square-metre facility to find room for the two additional machines, which are each the size of a large truck, bigger than anything

ALFA LAVAL AT A GLANCE

In engineering circles, Swedish company Alfa Laval hardly needs an introduction. Alfa Laval’s operations are based on three key technologies – heat transfer, separation and fluid handling.

Alfa Laval is the leading market player within all three of these areas, with a 30 percent market share in heat transfer products (plate heat exchangers), a 30 percent market share in separation (separators and decanters) and a 12 percent market share in fluid handling (pumps, valves, tank cleaning equipment).

These technologies have been continually developed and refined by the company since 1883, when the company launched the famous mechanical milk and cream separator. That was the year Gustaf de Laval and Oscar Lamm founded the company under the name AB Separator.

Today Alfa Laval products and know-how play a decisive role in many industrial processes across a wide range of industries and sectors. These include energy, food and beverage, chemicals, petrochemicals, pharmaceuticals, starch, sugar, ethanol, marine, wastewater treatment and refrigeration applications.

Alfa Laval has annual net sales of around 20 billion Swedish kronor in more than 100 countries around the world and about 10,000 employees. Re-listed on the Stockholm Stock Exchange in 2002, Alfa Laval aims to grow at a rate of 5 percent per year. Around 3 percent of sales are reinvested in R&D, resulting in about 30 new products every year.

A decanter centrifugal such as those manufactured in Copenhagen is based on the concept of a settling tank where particles, sediment and other solids gradually fall to the bottom, pulled by gravity. But gravity is slow, and most industries today want rapid and controllable results. In a decanter centrifugal, the sediment tank is a fast rotating tank that uses centrifugal force to separate liquids from solids at forces 3,000 times greater than gravity.

Depending on the particular configuration and equipment, a decanter centrifugal can be used to separate a wide range of solids from liquids on a continual basis.
else in the factory. “It is a puzzle,” admits Bjørnstad.

The Alfa Laval R&D department in Copenhagen is looking into ways to optimize standard decanter technology to make ethanol. After all, ethanol can be made from corn, as is done in the United States, and from wheat, as is done in Europe. Separating the liquid from the grain, which is what a decanter does, before it gets distilled into a fuel is a complicated process that can be fine-tuned for both wheat and corn.

An Alfa Laval decanter is quite large. To the untrained eye, a decanter centrifugal on the shop floor could easily be mistaken for a rocket – measuring up to six metres in length with all its appendages. A conical section tops it off, and there is a hub on the back end on which a gear is mounted.

The Alfa Laval decanter factory in Copenhagen receives pre-cast stainless steel cylinders, conical sections and different hub sizes from various sub-suppliers around the world. The conveyors, which help to move the liquid inside the decanters, are received as kits. These large semi-rough stainless steel parts are tested for cracks before going through the meticulous machining process. “Basically, what we do is finishing work,” says Henrichsen. “We shave off about 2.5 millimetres on both the inside and outside of these parts to reach the kind of exact tolerances and smoothness we need. The moving parts inside a decanter can spin at speeds of up to 2,800 rpm, so our measurements have to be very precise.”

While Alfa Laval machines smoothness into the rough stainless steel components of its products, the process is not unlike the call for a smooth transition to alternative fuels to beat the world’s dependence on fossil fuels and develop new fuels as alternatives to diesel and gasoline.

And as the production figures at the Alfa Laval decanter factory in Copenhagen reflect, that is exactly what is happening.

THE MILLTURN COMPLETE MACHINING

Combining all manufacturing and measuring operations without manual intervention in a single machine tool provides many significant performance benefits. As a worldwide manufacturer, WFL is exclusively focused on these unique multi-task machines.

WFL’s millturn machines are the perfect combination of a 2- to 4-axis turning and a 5-axis machining centre. The millturn can perform all machining and measuring operations on complex chuck and shaft parts in one step, making it the most powerful and flexible multi-task machine ever built.

The WFL product range consists of machines with a turning diameter from 420 millimetres (M35 millturn) to a maximum of 1,500 millimetres (M150 millturn) and a turning length from 1,000 millimetres to a maximum of 6,500 millimetres.

Each model is available with different length options and can be equipped with individual modules such as steady rest, tailstock, bottom turret, tool measurement, automatic load/unload and a large number of software options.

The biggest machine in the WFL product range is the M150 millturn. Its impressive 90kW (10.248 Nm) main drive and unrivalled 55kW (730 Nm) milling spindle set new machining standards for big workpieces. In combination with a 650-millimetre Y-axis travel, even workpieces of up to 15 tonnes can be machined.

“We used our flexibility and enormous experience from more than 20 years of complete machining to provide Alfa Laval with a very economical solution for its manufacturing problem,” says Dieter Schatzl, WFL’s marketing manager. “Alfa Laval is a great company, and we are very proud that the leading global provider of decanters centrifugals chose WFL as its supplier for complete machining centres.”
Inside the Silent Tools

Vibrations are not just the source of noise, but also the reason for uneven surfaces, poor quality and lower productivity. In the late ‘60s a student was struck by the idea of implementing a damping system in the boring bar to absorb the vibrations and avoid the damages they cause.

The first prototype didn’t work, but the idea was sound, and after stubborn work on a more practical approach to the problem, a solution was found and the first damped boring bar was born, now under the name Silent Tools.

“Since then, the technical design has changed a lot, but the same principle as was invented in 1971 is still used,” says Nils Ruud, responsible for Silent Tools.

The vibration arises from the variations of the cutting force on the insert tip. These may be caused by irregularities in the material. Furthermore, the cutting force causes a deflection of the tool and workpiece. The insert is forced out of its initial engagement, and while this happens, the cutting force is reduced, the bar straightens out and the insert gets back into initial engagement. The cutting forces rise again and a new deflection occurs.

This may cause the initial vibration to be self-sustaining, and the longer the boring bar, the worse it gets.

“The pre-tuning system in the boring bar creates a counter phase to the oscillating of the bar and makes the vibration die away,” Ruud explains.

The system consists of a heavy tuning body with a certain inertia mass, which is suspended in rubber. The tuning body is surrounded by a special oily liquid. The vibrations are dependent on the length of the bar, and therefore the tuning body is adapted to the different lengths.

“Earlier, the damped bars were somehow wrapped in mystery and were mainly used for problem-solving, but today they are also used to gain higher productivity,” Ruud says.

A broad range of products covered by the umbrella “Silent Tools” is available for turning, milling and boring. The products cover applications from the smallest diameters up to large diameters.

Read more about Silent Tools on page 29.

A One-Stop Machine Shop

Seeing an enormous growth potential for its decanters centrifugal, Alfa Laval’s factory in Seborg, a northern suburb of Copenhagen, decided it was time to modernize its production capabilities.

And productivity was the key word when the factory chose the M150 millturn machining centre from Austrian company WFL, outfitted with Sandvik Coromant tools. The first machine was installed in the beginning of 2006. Two additional machines will begin operating in the next year, one in November 2007 and the other in March 2008.

These millturn machines will be used to machine – bore, mill, drill and thread – all the cylindrical parts of the decanter from the cylinder body to the conical sections and the hubs. Previously, different machining steps needed different machine tools, requiring setup time and time to move the parts.

“We call it a ‘clamp once’ philosophy,” says WFL’s Dieter Schatzl, referring to how a part can be machined in one place without having to move it from work station to work station.

In addition, the time for making a bore has been decreased to 70 minutes with the new millturn, down from 136 minutes.

The millturn machine has an integrated and damped boring bar supplied to WFL by the Silent Tools range.

The brand name “Silent Tools” covers a family of damped tools for turning, milling and boring.

The big damped boring bar, integrated in the millturn from WFL and in use at the Alfa Laval decanter factory in Saborg, is a sophisticated tool. By stretching the limit for workable overhang beyond what is normal, Alfa Laval is able to utilize the philosophy of complete machining in a single setup.

“We see a lot more interest from various machine tool makers for bigger and more advanced damped boring bars,” says Nils Ruud, responsible for Silent Tools. “In addition, there is also a huge demand for standard damped tools. Modular tool holders are a key issue for extracting the productivity out of multi-tasking machine tools. A broad variety of damped tool holders with different sizes of Coromant Capto connections are available from stock.”

The two-metre-long boring bar has a diameter of 220 millimetres, which means it is capable of working with an overhang of 1,980 millimetres. The hydraulic Coromant Capto C8 clamping unit in the front of the boring bar makes it possible to change tools automatically, using the same tool changer as for the main B-axis spindle, which also has a Coromant Capto C8 interface.

“You don’t see that many of these machines,” says Erik Bøg-Jensen, a productivity specialist at Sandvik Coromant A/S in Copenhagen. “Only WFL has this kind of technology.”
As owner of Joe Gibbs Racing and head coach for the National Football League (NFL)’s Washington Redskins, Joe Gibbs has proven himself in the top two sports in the United States: football and auto racing. Racing in NASCAR (the National Association for Stock Car Auto Racing) requires champion drivers and precision cars. Joe Gibbs Racing (JGR) is a group of NASCAR racing teams owned by Joe Gibbs. Gibbs first started racing on the NASCAR circuit in 1991. Today the company is headquartered in Huntersville, North Carolina, in the US. The team was formed, in part, to give Gibbs an opportunity to spend more time with his sons, JD and Coy. Gibbs’ son JD is now the president of JGR and oversees daily operations since his father’s return to the NFL. JGR has won three series titles, the 1993 Daytona 500 with driver Dale Jarrett, the 2000 Brickyard 400 with driver Bobby Labonte and the 2005 Brickyard 400 with NASCAR champion driver Tony Stewart, as well as more than 50 NEXTEL Cup races. JGR is constantly looking for ways to maintain its leadership position, which means getting an edge over the competition wherever possible. One way to do this has been to team up with Sandvik Coromant as the main product sponsor for cutting tools. Sandvik Coromant and JGR are now working together to find ways to improve the machining of parts, with the ultimate goal of creating cars that perform better and make it possible for drivers and teams to achieve even greater successes.

A HISTORY OF SUCCESS

IMTEX 2007 – the Indian Machine Tool Exhibition with International Participation took place in Bangalore, India, 18–24 January, attracting 130,000 visitors from across the country.

The exhibition included an extensive display of metalworking machine tools, cutting tools, tooling systems, machine tool accessories, metrology and CAD/CAM. Amongst the new technologies showcased were dry machining, high-speed machining, versatile and multi-functional machines, compact machines and machines with smaller footprints. Sandvik Coromant’s booth had “pole position” in front of the main entrance of the hall. Under the slogan “Have you got your share?” the booth featured stations focusing on training, Productivity Improvement Programme, Original Tooling Supply and Silent Tools, as well as case stories and testimonials.

Visitors were given ample opportunity to check out new tools and discuss machining with Sandvik Coromant’s experts. In addition, Sandip the Magician was present to explain the magic of new Sandvik Coromant products and to amaze visitors with his tricks.

IMTEX is organized by the Indian Machine Tool Manufacturers’ Association (IMTMA) every third year. IMTEX 2007 was the 13th exhibition.
PATRICK DIXON, futurist, consultant and author, is no stranger to hyperactive verbal assaults.

"Your corporation may have a reputation for brilliant leadership, outstanding innovation, clever branding and effective change management, but the business may fail if the world changes and you are unprepared," Dixon said in a recent Financial Times article.

Trained as a physician, Dixon is now a professional prognosticator. He has been called “Europe’s leading futurist” and “one of the 50 most influential business thinkers alive today.” The Wall Street Journal called him a “global change guru.”

In a keynote address, “Take hold of your future: How high-performance manufacturers will stay ahead,” delivered to Microsoft in London (see link), Dixon talks about how product cycles are getting shorter, how companies should exploit demographic trends and how they should use technology to keep things personal.

Dixon’s view of the future features billions of microscopic computers embedded into every item manufactured, distributed and sold across the world. He sees RFID (radio frequency identification) technology as an inevitable part of all successful supply chains of the future and argues for the instant bottom-line cost savings that RFID can generate with very little investment. But Dixon also warns that it is the emotional reaction to new technology that is the real driver of its success or failure.

“The lesson is this,” he advises. “Stay close to people’s emotions, listen to how they are feeling, and design systems that improve life rather than for the convenience of the company. The greatest winners in the future will be companies that combine brilliant engineering and digital innovation with real needs that people have.”

❯ READ MORE: http://www.globalchange.com/ppt4/microsoft/index.htm
SILENT RUNNING
— MAINTAINING FINISH QUALITY QUIETLY

Low-vibration milling coupled with long, slender tools is possible with CoroMill 390 endmills – damped.

**CHALLENGE:** WHEN USING LONGER TOOLS IN MILLING APPLICATIONS, HOW DO YOU REDUCE PROBLEMS ASSOCIATED WITH VIBRATIONS?

**SOLUTION:** CONSIDER USING DAMPED COROMILL MILLING TOOLS.

**WITH THE INCREASING** trend towards the use of more sophisticated machining technology through multi-task and 5-axis machines, milling operations with longer tools are becoming more common. While this gives greater flexibility in the machining environment, the longer tool length carries with it the danger of vibrations, which have a detrimental effect on productivity and the final quality of components.

Requirements for reducing vibrations arise in a range of applications but are also prevalent in milling of tool steels and the more exotic materials such as heat-resistant super alloys and titanium alloys that demand higher cutting forces but present their own particular machining challenges.

Milling/cutting tools with an integrated damping system such as the CoroMill 390D overcome many of these problems. The damped concept comes into its own where productivity is a real issue. Often manufacturers who are using the latest machinery and technology to optimize their production are seeking solutions to make further improvements to their productivity. With the damped tooling solution, Sandvik Coromant was keen to address particular issues related to increasing the metal-removal rate, improvement of component surface finish and significant noise and vibration reduction. By creating a more secure process, the end result is a prolonged and consistent tool life.

The tooling solution is ideal for multi-task machining with milling cutting requirements for face and shoulder applications, but it can be applied equally successfully to 3- and 5-axis machines. Typical operations are ramping, pocketing and helical and cylindrical interpolation. Die and mould makers who have long-overhang applications could also use damped tooling. Other long-overhang applications relate to the general mechanical sectors using machining centres. Thus, the use of damped tooling can deliver problem-free machining with predictable tool life and significant increases in productivity.

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Silent Tools is a registered trademark of the Sandvik Coromant partner for tools with damping technology.

**FOR MORE INFORMATION:**
Contact your local Sandvik Coromant representative.
SUMMARY

For milling operations that involve long tools, vibrations are never good because they can signal poor overall surface finishes, reduced productivity and reduced tool life, resulting in very inconsistent processes. One solution is to incorporate damping technology in the tool, which not only reduces vibrations and associated noise but also has an impact on many aspects of the milling operation. This includes higher productivity and metal-cutting rates and more reliable and predictable milling with better surface finishing.

Typical applications where damped tools come into their own are in multi-task and 5-axis machining, where tools with a longer reach are common, and in the machining of difficult materials such as heat-resistant super alloys and titanium alloys.

CASE STUDY

One area where damped tools can be a benefit is in the milling of aerospace components. For example, in the machining of a support bracket for an aircraft part S144 (martensitic stainless steel) from a solid billet, a number of problems were encountered using a conventional undamped tool in a 5-axis vertical machine. The tooling life when milling this machine was rather poor, typically 15 minutes maximum. Vibrations caused damage to the inserts. Coupled with this, the process required an operator to be present to constantly monitor the operation because results were so inconsistent. This meant that the component had to undergo excessive repositioning and measurement, thus affecting productivity. Vibrations were particularly prevalent in corner wraparound areas, so that cutting rates had to be reduced in these areas. There was also the need to carry out a spring pass to remove chatter marks and material residues.

The solution was to introduce a damped tool (R390D-020A20-11L) that allowed an increase in the axial depth of cuts, thereby reducing the number of passes, and eliminating the need to carry out spring passing, which saved six hours of additional machining time. There was a 60 percent increase in the metal-removal rate, while the need for constant operator monitoring was relaxed. During the evaluation period for this component, the same tool was used for more than three months, and other components were processed with the tool. It was used without any failure for a period of six months. A total of 12 hours of uninterrupted machining was achieved, which was a considerable improvement over the standard, undamped tooling setup.

THE DESIGN

In the design of damped tooling, Sandvik Coromant wanted to ensure that the overall performance of the longer, damped milling cutter would meet that of shorter, undamped tools and exceed that of undamped tools of a comparable length. The damping module design is patent pending. It incorporates a damped mechanism that consists of a heavy tuning body, rubber bushes and a highly viscous liquid medium.

In addition to higher metal-removal rates, tool life is also extended through the lower level of vibration coupled with problem-free machining, as the likelihood of sudden breakage due to vibrations is reduced dramatically. The damped system has improved the tooling system’s ability to securely mill deep pockets, steep walls and longer-to-reach features. As the system lends itself to the avoidance of edge-line fracturing, it is possible to establish a safe and predictable tool life.

TECHNICAL FACTS

• Suitable for all milling machines, machining centres and multi-task machines
• Performance comparable with standard milling cutters
• Easy to identify (A simple coding system identifies a damped milling cutter from an undamped one.)
• Through-coolant ability
• Suitable for long reach applications, both closed and open
• Allows use of more effective teeth, resulting in higher productivity.

THE BENEFITS

• High metal-cutting rates
• Increased productivity
• Problem-free machining
• No need for spring passes
• Extended and predictable tool life
• Elimination of vibrations
• Safe, secure processes.
THE WINNER TAKES ALL

Fastest, furthest, highest – the sports world is a world of superlatives. But is human strength and prowess enough in an era of increasingly sophisticated technology?

Researchers, Scientists and the world’s sporting elite continue to push boundaries, not just in terms of physical performance but also in carefully developed equipment, footwear and clothing. The “smart” sports equipment industry is worth billions, so brands and their research are very closely guarded.

The world of sports technology is vast and complex, and it changes rapidly. Not only do designers have to consider the effects on performance but also how the results will look to spectators at sporting events and, most importantly, on TV. And, because the number of elite athletes is small, the investment in development must be recouped by marketing versions – often watered down – to ordinary mortals.

The World Federation of the Sporting Goods Industry (WFSGI) is an independent, non-profit association formed by industry suppliers from around the world, national organizations and sporting goods industry-related businesses, and is recognized by the International Olympic Committee as the industry representative within the IOC family.

“It is clear that the developments [in sports technology] have come mainly from footwear and, more recently, the apparel people,” says WFSGI Secretary General André Gorgemans, noting a number of internationally renowned brands for their contributions: adidas and Nike for footwear, ODLO for fabric development, Speedo for the Fastskin swimsuits and Callaway for golf clubs.

“Footwear technology has certainly helped many athletes to train better, get fewer injuries and perform better as well,” he says.

WFSGI WATCHES ALL innovations closely. Asked if taking advantage of technological developments might be considered unfair, Gorgemans responds: “Obviously the sports federations have been struggling with technological advancements such as the better performance of tennis racquets and the developments in skis that caused
increased knee injuries. Golf balls are now flying much higher and longer, which makes golf courses somewhat shorter than they were built. It’s not cheating, since the sports federations allow it, but technological advancements certainly need to be monitored so that everyone is on a level playing field.”

SPORTS TECHNOLOGIST Colin White, a former software engineer who moved into sports and exercise science some seven years ago, says the Holy Grail for sports equipment is a computer program that could model equipment performance accurately enough to predict its properties post mass production. That, and cameras inside balls.

The United Kingdom and United States lead the way in sports technology research and innovation, with the UK nosing ahead in software development.

White is based at the UK’s University of Portsmouth, which in spring 2006 opened a multimillion-pound research and teaching facility to prepare elite athletes for the 2008 and 2012 Olympic Games. The expertise developed will not only help the world of sports but also other sectors, including oil, energy and the military.

In his research, White has studied skis, bikes, racquets, diving equipment, canoes and kayaks as well as clothing.

“The most desirable design combination is speed, accuracy and injury reduction, along with cost, durability and repeatability of performance,” he says.
Along the way, White has developed notational analysis computer programs to assess sports people, their equipment and their performance. And, he says, while a computer can theoretically create a perfect piece of equipment, that equipment will inevitably be more efficient but less forgiving, as proven by racquets and skis.

“For many years the sweet spot on a racquet was considered some theoretical or abstract area, but over the past 10 years, it has been shown that you can calculate exactly where it’s going to be,” White says. “If you’re a good player, you can hit that small point every time, but an amateur won’t. So manufacturers have to tone down the design with a bigger sweet spot to sell enough to the greater number of non-elite sports people to recoup the cost of research that went into the elite equipment design.”

NOT ALL MATERIALS and components are entirely new. “Until the ’50s most sports equipment used solid wood,” White says. “Then came the first composite – plywood. That went out of favour when carbon fibre, titanium-loaded ceramics and other clever composites came in. Today there can be as many as 51 different components making up a single ski.

“We are also using piezoelectric crystals,” he continues. “If you put piezo-electric material inside something that’s prone to vibrate, a current is created that, if you amplify it and feed it back to the crystal, will kill the original vibration. That’s beginning to be used in the shafts of tennis racquets.”

Not all sports welcome such modernization, however. In cricket, for example, when Dennis Lillee, a former Australian cricketer, attempted to use an aluminium cricket bat in 1970, he was told to return to the pavilion and use a “proper” one. And as recently as a couple of years ago, the current captain of the Australian national cricket team, Ricky Ponting, had his Kookaburra cricket bat, which used thin graphite reinforcements along its rear edge, banned, first by the MCC and then by the International Cricket Council. However, cricketers will tolerate wicket bails with hidden cameras and high-tech helmets, and White suggests that it probably won’t be too many years before the cricket ball carries some sort of sensing equipment.

Asked what else may lie ahead, White suggests the “third umpire” might monitor more sports, and future computer games may so accurately copy game reality that top athletes may use them as simulators.

But, he says, while researchers will strive to improve sports technology for many more decades, the human element will always create a limit, and the competitive edge and spectator interest must be maintained.

NEW WAYS TO SCALE A MOUNTAIN

Alan Hinkes, the only British member of a very exclusive club of just 12 living mountaineers who have conquered the world’s 14 highest peaks, says developments in clothing and equipment over the past two decades have made difficult terrain more accessible.

Hinkes, who spends a lot of his time climbing rocks and ice, says virtually all the equipment required for an expedition has changed.

“When I started, waterproofs weren’t breathable so you were damp inside your clothes, but now there are laminated fabrics that are totally waterproof and light,” he says. “You still sweat, but you stay dry.

“We don’t have ice axes any more, but ice tools,” he continues.

“Until the 1970s ice axes hadn’t really changed for about 100 years, and climbers continued to use very old ones with straight wooden handles and straight picks,” he says. “They’ve developed into highly technical tools with long, curved metal shafts with hand grips. And you can replace the picks.”

Boots, shoes, crampons, ropes and helmets have all received attention, making them lighter and stronger.

“This means you can do more difficult routes,” he says. “You can go where you couldn’t before.”

But there is one material that hasn’t changed for mountaineers climbing the highest peaks – down jackets. They are still essential for warmth at high altitudes.
“In golf the effects are seen in US PGA Tour drive distances, which have been collected since 1980,” Strangwood says. “Approximately 32,000 data collected per year show a gradual increase of one yard per year up to 1993, due to golfer training and nutrition. But from 1993 this becomes three yards per year, due largely to the introduction of hollow, oversized, titanium-based alloy driver heads. The change of golf ball by Titleist from wound to solid in 2000 gives an increase of five yards in that one year.”

But such advances can be too much of a good thing. Tennis racquets with larger, stiffer heads have, says Strangwood, “made tennis more of a serve-and-volley sport, reducing interest for spectators whilst increasing the occurrence of short- and long-term injuries.”

And in baseball and softball the introduction of hollow metallic (and now composite) bats to replace solid hickory has cut costs and encouraged participation by schoolchildren and colleges. “However,” says Strangwood, “the improvement in performance created too high a risk of pitcher injuries in the professional game, so solid wooden bats are the only conforming bats now.

“Mostly my work has dealt with equipment as a mechanical system, for example, impact and energy transfer, but in future the interaction between athletes and equipment will be investigated more closely,” he says. “This will mostly be in greater tailoring of equipment to specific athletes, along with greater monitoring by perhaps wearable sensors and sensors embedded in equipment, to optimize equipment to individual athletes and monitor them during sports people, with functions ranging from weather forecasting to timing ski runs and calculating diving depths and wind speeds.

• Sports technology has frequently borrowed from aerospace technology: for example, carbon fibres for bikes, baseball bats and hockey sticks, thermally adaptive fabrics for sports apparel and clever metal alloys for tennis racquets.
CONQUERING INSTABILITY

Preventing micro-movements results in benefits to both performance and quality.

CHALLENGE: HOW DO YOU MAKE SURE THAT INDEXABLE INSERTS REMAIN FIXED EXACTLY IN THEIR POSITION?

SOLUTION: ADOPT A PRECISION INTERFACE BETWEEN INSERT AND TOOL HOLDER.

ANY TYPE OF instability has a negative effect on machining – on both performance and results. Until now, measures against instability have focused on major instability issues such as machinery, fixturing, tool holding, tool design, insert geometry, tool paths and overhang.

Today machining is becoming more sophisticated and must meet new standards of quality consistency and throughput times. So when the more obvious sources of instability have been reduced to a minimum, sources of minor instability emerge, causing both performance and quality challenges in machining.

MICRO-MOVEMENTS HIGHLIGHTED

Turning operations often include various tool paths that put extra radial strain on an insert, giving rise to the tendency for micro-movements of the insert in its seat. These movements are often only in the region of microns, but when they are continually repeated and when they move the cutting edge out of position, they can result in unsatisfactory performance, especially in finishing operations.

Dimensional accuracy, tool life and chip control are the victims of insert movement.

COROTURN TR - PRECISION FINISHING

CoroTurn TR is part of the iLock concept and is intended to optimize performance and results in turning. Profiling operations are especially prone to insert micro-movement because longer D- and V-shaped inserts are usually used.

The T-rail design positions the insert precisely in the tool holder seat and maintains the cutting-edge position with high stability. The profiling inserts usually change the direction of the tool path frequently during machining and have to cope with varying depths of cut during turning, facing, profiling and recess cutting. Inserts with the T-rail interface ensure that there is no micro-movement that can affect the dimensional accuracy and surface finish of even precision-machined components. The accurate T-rail engages the insert almost below the cutting edge, and the only task of the insert-clamping screw is to draw down and hold the insert against the T-rail.

MILLING – HIGH-SPEED MACHINING

The positioning and locking of inserts in milling cutters is becoming more and more important as spindle speeds rise to high-speed machining (HSM) and as quality consistency becomes even more vital to production. The security and precision of the insert clamping plays a critical role in achieving satisfactory performance with regard to both challenges.

The radial run-out of a milling cutter affects the balance of the tool, a property that grows in importance as the cutting speeds/spindle speeds increase to high levels. A balanced tool is a prerequisite for HSM, as even small amounts of run-out can affect performance and safety. A basic requirement is that, by design, tools are balanced with minimal run-out, complemented by exact positioning and uncompromising insert clamping.

Locking the insert in such a way that it cannot move at all provides security for these operations.

ILOCK FOR MILLING CUTTERS

The CoroMill 790 has an iLock interface. The contact surface in the insert seat is serrated, providing a precise and tightly secured location for inserts. High precision is accommodated through ground inserts, and the serration reduces the effect of the insert tolerance by about half. Cutting forces are taken up from all machining directions, and feed rates do not have
The open chip space has provided room for the huge amounts of chips produced in these operations and for the chips to be evacuated from the machining zone. The accurate, firm location of inserts minimizes tool run-out and counters high centrifugal forces at high spindle speeds. The iLock interface provides high insert stability and location accuracy, making the CoroMill 790 a highly productive cutter for HSM performance in aluminium and other non-ferrous materials.

The CoroMill Century facemill for non-ferrous materials has also been designed with an iLock interface for high spindle speeds (the cutter has HSM security by design). It also has built-in precision and features micro-precision axialsetting of inserts. The serrated iLock interface in the balanced milling cutter body is a guarantee of the performance and quality that the CoroMill Century offers. In addition, chip and coolant flow have benefited from the iLock interface, leaving the chip space free of obstacles. This is a modern milling cutter for HSM, where the demands of high spindle speeds have been taken into account in the tool development.

FOR MORE INFORMATION: Contact your local Sandvik Coromant representative.

SUMMARY
Locating an insert exactly and making sure it stays put without any micro-movement is a growing issue. Process quality consistency and high-speed machining are just two of the areas dependent on how well this is facilitated in a cutting tool. The iLock interface eliminates the source of insert instability through security and precision by design for various machining operations.
Imagine your job is to improve on a piece of technology that is already the best in the market. A daunting task, you may say. Yet that’s precisely what designers the world over are asked to do. Make that which is already at the top of its game better. It could be cars, it could be planes, it could be mp3 players. Or grades.

In our case, the challenge was making our market leader, metal-working inserts perform even better. No compromise was allowed. Our new generation of inserts had to be faster, safer, more predictable. And more durable, too. That’s them, on the right. And on the left is one of the people who has managed to improve on a piece of technology that was already the best in the market. An industrial hero, quite simply.

For a closer look at a whole new insert generation, please visit www.coromant.sandvik.com.