

SHAPE IT

A MAGAZINE FROM OSG | 2018 VOL. 1

The MEASURE OF SUCCESS

SPECIAL INTERVIEW

with President of
GROB

REVOLUTIONARY

1-Pass Thread Mill

AT-1



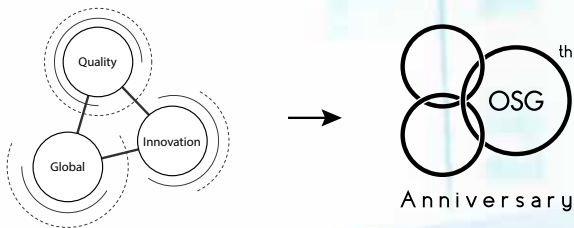
GLOBAL CUSTOMER REPORT

Cutting the Deep
and Narrow

Concept of OSG's Anniversary Logo

A Message from the President

OSG's 80th anniversary logo is represented in three intertwined rings. Each ring symbolizes the following essences:



The commitment to quality has always been a core value of OSG since its founding in 1938. Products and services offered by OSG must meet the required quality standard represented by our brand. Following quality, global presence is a key aspect of our growth strategy since 1968, when we established our very first overseas subsidiary in the United States. With our high-quality A Brand products and face-to-face sales support system, we aim to provide user-friendly and globalized manufacturing solutions to contribute to manufacturing industries worldwide.

In the world of manufacturing, the only constant is change. In order to thrive in this ever-evolving business environment, OSG will continue to innovate and challenge the status quo. Development can only be made possible with a company culture that is proud and takes pleasure by thinking outside of the box. As OSG continues its journey of growth, we will strive to take on new challenges and make our 80th anniversary year a successful and memorable milestone.

Norio Ishikawa
President & CEO of OSG Corporation



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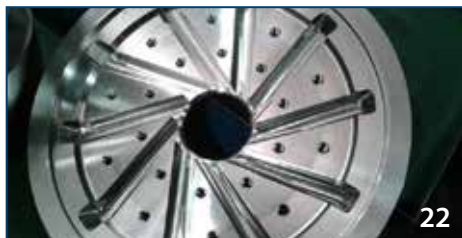
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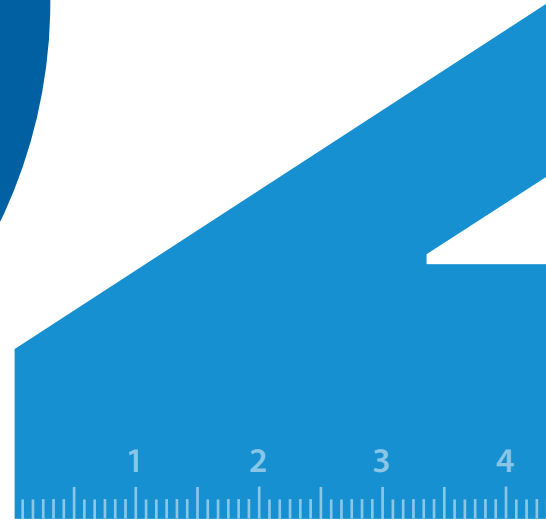
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The **MEASURE** OF 'SUCCESS'



OZT tool presetter slashes downtime, controls part quality and maximizes tool longevity

Reiko Masuhara, OSG Corporation

Productivity and quality are two key attributes to success in manufacturing. To boost productivity, often the first thing that comes to mind is to invest in newer and higher spec equipment, which can be very costly. Although making improvements to the setup process can potentially bring greater profits to a job shop, such option is commonly overlooked or is considered as an excessive cost. Regardless, every shop requires some form of tool measurement device for tooling setup to ensure accuracy. Shops that do not implement offline tool presetting rely on the machining center itself, which

can be less accurate and is a far more expensive choice for tooling setup. The machining center is one of the most expensive pieces of equipment on the production floor. Every time the machining center is stopped for tooling setup, it cannot generate profit for the shop. A much more economical option for tooling setup is the utilization of a tool presetter.

A tool presetter is a tool measurement device. Tool presetting and measuring machines allow long service life, short setup times, avoid rejects and prevent tool crashes. They are versatile for a wide

range of applications and industries. Tool presetting and measuring machines not only save time in work preparation and programming, but can also document measurements to provide quality assurance to its users.

Recognizing the importance of tool presetting, OSG Corporation collaborated with ZOLLER, a German-based manufacturer of tool presetting and measuring machines, to develop a tool presetting and measurement device called the OSG ZOLLER tool presetter (OZT) in November 2013.



About ZOLLER

ZOLLER is a global market leader in the field of measuring technology and tool-based manufacturing organization. Founded in Germany in 1945, ZOLLER specializes in the development of innovative tool presetting and measuring machines and software for the measurement, inspection and management of cutting tools. ZOLLER's products are certified according to ISO 9001 and ISO 14001 for quality and environmental management. Over the years, ZOLLER has experienced tremendous growth and has developed new markets in countries such as the United States, China, India and Japan. It has sold more than 30,000 units of tool presetting and measuring machines around the world in the past 70 years.



The second generation OZT series. Designed in conjunction with German manufacturer ZOLLER, the OZT enables quick, easy and precise measurement and presetting of tools. The end results – less spindle downtime, better parts and greater cost reduction.

The OZT tool presetter is compact yet powerful, ideal for space conscious work shop environment. The OZT tool presetter features a graphical user interface, dynamic crosshair and photo real input dialogs for user-friendly and intuitive metrology, and enables complex measurements on a single user interface.

OZT Tool Presetter

The OZT tool presetter development project was led by Etsushi Imaizumi, OSG Corporation's Sales Engineering Manager, to enhance manufacturers' production precision and efficiency. To accommodate different requirements, the OZT series offer a broad range of tool presetter and measuring machines from the entry-level class OZT-1, the mid-range OZT-2, up to the full spec universal inspection and measuring machine, OZT-3, for all precision tools.

The OZT tool presetter uses highly accurate parts and can perform measurement with high repeatability. It is also characterized by its superior operability compared to conventional equivalent products. With the implementation of the OZT, every tool is measured, checked for tolerances, and adjusted before being used, enabling the CNC machine tool to cut accurately and consistently. Because tools are preset in the OZT and not the machining center, an immediate increase



in CNC productivity can be obtained. Moreover, the processes of measuring, presetting and inspection can all take place near the CNC machining center. In terms of accuracy, projection technology depends on the operator's trained eyes, resulting in inconsistent measurement. With the OZT, results are precise and consistent every time regardless of the operator. Utilizing the latest vision system – camera and software, the OZT can measure the cutting edge in just seconds. It can measure much faster than conventional projectors. Last but not least, using the OZT is fast and easy. The dynamic crosshair (automatic cutting edge detection) quickly and accurately captures the cutting edge on the display, eliminating the hassle of positioning.

A recent upgrade was made to the OZT series in August 2017. The second generation OZT has modified its z axis range from 400/600 to 350/420/600; and x axis range from 400/600 to 320/420/620 to achieve a greater balance between flexibility and efficiency to accommodate the various work environment.

OZT Tool Presetter Caravan

Tool presetters are a great economical solution for manufacturers that seek productivity improvement. Internal studies by OSG have shown that if a machining center needs to change 20 tools per day, approximately 1 million yen worth of production time is stopped per year. With the implementation of the OZT tool presetter, such lost time can be eliminated.

However, anything that involves cost can be considered as an investment. A tool presetting and measurement machine is no different. When it comes to tool presetters, many manufacturers are often hesitant due to concerns with ease of use and whether or not they can maximize the full potential of the machine after purchase.

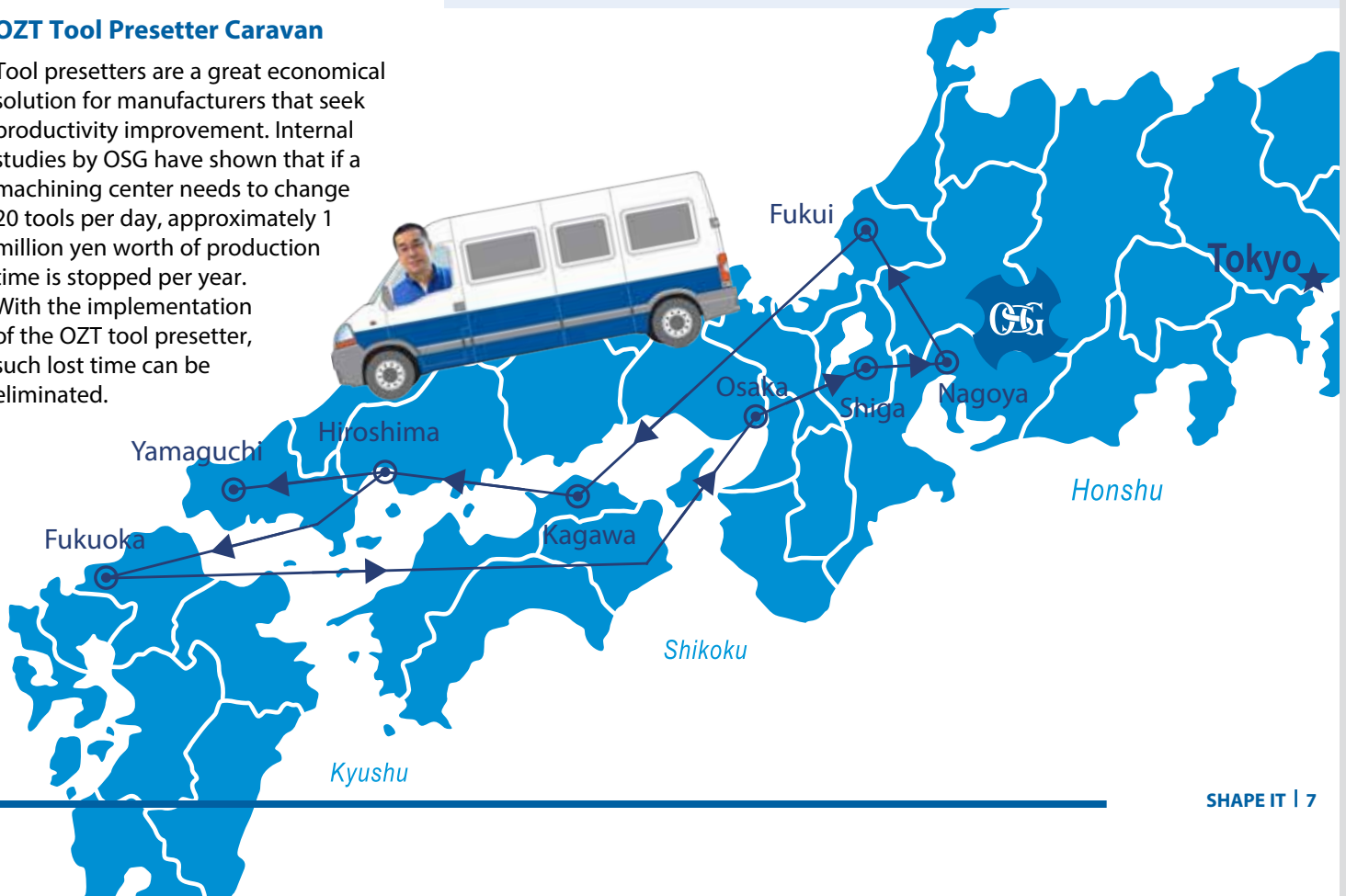
Additionally, large machines such as the OZT are generally displayed only during exhibitions. Over the years, OSG has discovered that many users are unable to attend exhibitions due to schedule

conflict, distance or other constraints. More importantly, operators and management staff seldom are able to attend exhibitions together. To resolve these challenges, the OZT tool presetter caravan campaign was created in May 2015.

The OZT tool presetter caravan campaign is setup that sales engineers would visit customers and exhibitions with the OZT-3 tool presetter so that demonstrations and Q&A sessions can be performed on the spot.

OZT Tool Presetter Caravan Tour

A full OZT tool presetter caravan tour typically last for four weeks with rotating staff. An example journey would begin from Aichi prefecture (OSG headquarters) to Fukui prefecture (user visit), Kagawa prefecture (regional exhibition), Hiroshima prefecture (user visit), Yamaguchi prefecture (user visit), Hiroshima prefecture (regional exhibition), Fukuoka (user visit), Osaka (regional exhibition), Shiga prefecture (user visit), and finally returning to Aichi prefecture (OSG headquarters).



FEATURE [cont.]

"It is most crucial to first explain how user-friendly the OZT is," said Kazunori Yamasaki, OSG sales engineer and leader of the OZT caravan campaign. "In fact, many customers have purchased similar machines in the past, but gave up on them due to poor operability. The machines are just left in the dust. Due to such past negative experience, we must take extra care in explaining the ease of use of the OZT."

The vehicle used for the OZT tool presetter caravan tour is especially

designed so that demonstrations can be performed right in the vehicle. The OZT caravan has an expandable tent from the car roof, so demonstrations can be conducted around the vehicle and the poor weather would not have any effect. There is no wait time and each demonstration typically requires 20 to 30 minutes. However, when there are many questions, one user may take up to one to two hours. The OZT caravan team can generally visit 4 end users per day. The caravan also stops by exhibitions, where the OZT team is able to demonstrate to

a larger audience and communicate with them in person.

The OZT sales engineering team would conduct short visits as well as long visits depending on customer demand. The team has made visits as far north as Aomori and as south as Kyushu. As long as there is a demand for demonstration and more in depth explanation, the OZT team will make arrangement to fulfill that need. ✖

Below: The OZT tool presetter caravan campaign is setup that sales engineers would visit customers and exhibitions with the OZT-3 tool presetter so that demonstrations and Q&A sessions can be performed on the spot.

Right: Kazunori Yamasaki, OSG sales engineer and leader of the OZT caravan campaign.





The OZT tool presetter enables greater runout control to enhance machining efficiency as well as tool longevity.



Tool	EXOCARB® WDO-3D Coolant-Through Carbide Drill
Size	Dia. 3.1
Work Material	SUS316
Cutting Speed	70m/min (7,200min ⁻¹)
Feed Rate	680mm/min (0.9mm/rev)
Depth of Hole	7.8mm (2.5D)
Coolant	Water Soluble 10% (Internal)
Machine	Vertical Machining Center

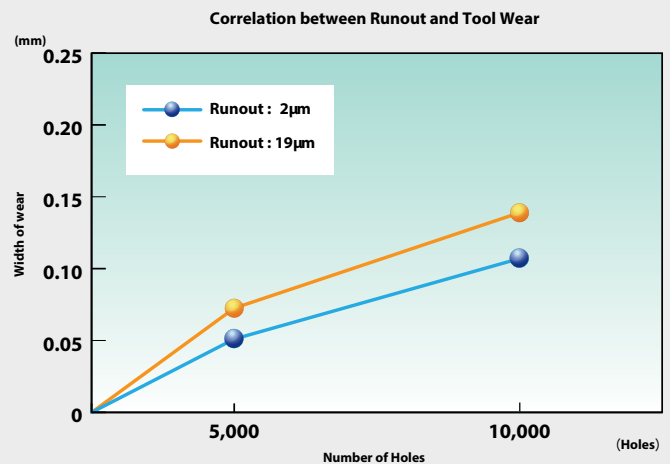


Figure 1.

Using the EXOCARB® WDO-3D, a coolant-through carbide drill widely used in the automotive industry as an example, the OZT can equalize the wear of each cutting edge by adjusting the vibration during tool installation. The result is a reduction in tool wear by 30 percent, thereby prolonging tool life.

Customer Responses

Since the start of the OZT tool presetter caravan tour, there have been a number of positive responses from users. A robot-related precision part manufacturer in Western Japan has commented that “in addition to the excellent features of the OZT, it’s reassuring to know that there will be technical support from both OSG and ZOLLER, so we purchased the OZT-3 with confidence.”

Productivity improvement does not always have to start with new and expensive machining centers. Tool presetters can measure tools quickly, easily, accurately and reliably. By improving the tooling setup process, downtime can be reduced with a streamlined manufacturing process and enhanced part quality to increase profit. The more frequently a shop has to load tools in a machining center, the more savings tool presetters can offer.

SPECIAL INTERVIEW

President of GROB shares insights on metalworking trends and OSG partnership

Rodrigo Katsuda, OSG Sulamericana



An aerial view of the B. GROB do Brasil facility in São Paulo, Brazil. Photo courtesy: GROB.

The manufacturing sector is consistently evolving through the new discovery of materials and technologies. Big data, automation, robotics and artificial intelligence are some of the key trends that have been accelerating the next industrial revolution and a new era of global business. To achieve growth, rather than becoming a follower, one must lead change with new innovations. Constant development and the pursuit of perfection is the company vision of

the GROB Group, a world-renowned manufacturer of machining center and production systems, who has established itself into a technology leader and trendsetter that it is widely known today. Recently, OSG Sulamericana in Brazil had an opportunity to sit down with Michael Bauer, president of GROB, to hear about his opinion on the outlook for the year ahead and the partnership with OSG.



“GROB will look to continue its strategic partnership with OSG and the pursuit of perfection in order to deliver the best possible results for our clients.”



From left to right, OSG Sulamericana Director Kenya Sugihara and GROB President Michael Bauer.

An OSG M12 x 1.75 spiral flute tap in a spindle at the production floor of B. GROB do Brasil. OSG services for GROB in all machining segments that they operate, including automotive, aerospace, mold and die, etc.

Q: Please tell us a little bit about GROB. How many years has it been operating globally and in Brazil?

A: Founded in 1926, the GROB Group is an internationally operating family company. Headquartered in Mindelheim, Germany, the GROB Group has three production plants in São Paulo, Brazil, Bluffton, USA and Dalian, China. There are currently 11 sales and service branches in South Korea, China, India, Russia, the United Kingdom, Hungary, Mexico, Italy and Poland. As of 2016, the company generates a consolidated revenue of 1.3 billion euros and employs approximately 6,000 employees worldwide. GROB's product offering includes universal

machining centers, complex production systems with individual automation, manual assembly stations and fully automated assembly lines.

GROB's Brazilian division, B. GROB do Brasil, was established on June 14, 1956 in São Paulo. It is GROB's first overseas plant and plays a crucial role in its production system. B. GROB do Brasil produces machinery for the domestic market as well as for exports. Key products include machining lines for transmissions and engines, as well as 4- and 5-axis universal machining centers. During fiscal year 2016, B. GROB do Brasil generated a revenue of nearly 102 million euros and employs more than 550 staff in a production area greater than 25,000 m². Having been in the Brazilian market for over 60 years,

GROB is recognized for their quality and reliability.

Q: Can you tell us about GROB's market segment?

A: The automotive segment is GROB's main business domain. GROB services large automotive manufacturers and their suppliers. In addition to automotive, GROB also supports manufacturers in the aerospace, mold and die, machine and mechanical equipment, medical, and energy industries.



From left to right, GROB Proposal and Sales Manager Ricardo Jorge Cruz, OSG Sulamericana Turnkey/Tryout and Tool Management Project Leader Giovanni de Paula, OSG Sulamericana Aerospace Project Leader Gustavo Santos, GROB Sales President for Americas Christian Müller, and OSG Sulamericana Automotive Project Leader Maximino Maldonado Borges. OSG participated in the “Soluções Tecnológicas em Usinagem com 5 Eixos” (Technological Solutions in 5-Axis Machining) Workshop, held at the facility of B. GROB do Brasil.

Q: What is your perception of the current market condition?

A: The metalworking industry is evolving rapidly. New trends and technologies such as Industry 4.0 and enhanced data mobility will have an underlying role in global manufacturing. Manufacturers and suppliers must stay ahead of change, identify and accommodate new market needs. At GROB, we are never satisfied with the status quo. Our company tradition lies in continuous innovation, which is a crucial value for ensuring long term growth and sustainability.

Q: Can you tell us more about GROB’s relationship with the automotive industry?

A: The automotive industry has always been GROB’s key domain for growth in both Brazil and abroad. GROB is always innovating to stay ahead of technological advances in the automotive market, such as engine coating technologies, the machining of turbochargers and structural components, as well as in the production of electrical engines, fuel cells and batteries.

Q: What role does OSG play in GROB’s growth?

A: OSG services for GROB in all machining segments that we operate, including automotive, aerospace, mold and die, etc. OSG acts as supplier of B. GROB do Brasil in the machining department, supplying a number of cutting tools for our machines. OSG also attends our clients’ turnkey processes during the final approval stage with tooling evaluation and technical support. In both cases, the synergy between GROB and OSG is critical in achieving optimal results. When GROB’s expertise in machining equipment is accompanied by OSG’s quality tooling, values are enhanced for our clients.



From left to right, GROB universal machining centers G550, G350 and G750 engineered to accommodate a wide range of industries for machining complex and high precision mold and prototype parts. Photo courtesy: GROB.

Q: How does GROB benefit from this partnership?

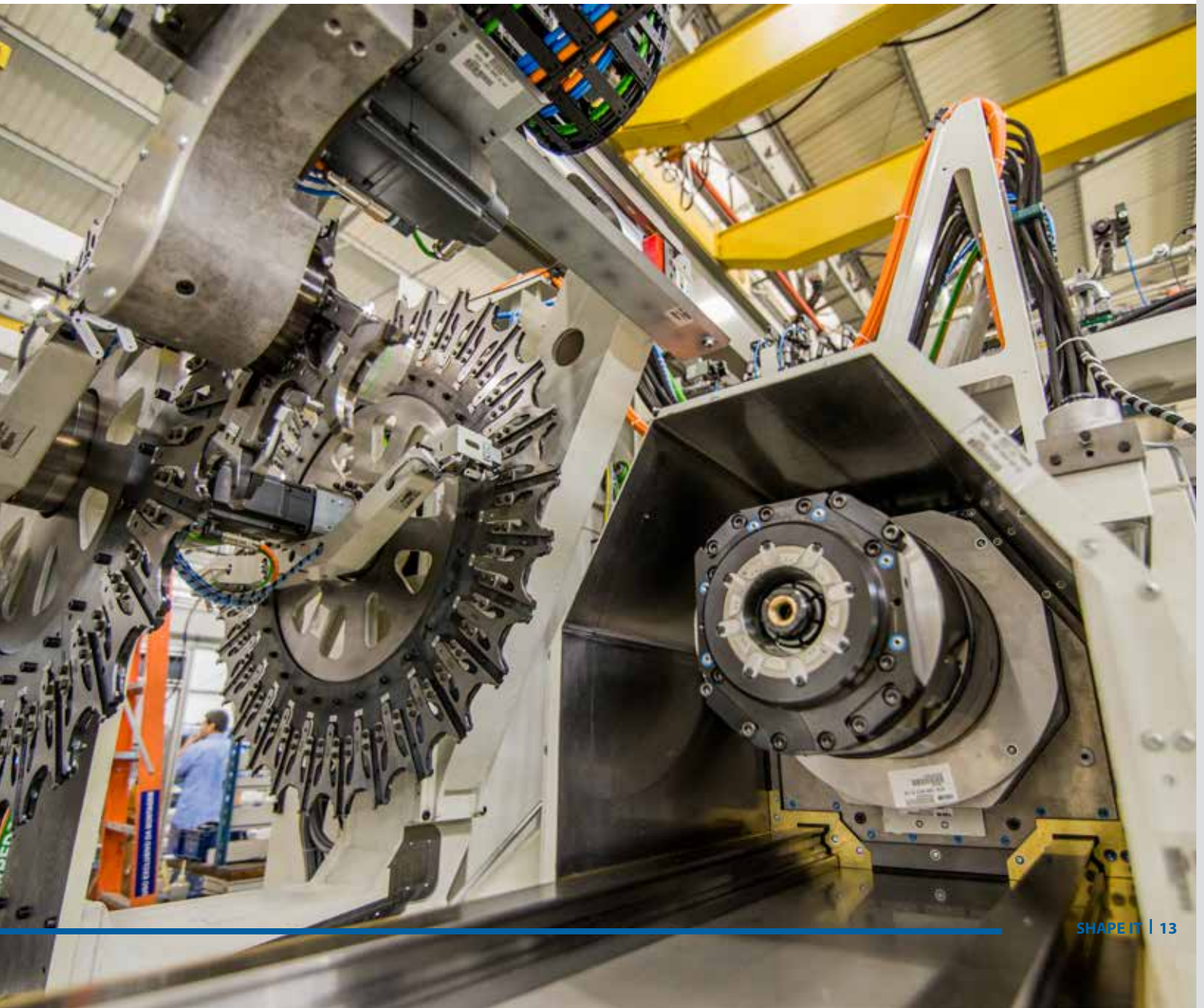
A: Recently, OSG has been working side-by-side with GROB on projects for Nematik, a manufacturer of highly complex aluminum components for the automotive industry, in Monterrey, Mexico, supplying approximately 50 percent of the project tooling. GROB is receiving excellent on-site support from the OSG technical team since the implementation of the tools. OSG also provides assistance at Nematik's plant in Mexico, ensuring absolute satisfaction for all parties involved.

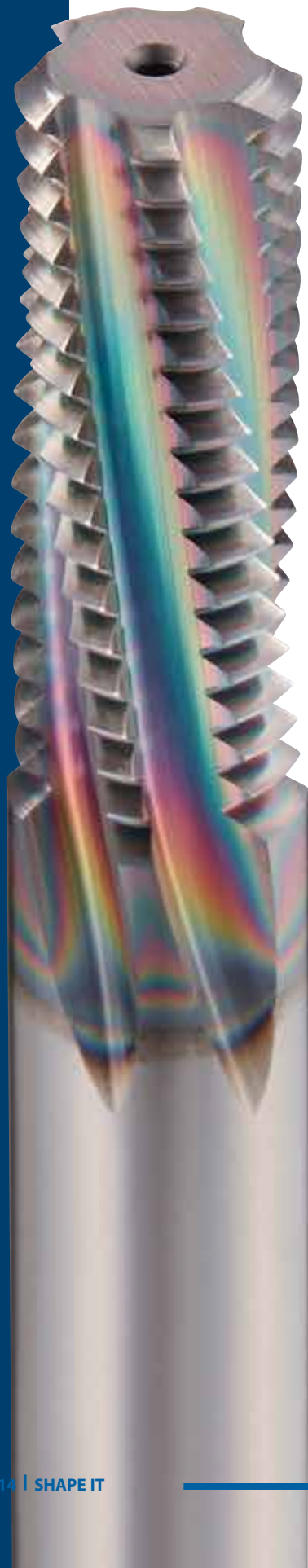
Q: What future plans does GROB have in terms of the OSG partnership?

A: OSG participated in the "Soluções Tecnológicas em Usinagem com 5 Eixos" (Technological Solutions in 5-Axis Machining) Workshop, held at the facility of B. GROB do Brasil in October 2016. Many consider the workshop to be a leading event for metalworking in the Brazilian market, as it presents new knowledge and innovations to its participants. During the workshop, GROB presented alongside with its technology partners, who are the best and most innovative solution providers in the

machining market. OSG was present with a booth in the exhibition area, where it showcased the latest cutting tool solutions and specific technological advantages. GROB is always seeking to work with committed partners with high quality products. The next workshop is scheduled to be held in October 2018. GROB will look to continue its strategic partnership with OSG and the pursuit of perfection in order to deliver the best possible results for our clients. ✦

Photograph of the assembly of a GROB machining center. GROB is a global manufacturer of universal machining centers, complex production systems with individual automation, manual assembly stations and fully automated assembly lines.



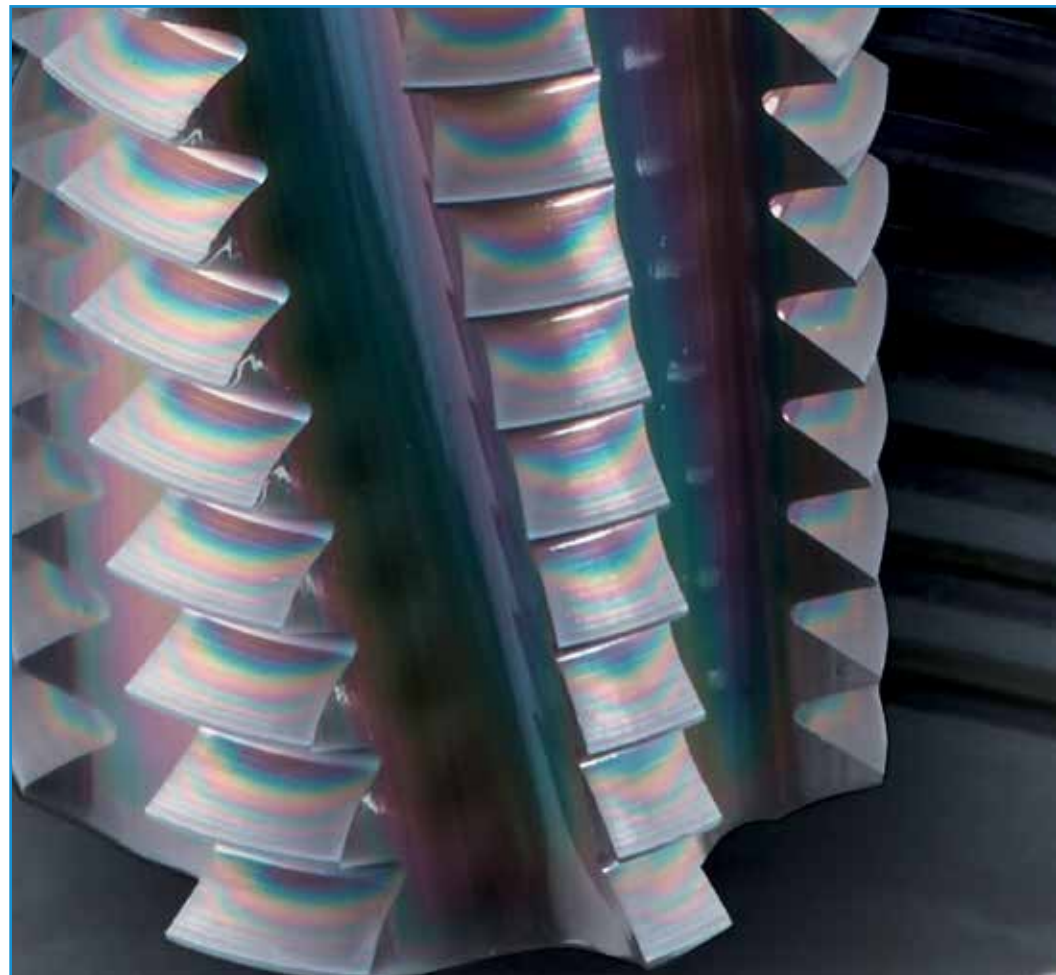


AT-1

REVOLUTIONARY 1-PASS THREAD MILL

for high-quality threading

Tomonori Yoda, OSG Corporation Applications Engineer (Tap Development Division)





Work materials have evolved significantly in recent years to fulfill the changing requirements of the global manufacturing industry. Material properties have become more lightweight and resilient against strength and heat for improved functionality, durability and fuel efficiency. In order to effectively process new advanced materials, greater performance is needed from cutting tools.

For the creation of threads in a hole, tapping is the most common method, where the tool moves axially into a previously drilled hole to form threads along the hole's wall by continuous cutting. Thread milling, in contrast, forms threads by intermittent cutting. Although OSG offers a full lineup of high-performance taps for machining difficult-to-machine materials with optimized substrate, surface treatment and tool geometry, it is often difficult to obtain suitable cutting parameters because performance is based on the tool rotation speed and a tap can only advance one pitch per revolution.

A thread mill is a tool designed to cut threads by milling. Thread mills are used on numerically controlled machining centers that have simultaneous, triaxle control and helical interpolation functions. Thread mills are applicable to a range of hole diameters rather than just one hole size like taps, where its diameter is fixed. A thread mill's latter diameter is determined by the CNC tool path; thus, a single tool can be used to cut threads in various sizes of diameters. One thread mill alone can combine multiple operations, such as drilling, chamfering and threading.

In comparison to tapping, thread milling is more stable with less cutting condition limitations in terms of chip management and coolant lubricity. Thread mills can produce short and broken chips that are easy to manage. Moreover, thread mills do not need to be reversed at the end of the tapping operation like general taps, which minimizes the occurrence of broken tools and scrap parts. With the thread mill's high-performance and reliability, unattended machining is also possible, making it the ultimate tooling solution for thread processing.

Ultra-Fine Grain Carbide

High wear resistance and toughness

EgiAs Coating

Exceptional wear resistance & toughness

**Unequal Spacing/
Variable Lead Flute**

Reduces vibration

**Right-Hand Cut &
Left-Hand Helix
Geometry**

Prevents Deflection

**High Quality
Internal Threading**

Why Aren't Thread Mills Chosen More Often?

Even though thread mills are capable of achieving the best thread processing performance, there are several reasons why they are not the first tooling choice.

1. Simultaneous 3-axis machining center is required.
2. Machining program is difficult.
3. It takes time to set up.
4. Cycle time is long.

Out of all of the reasons, the long cycle time is in general the most common factor in which thread mills are not chosen.

Correlation of Deflection & Cycle Time

There is a general conception that thread milling would require two or more passes to generate a thread, which makes the processing longer than tapping. Deflection is a common problem with thread mills, because the cutting force is not balanced. Deflection and dimensional accuracy would worsen as the tool progresses toward the bottom of the hole. To correct deflection, an extra pass is used for zero cutting. If zero cutting does not resolve the deflection, more passes are required, which further extends the cycle time.

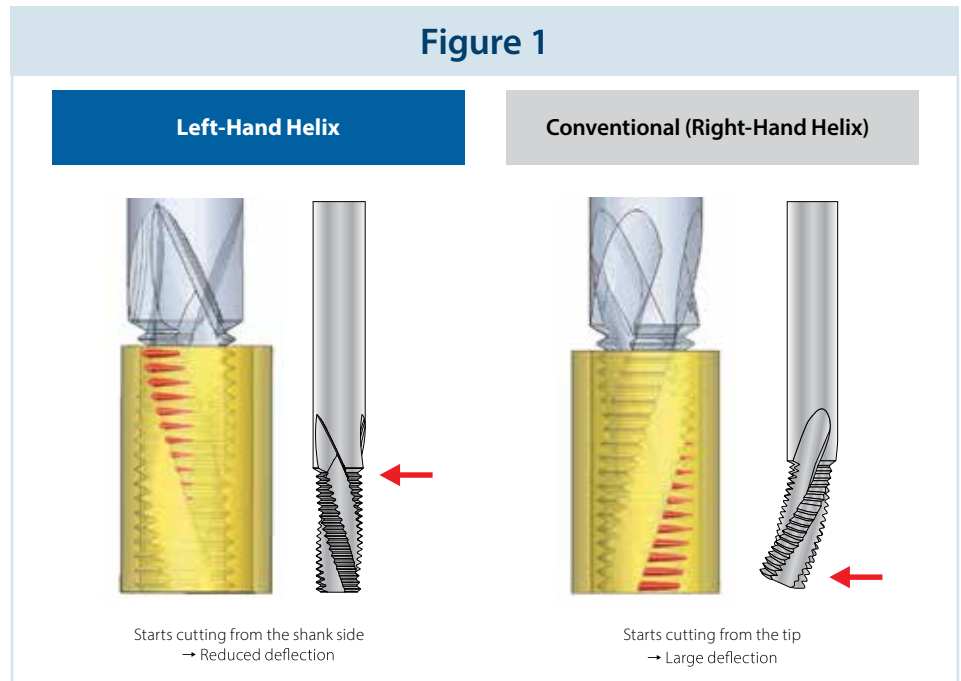
Revolutionary 1-Pass Thread Mill AT-1

To solve the problem of deflection and long cycle time, OSG has developed the AT-1, a revolutionary 1-pass thread mill for high-quality threading, with two patented technologies registered in Japan for its tool geometry.

1. Left-Hand Helix Geometry

The first patented technology is the AT-1's left-hand helix geometry. As shown in figure 1, conventional right-hand helix thread mill is most vulnerable to deflection as the cutting process begins from the tip. In contrast, the AT-1's right-hand cut and left-hand helix geometry begins the cutting process from the shank side, thereby minimizing deflection.

Figure 1



2. Unequal Spacing & Variable Lead Flute

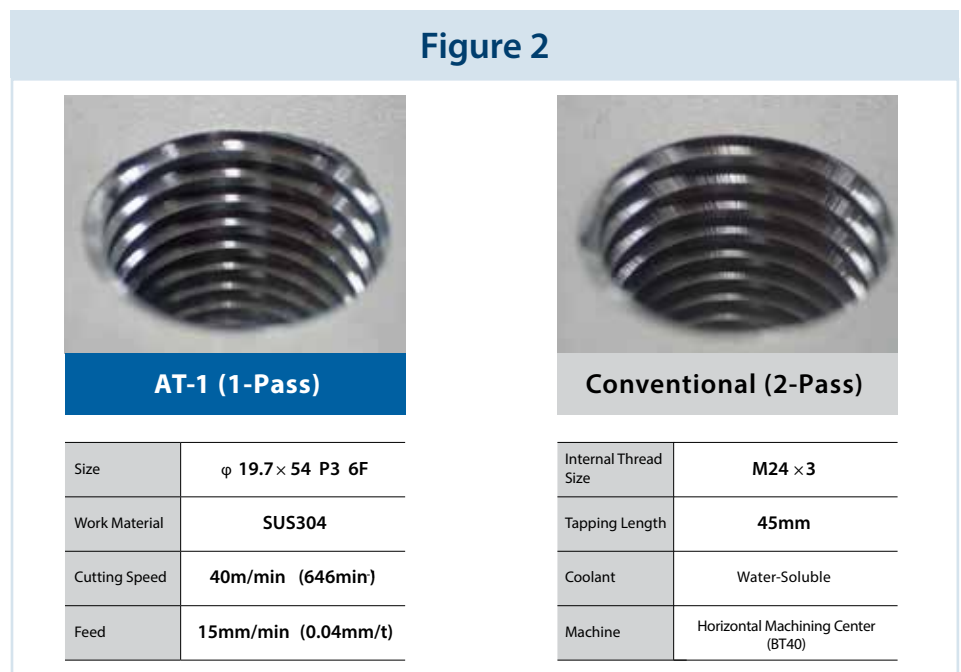
The second patented technology is the unequal spacing and variable lead flute geometry, which is commonly applied in end mills. The unequal spacing and variable lead flute geometry minimizes vibration. Even though the amount of cut has increased with one pass cutting, superior and consistent surface finish can be achieved as illustrated in figure 2.

Applying the unequal spacing and variable lead flute geometry in

thread mills involves a high degree of difficulty because the thread pitch has to be adjusted according to the flute geometry, which requires special manufacturing techniques.

Although thread milling is a more mature cutting process, it can outperform conventional tapping with increased reliability, surface finish and accuracy. With the AT-1's capability to generate threads in one pass, it is the ultimate thread milling solution for difficult-to-machine materials like stainless steel. ✖

Figure 2



Size	φ 19.7 × 54 P3 6F
Work Material	SUS304
Cutting Speed	40m/min (646min)
Feed	15mm/min (0.04mm/t)

Internal Thread Size	M24 × 3
Tapping Length	45mm
Coolant	Water-Soluble
Machine	Horizontal Machining Center (BT40)



CUTTING THE DEEP & NARROW

WXS, WXS-C and EPL end mill series provide reliable alternative for deep cavity machining

Magnus Hoyer, OSG Germany



From left to right, OSG Sales Manager Uli Blöcher, Meissner Divisional Manager Matthias Bassler, Meissner Cam Programmer Christoph Rothenpieler and Meissner Group Leader Christoph Schwarz.

A number of challenges, such as poor chip evacuation, vibration, chatter, tool instability and poor tool life, are commonly associated with the machining of deep cavities. In deep applications, the side walls of the workpiece become barriers for proper chip removal. Chip evacuation would only worsen the deeper into a part a cutter proceeds. Moreover, tool holders and adapters may collide with the workpiece due to the high contour and narrow web environment. With standard cutting tools, the cutting edges are fully engaged with the workpiece, resulting in lateral cutting forces that can trigger vibration, chattering and thus tool failure. Electrical discharge machining (EDM) is often used as an alternative for deep cavity machining, but it is highly time consuming and costly.



With the implementation of OSG's end mill tooling, it has been proven that even 3-axis machining can be significantly more efficient than 5-axis milling when processing water jacket core tools with deep and narrow cavities.

Meissner AG, a German manufacturer of prototypes, production tooling and molds, was experiencing such a challenge when working with the production of water jacket core tools that require the processing of tight pockets, narrow webs and high contours. As a manufacturer that is always in sync with the latest production equipment and technologies, Meissner has discovered that even with the utilization of 5-axis machining, optimal performance cannot be achieved for these types of work.

Founded in 1922 and headquartered in Biedenkopf-Wallau, Germany, Meissner offers services including the development, design and manufacturing of prototypes and production tooling and molds for clients around the world. Production tooling may include tools for the casting of engine blocks, cylinder heads, car rim parts from various materials, blow molds for fuel tanks and filler pipes, and more.

Meissner has a total of 340 employees,

out of which approximately 50 are engineers. Meissner places great emphasis on product excellence, reliability, and continuous innovation. Meissner employs modern equipment and technology with virtually all automotive industry-wide CAD systems and a CAD-based data management to enable effective and efficient communication with its clients.

Meissner is one of the first companies in Germany to introduce 5-axis machining. The reduction in cycle time and the increase in precision are two major advantages of 5-axis CNC machining centers. However, product engineers at Meissner have discovered more and more frequently that, for certain components, it does not always make sense to rely on 5-axis machining.

According to Christoph Schwarz, Group Leader of Mechanical Production at Meissner, the inability to fully maximize the potential of a 5-axis machining center is especially apparent in the machining of water jacket core tools.

"With these tools, we have tight areas, tight pockets, narrow webs and high contours," Schwarz said. "Limits are placed on the swiveling movements of machines, which reduces the speeds and feeds."

According to Schwarz, the rotational movements also place more stress on the tools. Thus, depending on the geometry of the workpiece, 5-axis machining center may not always make sense. Meissner has also been processing deep cavities workpieces with EDM, but it is time consuming and costly.

"With the right tooling, our comparisons have shown that for certain workpieces, we are much faster with a 3-axis machining center," said Schwarz.

Deep and narrow cavities usually require very long and thin tools. The deflection of the tool is a common issue during processing. For this reason, Meissner has been seeking an alternative, as it neither wanted to mill at an angle in 5-axis nor opt for EDM.

With the 2-flute toroidal and ball end mills from OSG, a solution appears to have been found, particularly for contour roughing and finishing of core tools for water jackets. The idea of using OSG's toroidal and ball end mills in conjunction with a 3-axis machining center came about at the beginning of the year from another project. The toroidal and ball end mills from OSG's WXS, WXS-C and EPL series have been chosen for many reasons, Schwarz explains.

"First, it was the positive experience. OSG always showed willingness in response to enquiries, delivery times were short and the advice was competent," Schwarz said. "More importantly, however, it was the result obtained from these cutting tools."

While the milling cutters in the WXS and WXS-C series originate from OSG's headquarters in Japan, tooling from the EPL series are manufactured at the OSG Germany facility in Göppingen. The WXS end mill series is engineered with a super-hard coating with nanotechnology for high heat resistance. It is designed to excel in work materials above 50 HRC. The OSG original WXL coating has a 1,300°C oxidation temperature to permit greater spindle speeds and longer tool life, even in high-speed or dry machining. Its unique tool geometry enables high quality, high precision milling even in difficult

machining conditions. In addition to the WXS end mill, the WXS-CRE is a 5-flute high performance carbide end mill with a super radius and is designed to accommodate materials up to 65 HRC.

Last but not least, the EPL is a 2-flute, high performance, long neck and ball nose end mill series designed to excel in materials of 45 HRC and up to 60 HRC.

Machining trials were carried out on the water jacket core tool with deep cavities using 3-axis milling. Tools from different manufacturers were put

to test under identical conditions. According to Matthias Bassler, Divisional Manager Production at Meissner, the decision was made in favor of OSG.

"We are not looking to the last second, but time is also an important factor for us," Bassler said.

"We have very many, very time-consuming finishing operations. Quality, tool life, and the reliability of the process

are of enormous importance. Any rework that may be necessary – for whatever reason – would have an enormous effect on the costs. Our tests have shown that, with this material, we had to run an additional step when using tools from other manufacturers. With OSG, on the other hand, everything went well," Bassler said.

In addition to productivity, Meissner also has strict requirements for dimensional accuracy as well as surface finish. Core tools are pre-finished with an optimum machining allowance of 0.3mm. After finishing, tolerances at all levels must lie within the specified tolerance range of 0.03mm. Such result naturally would require appropriate programming.

"To do the job right, it is necessary to first determine the tool sequence," said Christoph Rothenpieler, CAM programmer at Meissner.

"The tools for roughing and pre-finishing should be chosen in such a way that as little deflection as possible occurs later during finishing. This is the only

"We are not looking to the last second, but time is also an important factor for us."



Right: Meissner often works with components with tight pockets, narrow webs and high contours, which can limit the swiveling movements of the machining center, resulting in a reduction of speeds and feeds.



Above: Meissner's parts require a tolerance of 0.03mm, which OSG's end mills are able to achieve the required precision consistently.

Right: Tools for the casting of engine blocks, cylinder heads and other cast parts are one of Meissner's specialties.

way to prepare an optimum contour," Rothenpieler added.

Prerequisites for achieving such precision are highly dependent on the machining center and the cutting tools. In this case, machining centers from Hermle provide the best results. Eighty percent of finishing work is carried out on these machines. In terms of cutting tools, OSG Sales Manager Uli Blöcher knows what really matters.

"The differences between tools are determined primarily by the choice of carbide, the geometry of the cutting edges, the stiffness of the tapers, and

most important of all, by the substrate or how the tool works at the cutting edges," said Blöcher.

OSG's WXS, WXS-C and EDP series' unique cutting tool geometries are designed for deep work to enable faster cycle time with for deep applications. The spiral gash technology of the cutting geometry helps minimize vibration and chatter, thereby enables stable contour milling.

Meissner's pursuit for an alternative processing solution has enabled them to revive a number of 3-axis machining centers while allowing their

5-axis machining centers to be in full production with other jobs.

With the right tooling, a 3-axis can outperform a 5-axis machining center to maximize profitability. OSG's tooling demonstrates that cutting the deep and narrow on a 3-axis is possible with minimal chatter, cycle time and setup time, while at the same time, increasing removal rate and tool life. Sometimes questioning an established method may be the first step toward progress. ✦



EFFICIENCY & DURABILITY

All in One

Button insert end mill PRC SS slashes roughing time in stainless steel

Yukai Zhang, OSG Shanghai



Sichuan Nick Seal Manufacturing Co., Ltd. is a listed company that specializes in the processing and manufacturing of seal products. As a longtime business partner of OSG, Sichuan Nick Seal Manufacturing has been using OSG cutting tools for many years. They are a frequent user of OSG's round shank cutting tools, such as the EX-SUS-GDS / GDR drills, WDO drills, EX-SUS-SFT taps, and A-SFT taps.

Sichuan Nick Seal Manufacturing produces workflow channel in SUS304 with a slot width of 20-20.3 mm, a slot depth of 20 mm, and 10 slots in every workpiece.

Most of Sichuan Nick Seal Manufacturing's products are made of stainless steels. While working on a drilling application with OSG, Sichuan Nick Seal Manufacturing brought up a challenge that they were encountering with their flow channel production in SUS304. The roughing process is the most difficult part of the process. The slot width of the flow channel is 20 to 20.3 mm, with a slot depth of 20 mm. There are 10 slots in every workpiece. Prior to the consultation, Sichuan Nick Seal Manufacturing was using a 20D HSS 3-flute end mill, slotting using water-soluble coolant and running at a parameter of V_c 7.5 m/min (S 120 rev/min), V_f 40 mm/min (F_z 0/11 mm), a_p 6.6 mm, a_e 20 mm. Unsatisfied with the parameters, Sichuan Nick Seal Manufacturing was seeking an alternative solution to improve processing efficiency.

After evaluating the application thoroughly, OSG recommended a 20D OSG Phoenix PRC straight shank type radius cutter. Available in straight shank type, bore type or screw fit type, the OSG Phoenix PRC is a highly versatile series of button insert end mills and face mills for contour milling applications. The PRC features an insert rotation notch to allow the selection of 4- or 8-corner insert type based on depth of cut. The PRC's wide chip pocket geometry enables stable and trouble-free chip evacuation. Furthermore, its large body relief supports efficient 3-dimensional machining and is most ideal for mold and die work where 3-D machining is prevalent.

For Sichuan Nick Seal Manufacturing's application, OSG recommended the straight shank version of the PRC, PRC SS, which is a light and highly efficient tool. In terms of inserts,

OSG recommended the 8-corner type, XP2040 grade to ensure precision, long tool life and stability in high-speed machining of SUS304.

In the beginning, Sichuan Nick Seal Manufacturing was hesitant with the recommendation, as they were not very familiar with indexable tooling.

Confident with the performance of the PRC SS, OSG provided Sichuan Nick Seal Manufacturing a trial tool for testing purposes.

The result observed during the trial period greatly surpassed the expectation of Sichuan Nick Seal Manufacturing. The PRC SS was able to achieve V_c 120 m/min (S 1,900 rev/min), V_f 1,500 mm/min (F_z 0.4 mm), a_p 0.8 mm, a_e 20 mm. The processing time has improved from 300 minutes to 50 minutes, with each insert corner being able to complete 10 slots. In this application, the life of the 8-corner insert is approximately 80 slots, which is equivalent to eight workpieces. With the significant improvement in machining time and tool life, Sichuan Nick Seal Manufacturing couldn't be happier with the result.

During the past decade, OSG has expanded its product offering, invested time and resources in reflecting its vast experiences from round shank tools to indexable tools with the OSG Phoenix series. As demonstrated in the case of Sichuan Nick Seal Manufacturing, the superior performance of the OSG Phoenix series is clearly reflected in the field. ✦

The OSG Phoenix radius cutter series PRC offers 4- or 8-corner type inserts, which can be selected based on depth of cut. For the production of Sichuan Nick Seal Manufacturing's workflow channel, the 8-corner type was employed.





MEETING HIGH MILLING ACCURACY

Anti-vibration carbide end mill AE-VMS demonstrates superb finish quality and machining efficiency in sensor manufacturing

Raman Pandiyan, OSG India



Sensors and measurement devices are designed to provide absolute accuracy and reliability to its users. The manufacturing of these components demands the same delicacy as they are to become a part of a larger system and must work coherently with the rest of the elements.

OSG supplies precision cutting tools for the manufacturing of high quality sensors and measurement equipment.

A global manufacturer of load cells and force measurement equipment located in Sri Lanka was recently looking for a new solution to improve cycle time and tool life while maintaining strict tolerances for their production of single point load cell weight sensors.

For confidentiality reasons, the name of this customer and images of the part cannot be disclosed. However, what can be shared openly regarding the part is that it is made in 17-4 PH stainless

steel and requires a strict surface finish requirement of Ra 1.6, dimensional tolerance of +/- 0.03 mm, and the wall thickness must be maintained within +/- 0.05 mm.

Established in 1968, this manufacturer's core product offering include strain gauge load cells, strain gauge force sensors, amplifiers, A/D converters, weight indicators and mechanical application parts, all of which are components that can be combined to form complete systems.

This manufacturer today employs more than 900 workers at 10 global locations,

including the United States, Sweden, Sri Lanka, Italy, India, the Great Britain, Germany, France, China and Brazil.

This manufacturer produces approximately 1 million sensors and 5 million strain gauges annually. Operating in Sri Lanka since 1996, this customer has two production facilities within Sri Lanka with a combined manufacturing space of approximately 12,000 square meters, all dedicated to the production of general industrial sensors, strain gauges and medical products.

The single point load cell weight sensors manufactured at the customer's Sri Lanka factory are typically used in low capacity, compact weighing systems.

The customer was originally using a competitor carbide end mill for the side milling and pocketing of their single point load cells. The Mazak VTC-200 (BT 40 spindle) with emulsion of 7 percent oil concentration is used for the machining center. A shrink fit holder is employed and the cutting parameter was set at vc 60 m/min, fz 0.03 and ap 2.4 mm. Tool life was calculated to be around 250 minutes.

The 17-4 PH is a very tough stainless steel. It is not easy to maintain such a thin wall thickness tolerance within 50 micrometers, and many competing end mills failed to fulfill the requirement due to large vibration occurrences at the thin wall section.

OSG has recently introduced a new anti-vibration carbide end mill offering, the AE-VMS series, designed to attain an all

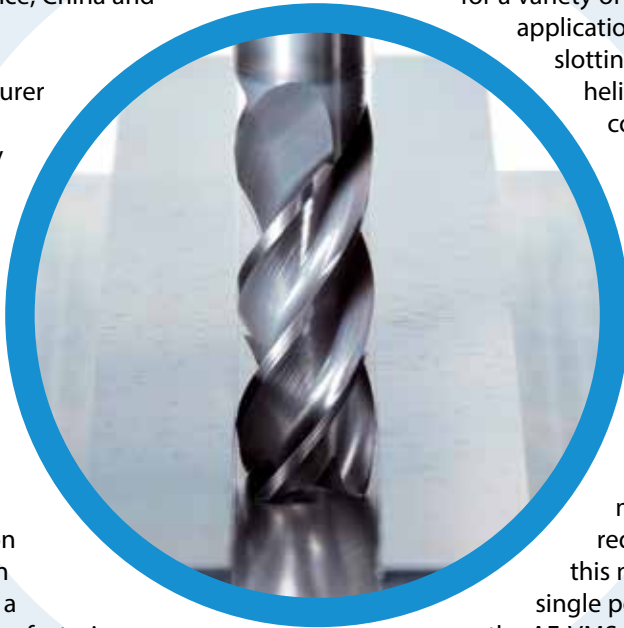
new level of milling efficiency coupled with superb finish quality suitable for a variety of milling applications, including slotting, side milling, helical milling, contour milling and ramping in stainless steel, cast iron, carbon steel, alloy steel and hardened steel (up to 40 HRC).

Based on manufacturing requirement of this manufacturer's single point load cell, the AE-VMS appears to be a perfect fit.

A 6 mm square type AE-VMS carbide end mill was put to the test. The AE-VMS' sharp positive rake angle geometry significantly reduces cutting force to minimize tool wear and potential damage to the workpiece. Chattering is minimized with the AE-VMS' unequal spacing of teeth and variable-lead geometry. Furthermore, its unique flute form helps facilitate trouble-free chip evacuation to enable stable

and consistent performance. With the AE-VMS' high tool rigidity, the occurrence of burrs can be suppressed to ensure high milling accuracy. With the addition of OSG's original DUARISE coating, tool life can be enhanced by its excellent lubricity, superior friction-resistance and high oxidation temperature qualities. The DUARISE coating's multi-layer construction minimizes thermal cracks, allowing the AE-VMS to excel even in water-soluble oil.

At the end of the trial, the AE-VMS was able to increase cutting speed from vc 60 m/min to 80 m/min, feed per tooth from 0.03 to 0.06, and tool life from 250 minutes to 320 minutes. Outperforming other competing tooling, the AE-VMS has proven itself with superior accuracy and reliability even under aggressive cutting condition to meet this manufacturer's quality standard. ✖



The AE-VMS is ideal for milling stainless steel, carbon steel, and alloy steel. Its unique flute form with high tool rigidity and excellent chip evacuation properties enables stable milling and the suppression of burrs. Available in square, radius, stub length and long neck style.

AT-1

Revolutionary 1-Pass Thread Mill for High-Quality Threading



Conventional thread mills often require several passes to generate a thread. The AT-1's revolutionary capability to generate threads in one pass lies in its unique tool geometry. The unequal spacing and variable lead flute of the AT-1 minimizes vibration, thereby enables superior and consistent surface finish.

A conventional right-hand helix thread mill is prone to deflection as the cutting process begins from the tip. In contrast, a first of its kind with a patent in Japan in the thread mill category, the AT-1's right-hand cut and left-hand helix geometry begins the cutting process from the shank side, thereby

reducing deflection. With the elimination of zero-cutting, which is used for the correction of deflection, longer tool life can be achieved.

Made of ultra-fine grain carbide paired with OSG's original EgiAs coating, tool life can be further prolonged with improved wear resistance and toughness. The AT-1's ability to generate threads in one pass reduces machining time, making it a highly efficient thread milling solution in comparison to right-hand helix thread mills.

The AT-1 is designed to excel in a wide range of work materials, including carbon steel, alloy steel, stainless steel, cast iron and non-ferrous metal.



Ceramic End Mills

High Efficiency Ceramic End Mills for Heat Resistant Alloys

OSG Corporation announced the release of its new ceramic end mill series for high efficiency machining in heat resistant alloys. OSG's ceramic end mill series employs an optimum ceramic grade ideal for high-speed machining at high temperatures in difficult-to-machine materials such as Inconel 718, with roughing efficiency surpassing carbide end mills.

Two types of ceramic end mills are included in the series – the CM-RMS peripheral cutting edge type and CM-CRE end cutting edge type. The CM-RMS features optimum flute geometry to enable smooth chip evacuation even at aggressive cutting condition. Its negative cutter form

increases cutting edge rigidity to enable long tool life. The CM-RMS is available in 4-or 6-cutting edge specification to accommodate individual application needs.

The CM-CRE does not only excel in flat surface milling, but also in 3D applications, such as the machining of blades. Its large-diameter specification reduces the risk of breakage during machining and enables optimum cutting speed without being restricted by the capability of the machining center. The CM-CRE is regrindable and can be reincarnated by cutting away the used portion.



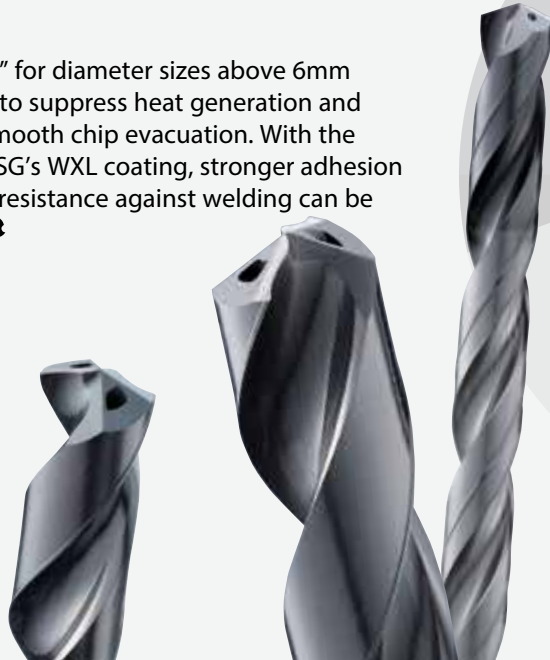
EXOCARB® ADO-SUS

8D Sizes Added to ADO-SUS Carbide Drill Series for Stainless Steels and Titanium Alloys

8D sizes have been added to OSG's EXOCARB® ADO-SUS, a coolant-through carbide drill series engineered to excel in difficult-to-machine materials such as stainless steels and titanium alloys.

Work hardening, welding, elongation of cutting chips and poor thermal conductivity are common problems in the machining of stainless steels and titanium alloys. The ADO-SUS series has adopted a tool geometry that emphasizes sharpness to reduce work hardening, thereby prolonging tool life for post-processing including reaming and tapping. Its unique flute form encourages the creation of small cutting chips, which is essential for trouble-free chip evacuation. Furthermore, the ADO-SUS has employed a unique oil hole design

"Mega Cooler" for diameter sizes above 6mm in 3D and 5D to suppress heat generation and to facilitate smooth chip evacuation. With the addition of OSG's WXL coating, stronger adhesion strength and resistance against welding can be achieved. ✖



AE-VMS

Stub Length Added to Anti-Vibration Carbide End Mill AE-VMS Series

Stub length style has been added to OSG's AE-VMS anti-vibration carbide end mill offering, a series designed to attain an all new level of milling efficiency coupled with superb finish quality suitable for a variety of milling applications.

The AE-VMS' sharp positive rake angle geometry significantly reduces cutting force to minimize tool wear and potential damage to the workpiece even under aggressive cutting conditions. Chattering is minimized with the AE-VMS' unequal spacing of teeth and variable-lead geometry. Furthermore, its unique flute form helps facilitate trouble-free chip evacuation to enable stable and consistent performance. With the AE-VMS' high tool rigidity, the occurrence of burrs can be suppressed to ensure high milling

accuracy. With the addition of OSG's original DUARISE coating, tool life can be enhanced by its excellent lubricity, superior friction-resistance and high oxidation temperature qualities. The DUARISE coating's multi-layer construction minimizes thermal cracks, allowing the AE-VMS to excel even in water-soluble oil.

Available in square, radius, stub length and long neck, the AE-VMS is designed to accommodate a wide range of milling operations including slotting, side milling, helical milling, contour milling and ramping in stainless steel, cast iron, carbon steel, alloy steel and hardened steel (up to 40 HRC). ✖



2018 Exhibition Schedule

Global Events



Feb 6-8 Expo Manufactura
Cintermex
Monterrey, Mexico

Feb 7-8 MNE
Kortrijk, Belgium

Feb 11-13 Grainger Show
Orlando, USA

Feb 20-24 Metav
Düsseldorf, Germany

**Mar 1-3 Fastener Fair
Turkey**
Istanbul, Turkey

Mar 15-17 Expo Dental
Madrid, Spain

Apr 3-7 SIMTOS
Goyang, Korea

Apr 9-13 CCMT
Shanghai, China

Apr 9-13 MACH
Birmingham, UK

**Apr 10-12 Taiwan
International
Fastener Show**
Kaohsiung, Taiwan

Apr 15-16 ISA
Baltimore, USA

Apr 17-19 Fastenal Customer
Nashville, USA

Apr 18-21 INTERMOLD
Osaka, Japan

Apr 25-29 ILA
Berlin, Germany

May 14-16 MMTS
Montreal, Canada

May 15-18 Intertool
Wien, Austria

June 13-14 Amerimold Expo
Novi, USA

OSG Applications Engineer Katashi Hirosawa introduces OSG's ADF flat drill to a visitor during JIMTOF on November 18, 2016 at the Tokyo Big Sight in Tokyo, Japan.

June 21-25 **ACMEE**
Chennai, India

Jul 16-22 **Farnborough
International
Airshow**
Farnborough, UK

Sep 10-15 **IMTS**
Chicago, USA

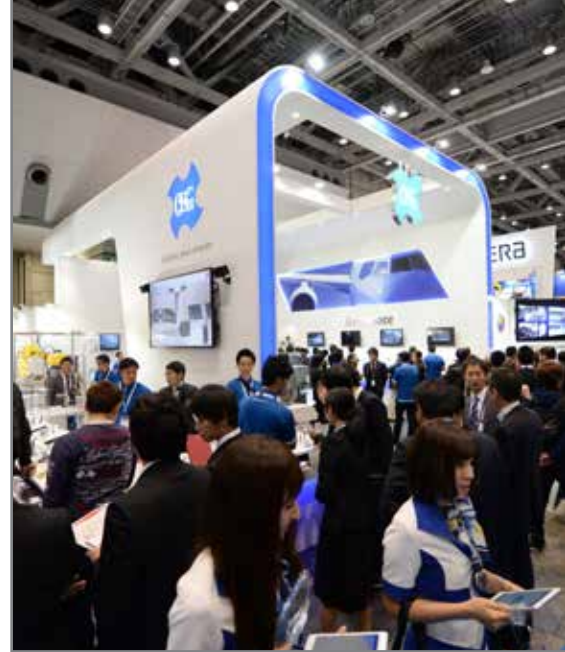
Sep 18-22 **AMB**
Stuttgart, Germany

Oct 2-7 **MAKTEK Eurasia**
Istanbul, Turkey

Oct 30-Nov 1 **National Industrial
Fastener**
Las Vegas, USA

Nov 1-6 **JIMTOF**
Tokyo, Japan

Nov 7-11 **TMTS**
Taichung, Taiwan



OSG participated at the 2016 Japan International Machine Tool Fair (JIMTOF) from November 17 to 22 at the Tokyo Big Sight. With an exhibition area of approximately 82,660 square meters, over 800 exhibitors and 147,000 visitors participated at the trade fair.

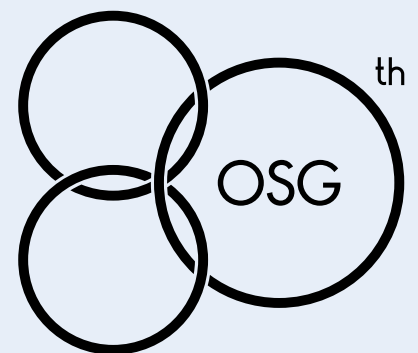
OSG Celebrates 80th Anniversary

Global News

2018 marks OSG Corporation's 80th anniversary. Our history stretches back to 1938, when our founder, Hideo Osawa, established OSG Grinding Co., Ltd. in Tokyo and started the manufacturing and sales of taps and dies. Thirty years later, OSG established its very first overseas subsidiary in the United States. Since then, we have built a production, sales and technical support network spanning 33 countries. To support the manufacturing industry on a global scale, OSG is constantly on the move, researching and developing new cutting tool solutions. Today, our product offering is comprised of not only taps and dies, but also drills, end mills, indexable, gauges, tooling systems, coating services, and much more.

An anniversary logo has been created in commemoration of this special milestone. The intertwined rings of the 80th anniversary logo symbolize the core values of our company – quality, global and innovation. Decade after decade, these key values have paved the way in making OSG one of the world's leading cutting tool providers that it is known today – a brand name associated with quality products, exceptional services, and passion for new challenges and commitment to transforming each and every one of our customers' ideas into reality.

OSG's tremendous growth and success cannot be made possible without the support and patronage of clients, partners and employees, whom we are utmost grateful to. With the support of our OSG family around the world, we will continue our commitment to manufacture products for enhancing quality of life and the prosperity of future generations. ✨



Anniversary

OSG's 80th anniversary logo.

OSG Around the World

Paulo Bergamini

Employee Interview



Paulo E. Bergamini

Company Location:

Brazil

Position:

IT & Financial Manager

Joined OSG:

2004

Motto:

"Making IT simple."

OSG Corporation was founded in 1938, more than 80 years ago. Today OSG holds the No. 1 position in the Japanese cutting tool market as well as a top-ranking position globally, with a production, sales and technical network spanning 33 countries. Our commitment to innovation, services, total solutions and out-of-the-box thinking has contributed to our immense success today. However, without our employees, none of it would be possible. We truly believe that our employees are one of the greatest assets of the company. In this section, we will introduce our team members from around the world.

Tell Us About Your Work & Experience at OSG:

I studied systems analysis during college and joined OSG Sulamericana in 2004 as an IT manager. Some of my projects include ERP adoption, strengthening of infrastructure, breaking down the information consumption paradigm through adoption of tools aimed in cloud computing and web technologies, etc. My motto at work is “making IT simple” because technology can be

difficult as it is always evolving at a rapid pace. It is my role to simplify the process so that our employees can complete their job at ease.

Since joining OSG I have earned a Bachelor of Laws, an MBA in finance, accounting and auditing, and a master degree in system information technology. Due to my academic

background, I also work with budget process coordination. In June of 2017, I was assigned to oversee the company’s financial area, which is a new challenge for my career.



What is unique about the Brazilian division at OSG?

OSG Sulamericana in Brazil is a great place to work for. There is a lot of synergy, discipline and mutual respect. The unique atmosphere makes our employees feel like they belong to a big family.



Above: A-Tap Σ (sigma) – the latest addition to the A-Tap multi-purpose tap series.

Right: Bergamini takes his two sons for a drive during winter vacation.



Below: Bergamini carries his youngest son Rafael on his shoulder during the demonstration against government corruption in March 2016.



What is your favorite OSG tool?

Taps are my favorite OSG tools. OSG’s taps are well known in the industry for their quality and reliability. Taps are our core products in Brazil and we offer a wide range of styles and coating to accommodate various manufacturing needs. According to the latest annual report, the OSG group continues to enjoy approximately 30 percent global market share in taps. OSG has been designing and manufacturing taps since its founding in 1938. As taps are the roots of the company, I have great respect for them.

Tell us about your daily routine.

Routine does not exist for IT people. Everyday there are new challenges and new issues. Our role is not only to help users with their work, but to utilize new technologies to create more business opportunities and to support growth. The only routine we have is coffee break. There would be no IT staff without coffee!

Far Right: Bergamini and his two sons relax at home after school.



How do you spend time on your day off?

When I am not working, I enjoy spending time with my two sons, ages 6 and 9. We would go to the cinema, to the parks and to soccer games, as we are huge fans of the Sociedade Esportiva Palmeiras, a professional soccer club based in São Paulo. I also enjoy listening to rock and roll music and cooking Italian food on the weekends for my family.



shaping your dreams

AT-1

*Revolutionary 1-Pass Thread Mill
for High-Quality Threading*



Scan for details.



A

The A Brand