# SHAPE IT

OSG Global Tooling Magazine | SUMMER 2020

# Collaboration Based on Trust

## The right tool, the right price and fast delivery

**Technical Insight**

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**Customer Report**

## Forgotten Britain in Good Shape

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# *Pursuing Growth in a Volatile Market*

## A Message from the President

The year 2020 marks a major challenge for the world economy. I sincerely hope that by the time of this publication, the coronavirus pandemic has subsided.

Market conditions have been hostile to most industries this year. The cutting tool sector is no exception. Following a management policy with an aim to double sales is presumed to be a great challenge under the current economic environment. In a reduced marketplace, many companies are feeling the pressure to take actions to drive sales and may find their efforts to be insignificant. However, rather than focusing on sales, the emphasis should be on increasing market share. During times of uncertainties, companies should refocus on operations and making improvements to the core of its business. Market share can be increased through innovations – with new technologies and products; and the strengthening of customer relationships – by shortening delivery time, enhancing customer services, etc. With these key differentiators, higher values can be delivered, which can ultimately lead to greater market share.

Volatility doesn't last forever. OSG will continue its journey of market growth by continuous improvement and innovation to provide high value solutions to manufacturers around the world.

**Norio Ishikawa**
President & CEO of OSG Corporation

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From left to right, Prodtek owners Ulf Lepik and Jakob Fornander pose for a photograph with a machined clutch housing made for a bus. Other complex products from Prodtek's production can be seen in the background.

# Collaboration Based on Trust

## The right tool, the right price and fast delivery

**Peter Cramer**
OSG Scandinavia

On a Tuesday morning, cheerful conversations can be heard around the table in the city of Lund in southern Sweden. It is evident that OSG Key Account Manager Mats Andersson and the owners of Prodtek, Jakob Fornander and Ulf Lepik, have an excellent relationship. They chat about their common history, old colleges, workplace and current tasks at hand. It is a small world in the manufacturing industry. Andersson, Fornander and Lepik have known each other for many years. In fact, Prodtek was one of the first customers that Andersson acquired after OSG Scandinavia was founded in 2000, and he became the first of the company's staff in Sweden.

Prodtek is short for Produktionsteknik in Lund. The company was founded in 2003 by Fornander and Lepik. The pair started the company from scratch with an empty room. Today, Prodtek employs 18 staff and has an impressive turnover of approximately 40 million Swedish krona. Prodtek has now expanded with yet another production unit located in Ystad, some 70 km south of Lund.

"I live in Ystad," says Fornander. "For us and many other companies in the area, finding qualified labor is a challenge. Therefore, it makes sense for us to have two production sites so that we are close to our employees. And despite the distance, there is good synergy between our units," Fornander explains.


Prodtek owner Ulf Lepik processes an item in one of the 11 Mikron machining centers at the company's manufacturing facility. At Prodtek, the owners operate the machines themselves.

Prodtek has a total of 11 units of Mikron 5-axis machining centers, a couple of spark erosion machines, lathes and a measuring machine. Frequently processed materials include aluminum, stainless steel, tool steel up to 60 HRC, and plastic. The most commonly used cutting tools are OSG's AERO end mill series, the A Brand AE end mill series, the WXS and WXL series, and the EPL series.

"We make prototypes for clutch housings for the automotive industry," says Lepik as he shows off one of their manufactured items. "This is a clutch housing for a bus that is made out of a solid block of aluminum. When approved by the customer, it is subsequently manufactured by casting and then machined. We also make ready-made clutch housings for cars in the luxury segment. In these cases, the quantities are often so small that they are made of solid aluminum," Lepik explains.

It all started with molding tools for the packaging industry, with TetraPak as Prodtek's customer. "Molding tool for the packaging industry is still a large part of our production, and it will continue to be, as packaging requirements are becoming more stringent due to the increased focus on climate change," says Fornander. "Therefore, we must come up with new solutions that minimize the use of plastic or use it in a smarter way. But we also do serial production, so we produce anything from 1 to 10,000 items."

The AERO-ETS is a part of OSG's AERO end mill series for high-speed milling in aluminum alloys. The AERO series is perfect for high-power equipment over 80kW. It is designed to maximize the full potential of high-performance equipment. The AERO series is most ideal for high-efficiency processing of large aluminum components.


From left to right, Prodtek owners Jakob Fornander, Ulf Lepik and OSG Key Account Manager Mats Andersson pose for a photograph at Produktionsteknik in Lund, Sweden.

"We have no CFO and no receptionist," Fornander continues. "We manage everything ourselves, and we also operate the machines ourselves. All employees are on the same level, and we all participate in the process, from raw material selection to finished products. All operators program, run the programs and carry out final checks in the machines themselves."

Lepik joins in and adds that "the fact that every employee has full responsibility for an item ensures high product quality and is a major part of our success. It creates cohesion and an inspiring atmosphere in our everyday work."

"Therefore, we also depend on our suppliers," Fornander says. "In the cutting tool business, it is crucial for us to have a contact who understands our production and our needs. We do not have the time to start from scratch every time and discuss quality and price. We choose a supplier based on trust – we trust that they understand our needs, and we trust that we are provided the right tools at the right price from a supplier with a broad product portfolio of high-end tools. Another important issue for us is that, when we order a tool, we need to have it delivered the next day. We get all this from OSG."

A dia. 16 R1 AERO-ETS 3-flute carbide end mill is being used at a cutting speed of 16,000 min-1 and a feed of 6,000 mm/min at a depth of cut of ap 4. OSG's AERO-ETS is one of the preferred tools for milling aluminum at Prodtek.


Established in 2000, OSG Scandinavia A/S serves manufacturers in northern Europe, including Denmark, Norway, Sweden and Finland. The company is led by Director Peter Jørgensen since 2011 and currently employs 18 staff.

## About OSG Scandinavia

The Company Thrane Tools, located 30 km west of Copenhagen in Denmark, was founded in 1974 by Poul Thrane. In year 2000, Thrane Tools was aquired by OSG after having been a dealer of OSG tools for several years, and was renamed OSG Scandinavia A/S.

Today, OSG Scandinavia A/S serves manufacturers in northern Europe, including Denmark, Norway, Sweden and Finland. The company is led by Director Peter Jørgensen since 2011 and currently employs 18 staff. Sales and technical support for manufacturers in Denmark and Sweden are provided by external salesmen from the Denmark office. There are five salesmen in both Denmark and Sweden. Norway and Finland are covered by respected dealers for many years.

Over 150,000 items are available in the Danish stock, with more being supplied by the European stock in Belgium. With inventory from both locations, OSG Scandinavia A/S is able to ship products on a daily basis for next day delivery.



1. Over 150,000 items are available in the Danish stock, with more being supplied by the European stock in Belgium. With inventory from both locations, OSG Scandinavia A/S is able to ship products on a daily basis for next day delivery.

2. The entrance of OSG Scandinavia A/S' office in Denmark.

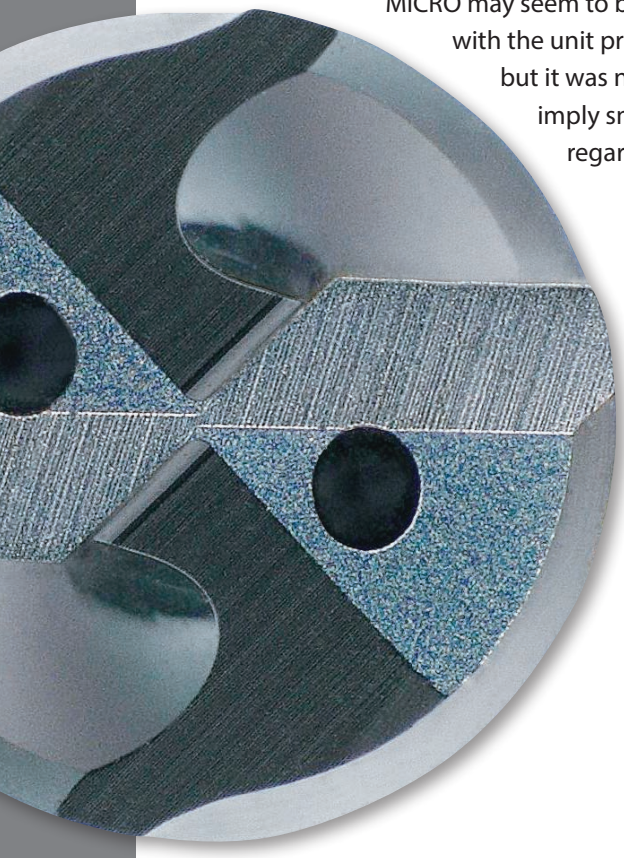
# ADO-MICRO Small Diam Coolant-Through Carbid

## Stable and high efficiency in small diameter deep-hole applications

**Hiroyuki Amano**
OSG Corporation Applications Engineer (Drill Development Division)

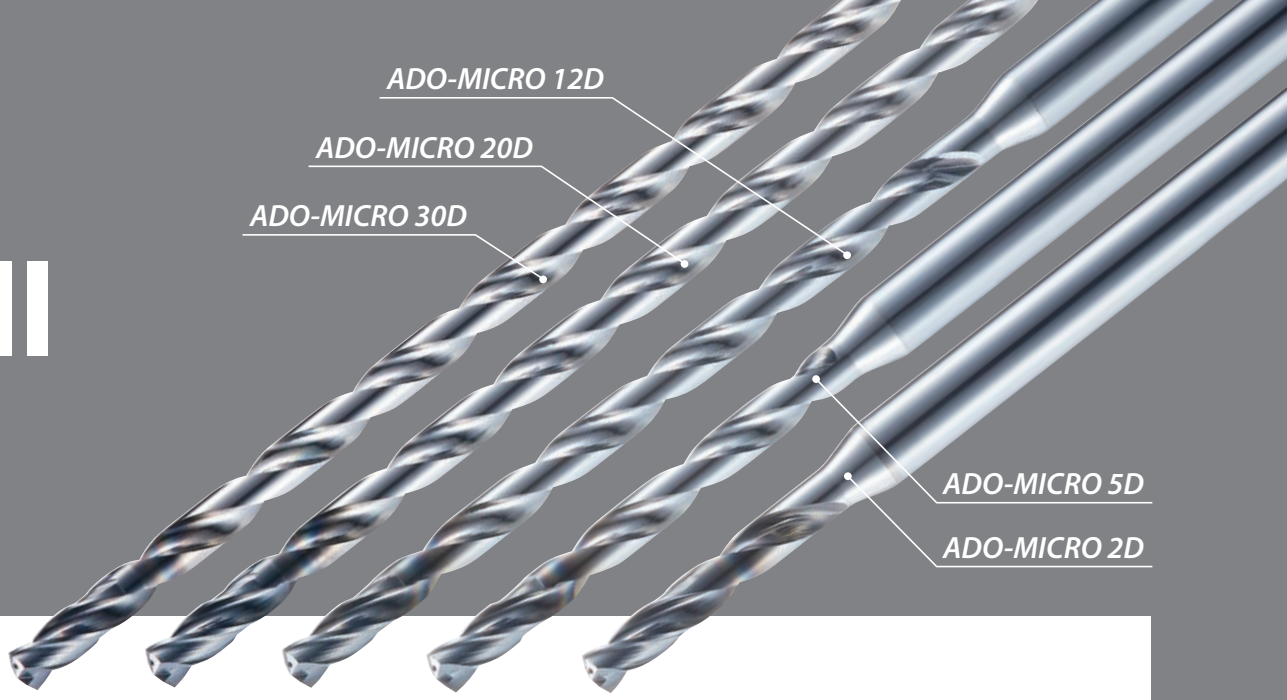
OSG Corporation has recently released the ADO-MICRO – the company's first small diameter carbide drill with oil holes designed for stable and high efficiency drilling in deep-hole applications. The sense of size upon hearing the phrase "small diameter" will be understood differently among users in the manufacturing industry.

The ADO-MICRO has a lineup of drill diameters from 0.7 mm up to 2 mm for drill lengths of 2xD and 5xD, and diameter 1 mm to 2 mm for drill lengths of 12xD, 20xD and 30xD. The product name ADO-MICRO may seem to be associated with the unit prefix micro (μ), but it was named to simply imply smallness in size regardless of the unit.



For small diameter drilling, options such as carbide drills and HSS drills using external coolant are available. However, today's machining needs require greater stability, higher efficiency and longer life than ever before. There is no exception in small diameter deep-hole applications, with growing needs for coolant-through small diameter drills.

# eter
# e Drill




## Tool Geometry

One of the keys for successful small diameter drilling is trouble-free chip evacuation. As illustrated in figure 1, chips generated at the tip of the tool flow in the direction of the blue arrow. However, if there is insufficient space in the flute, cutting chips cannot evacuate smoothly, which causes the drilling accuracy to deteriorate and increases the probability of tool breakage. Therefore, by providing a wider flute specification at the area where the tip of the blue arrow locates, as depicted in figure 1, cutting chips are able to be discharged without difficulty, leading to stable machining.

Figure 1. Extended flute

In addition, the ADO-MICRO employs a unique double margin geometry (as depicted in figure 2) in all sizes to enable stable machining even in deep-hole applications. In order to ensure the rigidity of the cutting edge, the margin is set to the minimum necessary length. However, micro sludges can be easily accumulated around the outer periphery of the cutting tool, which is a key cause of abrupt tool breakage. To resolve this challenge and to achieve an overall balance, an extended flute configuration is incorporated to provide sufficient exit room as shown in figure 3.

Figure 2. Four support points with the double margin design

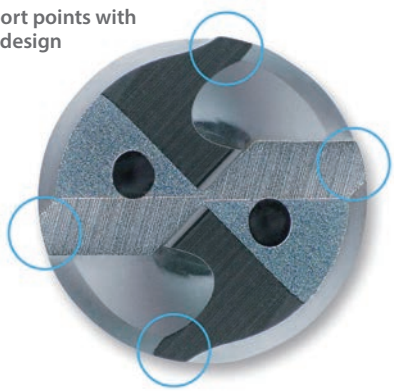
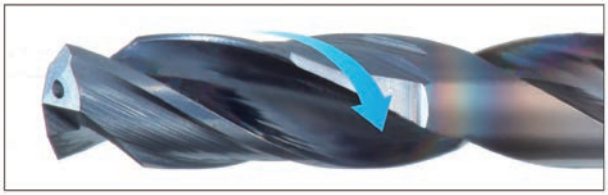


Figure 3. Exit room at end of margin

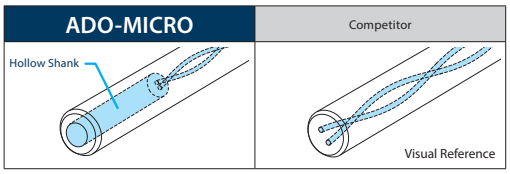


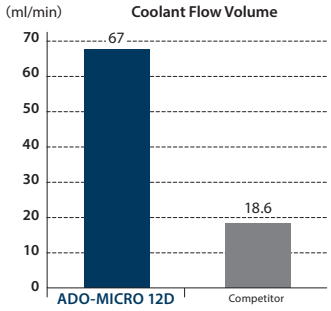
## Oil Holes

The ADO-MICRO features a straight hollow shank design where coolant is injected in addition to the two spiral oil hole paths. This configuration increases coolant discharge from the tool tip. Without the hollow shank configuration, greater pressure is required in order for the coolant to pass through the thin oil hole paths. With the hollow shank feature, pressure loss is reduced, which increases the coolant flow volume. As illustrated in figure 4, with a higher coolant flow rate, cutting chips can be more effectively evacuated, thereby enabling stable machining.

Figure 4. Relationship between shank structure and coolant flow volume

| Tool | ADO-MICRO 12D $\phi$1.5 | Competitor $\phi$1.5 |
|---|---|---|
| Hollow Shank | Hollow | Solid |
| Coolant | Water-Soluble (Internal) | |
| Coolant Pressure | 1.5 MPa | |
| Time of Lubricant Supply | 60 sec. | |

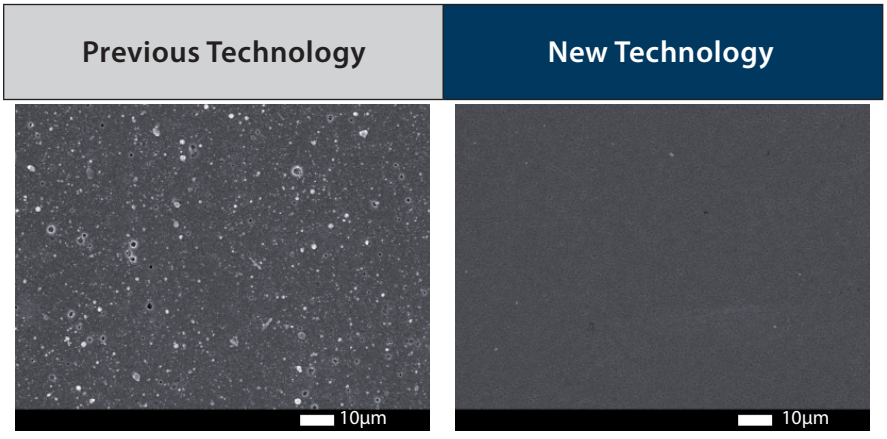



## OSG's Latest Coating Technology: IchAda Coating

Another key element for achieving stable processing in small diameter deep-hole application is coating technology. The role of tool coating is to provide wear resistance and heat resistance to prolong tool life, which is particularly important to small diameter tooling. As illustrated in figure 5, the coating surface by conventional technology is not smooth, which may interfere with the performance of chip evacuation. OSG's latest IchAda coating, on the other hand, provides excellent surface smoothness in conjunction with high wear resistance and heat resistance to enable small diameter tools to achieve long tool life by improving adhesion.

Figure 5. Surface of coating



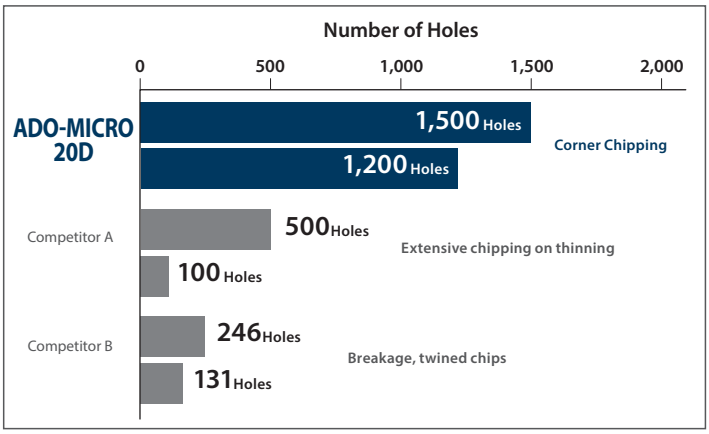

IchAda is a registered trademark of OSG Corporation.

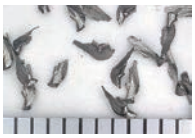
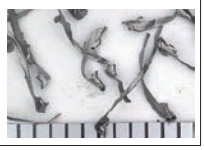
# Cutting Data

Figure 6 demonstrates a comparison of tool life between the ADO-MICRO and two other tooling manufacturers' products in the machining of SCM440. The competitor drills have chipped or have broken at the initial machining stage. The ADO-MICRO, on the other hand, was able to achieve long tool life stably due to its superior chip evacuation capability by breaking chips into small and manageable pieces.

Figure 6. Stable and long tool life in SCM440

| | |
|---|---|
| Tool | ADO-MICRO 20D $\phi$2 |
| Work Material | SCM440 |
| Cutting Speed | 50 m/min (7,960 $min^{-1}$) |
| Feed | 557 mm/min (0.07 mm/rev) |
| Depth of Hole | 38 mm (Blind) with pilot hole |
| Coolant | Water-Soluble (Internal) |
| Coolant Pressure | 3 MPa |
| Machine | Vertical Machining Center (HSK-A40) |

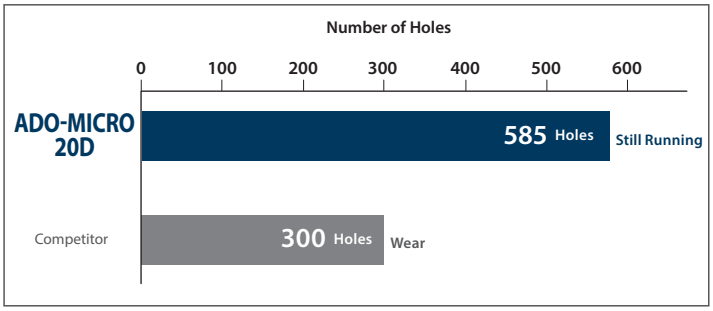



| ADO-MICRO 20D | Competitor A | Competitor B |
|---|---|---|
|  |  |  |

The ADO-MICRO demonstrates stable performance even in difficult-to-machine titanium alloy applications. As shown in figure 7, the competitor drill struggled with chip evacuation, thus requiring step processing. However, with the ADO-MICRO, step processing can be eliminated while achieving approximately five times the drilling efficiency. The ADO-MICRO was still in good shape after doubling the competitor drill's tool life, allowing it to be used on other applications.

Figure 7. Efficiency improvement in titanium alloy

| | | |
|---|---|---|
| Tool | ADO-MICRO 20D $\phi$1.2 | Competitor $\phi$1.2 |
| Work Material | Ti-6Al-4V | |
| Machining | Non-step Drilling | Step Drilling (0.12 mm step) |
| Cutting Speed | 35 m/min (9,300 $min^{-1}$) | 10 m/min (2,600 $min^{-1}$) |
| Feed | 167 mm/min (0.02 mm/rev) Approx. 5 times | 30 mm/min (0.01 mm/rev) |
| Depth of Hole | 15 mm (Blind) with pilot hole | |
| Coolant | Water-Soluble (Internal) | |
| Coolant Pressure | 2 MPa | |
| Machine | Vertical Machining Center (BT30) | |




The ADO-MICRO's unique tool geometry and OSG's original IchAda coating allow non-step drilling even for deep-hole applications, enabling high processing efficiency. By eliminating common complication in small diameter deep-hole drilling, the ADO-MICRO is able to excel with stable performance in a wide range of work materials including stainless steel. In addition to standard stock items, OSG also offers customization services with tailored solutions for each and every manufacturer's specific machining needs.


From left, OSG UK Area Manager Neil Lane, OSG UK Engineering Manager Hirozumi Kubo and Clarkwood Engineering Head CNC Programmer Steven Hall pose for a photograph at Clarkwood Engineering's manufacturing facility in Wolverhampton, United Kingdom.

# Forgotten Britain in Good Shape

OSG supports the manufacturing scene in the UK by providing leading cutting tool technologies to the advanced and competitive British engineering industry

**Hirozumi Kubo**
OSG UK

Today, world engineering topics tend to focus heavily on countries such as China, the United States, Japan and Germany. However, companies like Clarkwood Engineering is proving to us that manufacturing in Britain is alive and in good shape. Brexit? "You can see that we are flooded with work and we are not affected at all," Clarkwood Engineering Head CNC Programmer Steven Hall comments.

The United Kingdom has been the number one manufacturing powerhouse during the 18th century, and currently ranks 9th in world manufacturing output, according to a 2015 study by the United Nations Conference on Trade and Development. There is a good chance that sometime, somewhere, directly or indirectly, you already are a benefactor of British products. Having this statistic in mind, have you ever wondered what a day-to-day manufacturing scene is like in the UK? Well, Clarkwood Engineering is one of the representative subcontracting engineering shops that supports the United Kingdom's competitive engineering industry.

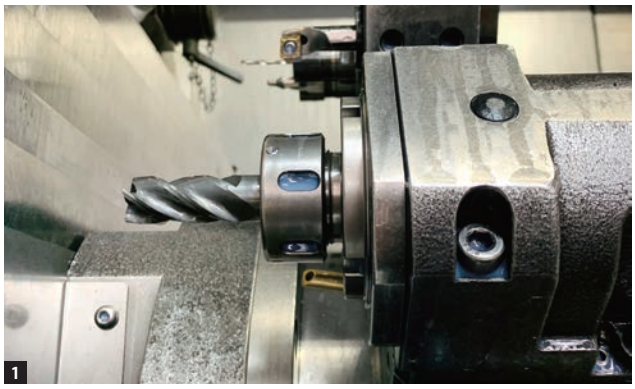
Founded in 1974, Clarkwood Engineering Limited is a manufacturer of high-quality special fasteners for a wide variety of applications. Its key products include bolts, nuts, plugs, socket cap screws, turned parts, washers, and more. Employing 77 staff, Clarkwood Engineering is located in the city of Wolverhampton in the United Kingdom, with an estimate land area of 50,000-square-meter.

As a company that prides itself on superior quality, Clarkwood Engineering continually invests in the latest machinery to enhance accuracy and efficiency. Along with being a registered ISO 9001 company, Clarkwood Engineering has also earned the BSL-3 in the American Petroleum Institute (API) specifications 20E and 20F, which is most rigorous bolting specification level available. So how does Clarkwood Engineering achieve successful sales of their high-end products? This is where OSG comes in.


Founded in 1974, Clarkwood Engineering Limited is a manufacturer of high-quality special fasteners for a wide variety of applications located in Wolverhampton, United Kingdom.

OSG is grateful to play a small part in the manufacturing of Clarkwood Engineering's successful products. One of Clarkwood Engineering's core products consists of nuts that are specialized for heavy duty subsea and the petrochemical industry, which the company has been manufacturing since its foundation. Super duplex, Inconel and titanium are some of the commonly employed materials and are notoriously known to be highly abrasive to carbide cutting tools. When OSG first visited Clarkwood Engineering, the company was already using premium and expensive cutting tools from well renown global brands. The company is always under pressure to increase production output while achieving cost reduction. Due to quality assurance, OSG products also rank on the higher spectrum in terms of price. However, OSG UK Area Manager Neil Lane straightaway noticed the potential improvements in many of Clarkwood Engineering's applications.

The production of nuts made of super duplex (30 HRC) that requires side milling is one of such application. The super duplex wears the cutters very quickly and Clarkwood Engineering was actively seeking to reduce cost and improve cycle time. The company was originally using a competitor 4-flute carbide end mill that was approximately 40 percent more expensive than OSG's UVX-Ti 5-flute cutter.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2

1. OSG's UVX-Ti variable lead carbide end mill enables faster cycle and longer tool life in Clarkwood Engineering's super duplex milling application.

2. Today, Clarkwood Engineering employs OSG products for a majority of the machining processes required in the production of various nuts. For face milling of large nuts, the company uses the OSG Phoenix PSTW 6-corner shoulder milling cutter.

The UVX-Ti carbide end mill series is one of OSG's latest milling innovations designed to excel in titanium alloy applications. It features unequal spacing and variable lead geometry to suppress chattering. With its optimal flute shape, smooth evacuation of cutting chips can be achieved at ease. The end mill's web taper geometry further enhances rigidity to allow high-efficiency milling. The UVX-Ti series is available in 4-flute, 5-flute and long style configuration.

The competitor tool was able to complete 500 parts at a material removal rate (MRR) of 25 $cm^3$ / min on a Mori Seiki VMC40 vertical machining center. During the cutting trial, OSG's 16 mm diameter UVX-Ti was able to complete more than 700 parts with a 53 $cm^3$ / min MRR. By matching the tool life alone would have already made the UVX-Ti more superior than the competitor tool based on cost. Not only did the UVX-Ti nearly doubled the tool life and production output against the competitor tool, it also doubled the MRR to enable an even faster cycle time.

A few months later, Clarkwood Engineering CEO Roger Wood showed OSG UK Area Manager Neil Lane the cutter bill and commented that "the UVX-Ti has blown the other tools away, both on cycle time and price."

Today, Clarkwood Engineering employs OSG products for a majority of the machining processes required in the production of various nuts, such as the OSG Phoenix PD indexable drill for holes, the AT-1 one pass thread mill for thread milling, and the OSG Phoenix PSTW 6-corner shoulder milling cutter for the face milling of large nuts. All of these tooling are provided with sincere intention to add values for local manufacturers and the high-end British engineering sector.

A nut made of super duplex (30 HRC) that requires side milling. Clarkwood Engineering's key products include bolts, nuts, plugs, socket cap screws, turned parts, washers, and more.

The UVX-Ti carbide end mill series is one of OSG's latest milling innovations designed to excel in titanium alloy applications.

From left, OSG Sulamericana Applications Technician Gabriel Fernando Gialorenço explains the features of the A-Tap to IMSC Process Engineer Wilson Santos.

# Longer Tool Life with Shorter Run Time

## A-Tap A-OIL-SFT boosts productivity in axle production

**Marcela Rattin Bombini**
OSG Sulamericana

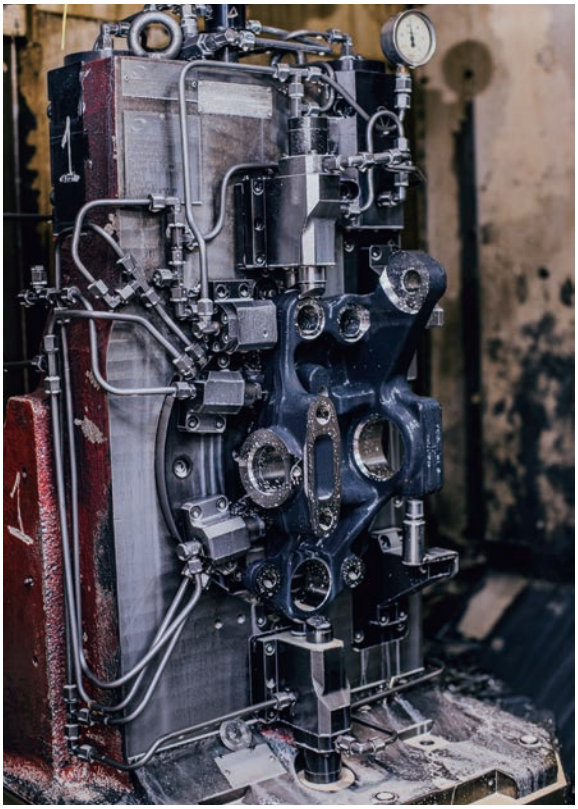
Founded in 1960, Indústria Mecânica São Carlos (IMSC) is a leading solution provider for the machining and assembly of parts for the automotive and heavy industries in markets of Brazil and abroad. Some of its key products include transmission housings machined in aluminum and cast iron; axles machined in cast iron and rolled or forged steel with or without heat treatment; and assembly of wheel reduction assemblies and brake pads.

Employing 188 staff, IMSC's manufacturing plant is located in the city of Elias Fausto, São Paulo, Brazil, with an estimate land area of 400,000-square-meter and an industrial warehouse of 12,000-square-meter.

Recently, IMSC was looking to improve tool performance on its axle production made for dump trucks, which the company has been manufacturing for about 10 years. IMSC's goal was to increase the number of fabricated parts per tool while decreasing machine time. The axles are made of steel 39MnCrB6 (350 HB) and has an annual estimate production volume of 78,000 pieces. Two blind holes at a depth of 54 mm are required to be threaded per workpiece with a tap tolerance of 6HX. The parts are machined using an Okuma MA600HB horizontal machining center and a DMG Mori NH 600 horizontal machining center.

During a visit to IMSC's facility, OSG Sulamericana Applications Technician Gabriel Fernando Gialorenço requested a tool trial opportunity to tackle the challenge of production improvement. Upon a detail evaluation of the application, Gialorenço recommended the A-OIL-SFT M22 x 1.5 DIN 374 (EDP# 48139240 with oil holes added) from the A-Tap series.

OSG's A-Tap is an all-purpose tap series designed to simplify tool management and to excel in a wide variety of materials and applications. Achieving trouble-free chip evacuation with a spiral tap in blind holes is particularly challenging and is a main cause of headaches for many manufacturers. To resolve this problem and to improve the ejection of chips, OSG's A-Tap A-SFT has adopted a variable helix flute design, which encourages stable chip evacuation and reduces cutting forces. The helix angle changes from the chamfer, where chips are formed, to the flutes, where chips are evacuated. This unique geometry enables greater chip control that can help produce tightly compacted chips for easy ejection from the hole.



**IMSC was searching for tap processing improvement in their axle production made of 39MnCrB6 (350 HB). Two blind holes at a depth of 54 mm are required to be threaded per workpiece with a tap tolerance of 6HX.**

**Founded in 1960, Indústria Mecânica São Carlos (IMSC) is a leading solution provider for the machining and assembly of parts for the automotive and heavy industries in markets of Brazil and abroad.**

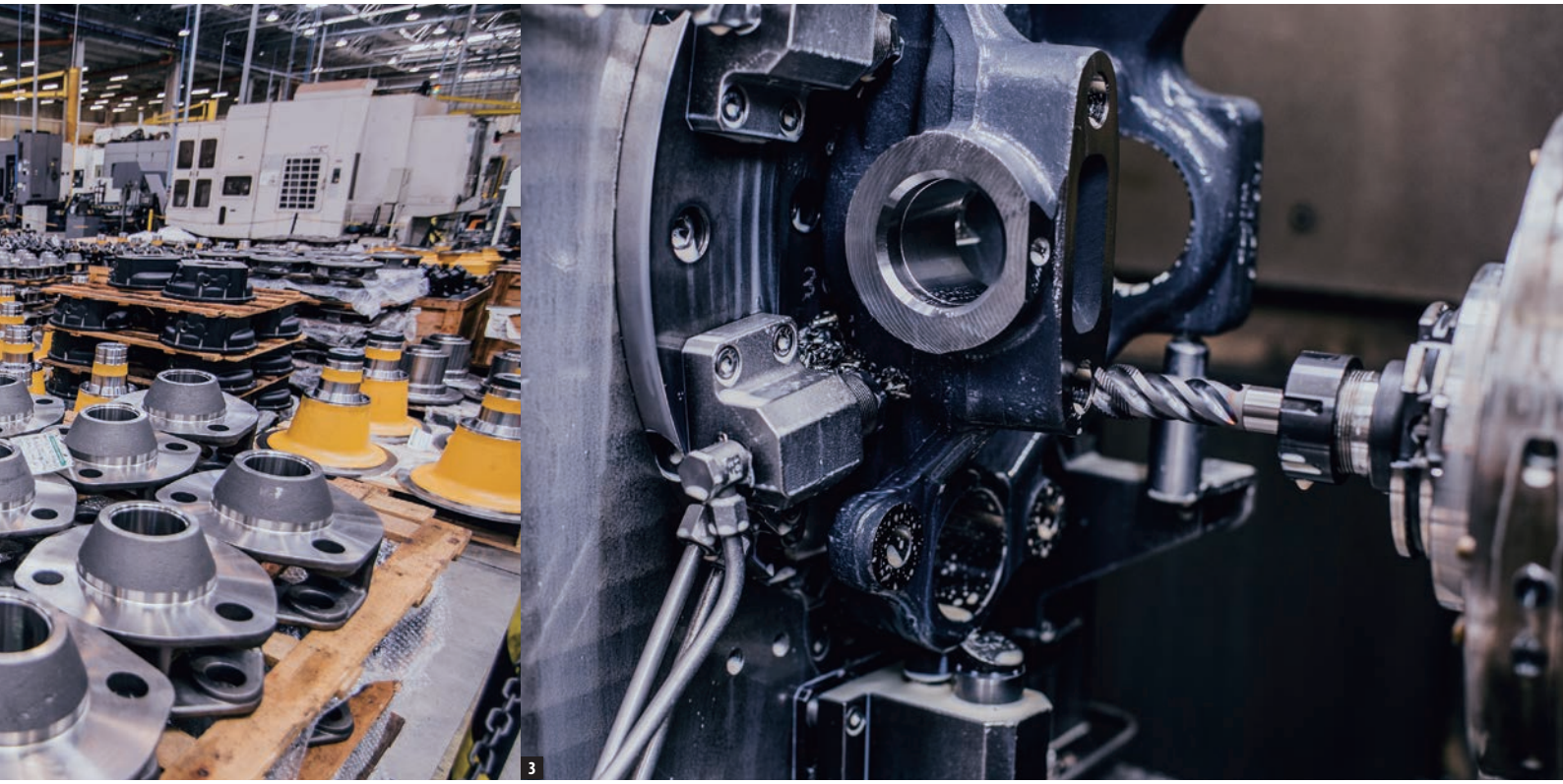
1. IMSC Process Engineer Wilson Santos prepares for the machining of the axle part.

2. Some of IMSC's key products include transmission housings machined in aluminum and cast iron; axles machined in cast iron and rolled or forged steel with or without heat treatment; and assembly of wheel reduction assemblies and brake pads.

To accommodate a wide range of cutting conditions, powdered metal HSS and OSG's patented V coating have been employed in this series to achieve excellent wear resistance. In addition, to enable high speed machining, the A-Tap series incorporates a unique cutting-edge design that emphasizes sharpness. Not only does the A-Tap series perform well in general steel, it also excels in difficult-to-machine materials such as stainless steel and mild steel. The A-Tap is compatible with various types of machining equipment – from manual machines to the latest advanced machining centers.

Due to confidentiality reasons, IMSC's previous tooling choice cannot be disclosed. However, at the end of the trial, it was revealed that the A-OIL-SFT is used at a cutting speed of 11 m/min versus the previous tool's 8 m/min. The OSG tool outperforms the competitor tool in both time and tool life. The A-OIL-SFT is able to increase tool life by 20 percent and reduce 4 seconds of machining time per workpiece. With an annual production volume of 78,000 pieces, this time saving is equivalent to a total of 312,000 seconds, or 5,200 hours.

Any machinist would agree that breaking a tap in a part as one of the final machining operations can be very costly, with significant impact made to the overall production and delivery. By implementing OSG's A-OIL-SFT, IMSC is able to achieve stable tapping performance and reduce cost in their axle production to deliver high quality products at competitive pricing to their clients.



3. The A-OIL-SFT is able to increase tool life by 20 percent and reduce 4 seconds of machining time per workpiece. With an annual production volume of 78,000 pieces, this time saving is equivalent to a total of 312,000 seconds, or 5,200 hours.

From left to right, IMSC President Lino Fracasso, IMSC Purchasing Analyst Juliana Santana, IMSC Process Engineer Wilson Santos and OSG Sulamericana Applications Technician Gabriel Fernando Gialorenço pose for a photograph at the IMSC plant in Elias Fausto, São Paulo, Brazil.


# The Ultimate Counterbore Solution

## ADF carbide flat drill more than double tool life and efficiency while enhancing counterbore hole surface quality in bearing production

**Tim Holmer**
OSG USA

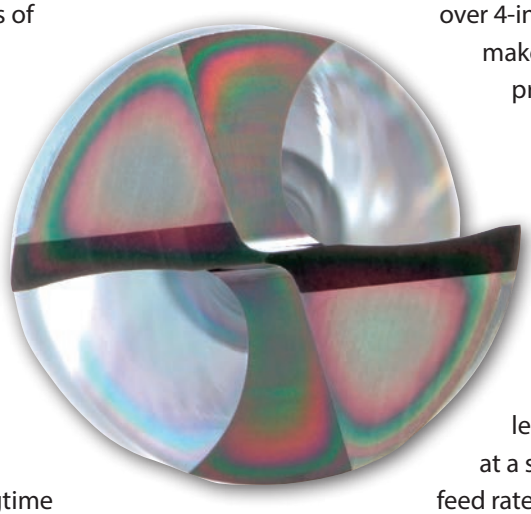
Professional Bearing Service CNC Programmer Travis Lee prepares for the counterboring operation of their bearings made of 1020 steel in Los Alamitos, California, United States.

Professional Bearing Service Inc. located in Los Alamitos, California, United States has been reconditioning and repairing bearings, oil rings and seals for over 40 years. The shop was founded by Ted and Chris Mandryk, father and son, respectively, with the goal to achieve superiority in the repair and manufacturing of Babbitt bearings for a wide range of industries, such as oil refineries, power plants, electric motor shops, mills, sewage treatment facilities, and many more. Professional Bearing Service currently employs 28 staff at its 12,280-square-feet shop. Many of its workforce are dedicated employees with an average tenure of over 15 years.

Since 1978, Professional Bearing Service has been serving as a full service 24/7 Babbitt bearing repair and manufacturing leader.

"We sometimes get calls from companies at 2 a.m. or 3 a.m. saying that their equipment is down, and we would get right to work to either repair or manufacture new parts for them," said Joe Gonzalez, Professional Bearing Service CNC Supervisor.

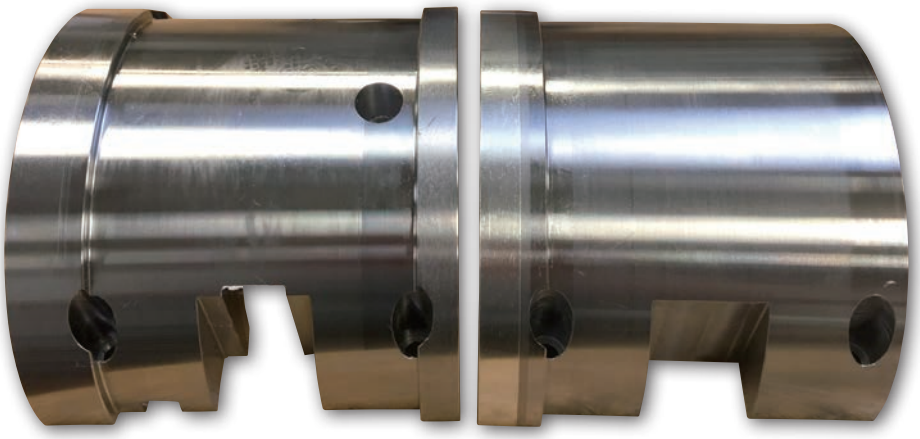
"When a customer's equipment goes down, it can cost them several thousands of dollars per hour in production," said Gonzalez. "The capability to supply clients with immediate solutions is immensely important to their production schedule and financials," said Gonzalez.



Over the years, Professional Bearing Service has evolved from repairing bearings to keeping inventory of certain products to best service their longtime customers. As Professional Bearing Service continues to provide superior products to their clients, they are always in search of new solutions to further improve processes.

Recently, Professional Bearing Service has been trying to resolve an issue they have with counterboring. Professional Bearing Service counterbores approximately 90 percent of the bearings that the company manufactures. Professional Bearing Service manufactures approximately 500 bearings annually. Bearings being a round product, can present multiple machining challenges. There are several places in which machining curved surfaces to a flat is necessary in order to make these bearings. The counterbore depths that Professional Bearing Service deals with range from 1.5-inch to over 4-inch. The long reach requirement makes it a challenge to identify a productive and effective tool for the job.

In the past, Professional Bearing Service used a half-inch 4-flute end mill to plunge and peck out material to create flat holes in 1020 steel. The end mill's length of cut was 1-inch with an overall length of 6-inch. The tool was used at a speed of 2,000 RPM (262 SFM), a feed rate of 5 IPM (0.0006 IPT) and a peck cycle of every 0.050-inch using a Southwestern Industries Trak Machine Tool machining center. The average tool life was 50 parts with four holes per part, which is equivalent to 200 holes.



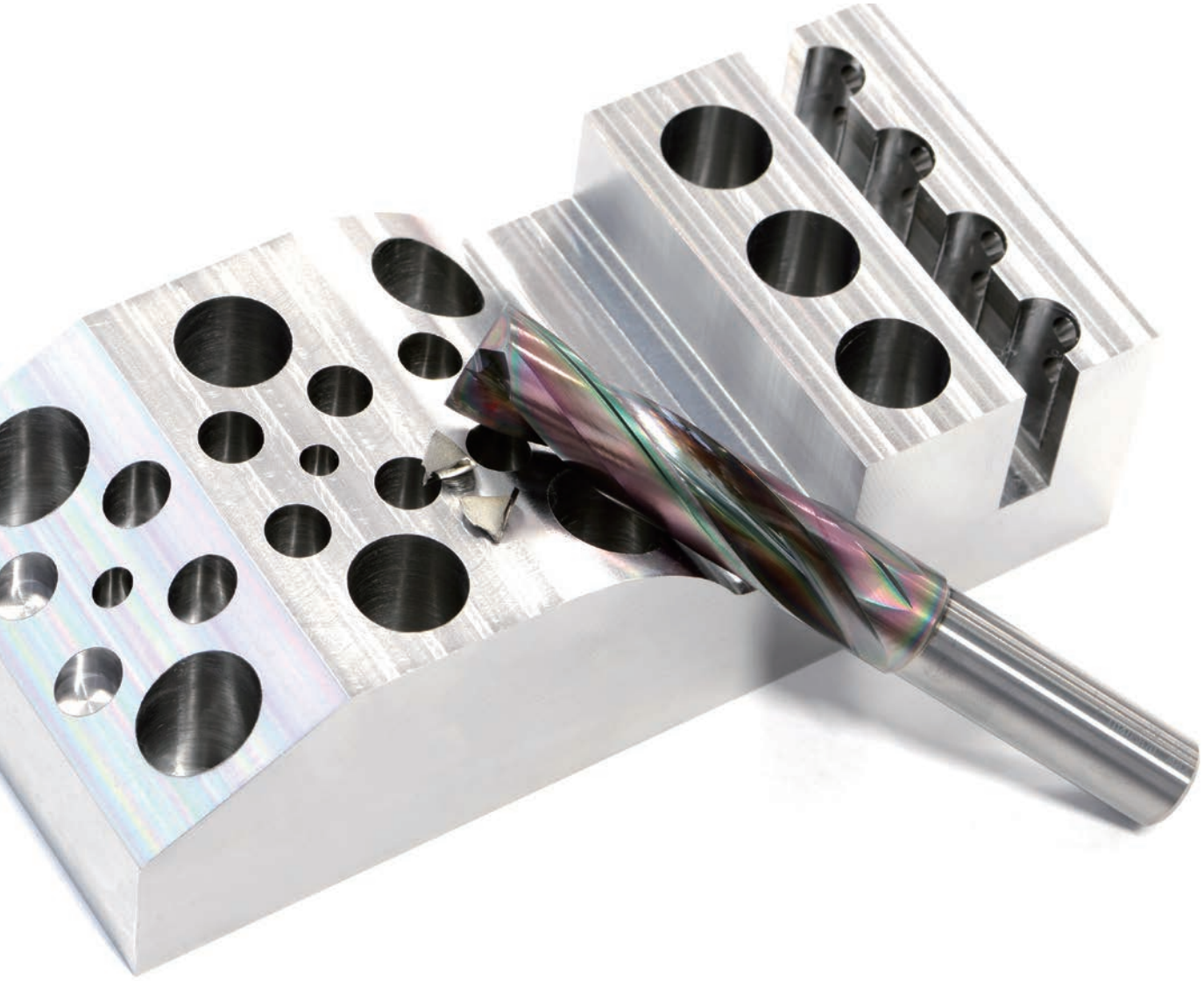
**Professional Bearing Service manufactures approximately 500 bearings annually. Bearings being a round product, can present multiple machining challenges. There are several places in which machining curved services to a flat is necessary in order to make these bearings. The counterbore depths that Professional Bearing Service deals with range from 1.5-inch to over 4-inch.**

Professional Bearing Service has been using OSG's A-Tap series for tapping deep blind holes to place bolts into their bearings. Its CNC department has relied on OSG's A-Tap line for the past two years with great results that no other competitor taps are able to achieve. With high confidence in OSG's tooling performance and a recommendation by Professional Bearing Service's tool supplier Pacific Industrial Supply Co., Professional Bearing Service decided to try out OSG's latest drilling innovation for inclined surfaces and counterboring applications – the ADF carbide flat drill series – to tackle their counterboring challenge.

Machining a flat hole traditionally required the use of an end mill and a drill. OSG's ADF carbide flat drill enables one-step drilling without requiring a starter hole to shorten machining time and simplify tool management. The ADF's unique balanced point form improves precision and minimizes the shifting of the hole position. Its sharp cutting edge geometry results in low cutting force to minimize burrs even in thin plates. With a wide chip room configuration, trouble-free chip evacuation can be achieved. Furthermore, with the addition of OSG's proprietary EgiAs coating, tool life can be prolonged with excellent heat and wear resistance.

Upon a detail evaluation of the application, a 2-flute 10.5 mm (0.4134-inch) diameter ADFLS (EDP# 3333050) from OSG's ADF flat drill series was put into the spindle. The ADFLS's length of cut is 46 mm (1.811-inch) with an overall length of 160 mm (6.3-inch). With OSG's ADF flat drill, Professional Bearing Service's CNC department is able to run the 1020 steel application in their Southwestern Industries Trak Machine Tool machining center with greater efficiency. The tool is being used at a speed of 2,500 RPM (270 SFM), a feed rate of 10 IPM (0.002 IPT) and a peck cycle of every 0.050-inch.

**The ADF is a multi-purpose flat drill series engineered for machining inclined surfaces and counterboring applications. Unlike conventional drills, the ADF flat drill is capable of creating holes in inclined and contoured surfaces without requiring a start hole.**



The ADF series is suitable for materials such as carbon steel, alloy steel, hardened steel, cast iron and even stainless steel with its recently expanded oil hole type offering ADFO. Professional Bearing Service's bearings vary in material, but are mostly made of 1020 steel, cast iron, or bronze, all of which can be cut by OSG's ADF with ease. Professional Bearing hasn't seen the full tool life of the ADF yet, but they are extremely positive with the result the tool has achieved so far. The ADF flat drill has thus far completed 140 parts (560 holes), which is nearly three times the tool life of the previous tooling choice, and is still being used in 1020 steel and bronze applications. Although the ADF drill is approximately 30 percent more expensive than the competitor tool, it provides more than twice the tool life, reduces 50 to 70 percent of the operation time, and also further enhances surface quality.

"We have been able to reduce our run time by 50 to 70 percent on this operation while also improving the surface finish on our product," said Gonzalez. "Our goal at Professional Bearing Service is to provide the very best products for our customers, along with the shortest lead times. OSG has helped us at Professional Bearing Service to achieve our goals."

# SynchroMaster

Next Generation Synchronized Tap Holder

The SynchroMaster tap holder is designed to turbocharge tapping performance on CNC machines with synchronous spindles by compensating for synchronization errors during the threading process. High thrust force and an increase in cutting pressure are caused by the discrepancies between calculated feed and actual movement of the tap. The SynchroMaster tap holder's unique micro float unit eliminates the extra axial forces on the tap to enable long tool life, stable tapping performance and precision thread quality.

# Phoenix PD

Comprehensive Indexable Drill Series

The Phoenix indexable drill series consists of four length sizes – 2D, 3D, 4D and 5D, designed for reliable and highly efficient drilling of large holes. The high precision finishing of this series' flute surface dramatically improves chip ejection to eliminate common deep-hole machining problems such as chip packing, elongation of chips and tool breakage. Its unique flute design features both high rigidity and superb chip evacuation. With an attached breaker to the cutter body, cutting chips can be broken into small pieces. Thanks to the above features, high feed machining can be achieved to maximize efficiency even under rigorous 5xD deep-hole drilling.

This series offers a broad insert lineup to accommodate a wide range of work materials, such as steels, stainless steels, cast irons, aluminum alloys and non-ferrous metals. All inserts incorporate an economical 4-corner design that can be applied to both the center and peripheral cutting edge and are applicable to every cutter body in the series to simplify tool management.

# XPF

## High Performance Forming Tap

The XPF represents a new evolution in forming tap technology. This series is engineered to generate up to 40 percent less torque versus other forming taps, making it feasible to tap materials up to 35 HRC and sizes up to M45 in diameter. Its low-torque design allows for longer tool life at faster speeds. With the addition of OSG's proprietary V coating, wear resistance can be further enhanced. The XPF is available with or without coolant holes, and in standard or long shank style.

# AE-VM

## Anti-Vibration Carbide End Mill Series

The AE-VM anti-vibration carbide end mill series is designed to attain an all new level of milling efficiency coupled with superb finish quality suitable for a variety of milling applications. The AE-VM's sharp positive rake angle geometry significantly reduces cutting force to minimize tool wear and potential damage to the workpiece even under aggressive cutting conditions. Cutting vibration is minimized with the AE-VM's 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 addition of OSG's original DUARISE coating, tool life can be enhanced by its excellent lubricity, superior friction-resistance and high oxidation temperature qualities.

Available in square, radius, stub length, long neck, long flute and long flute with chipbreakers, the AE-VM series 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.

# OSG Mergers and Acquisitions in Europe

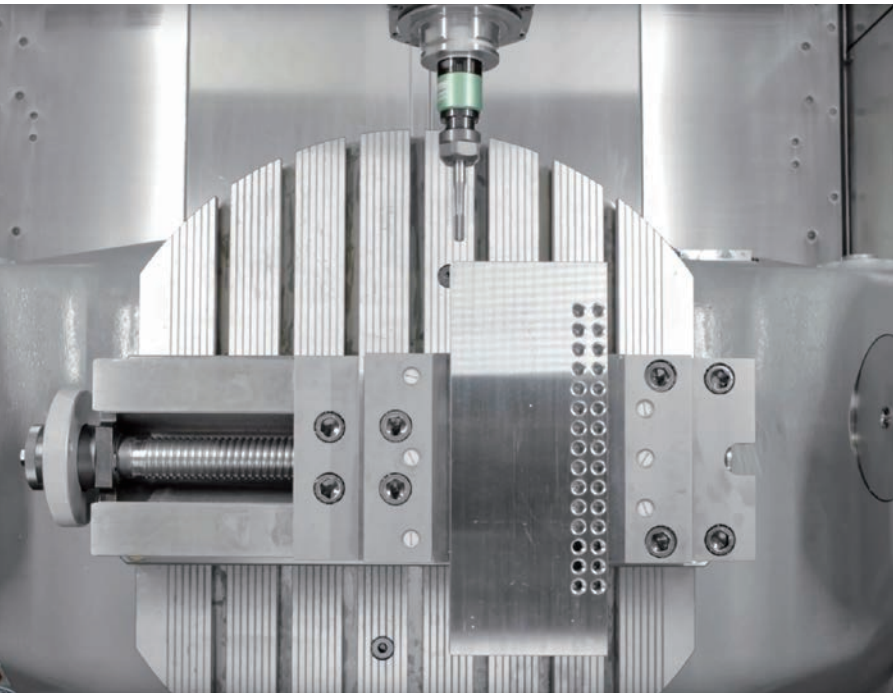
## OSG Corporation acquires three European companies and businesses to better accommodate the shift to EVs and expand new sales channels

OSG Corporation has recently acquired three European companies and businesses to further expand global sales channels. As the automotive industry enters a major reform period with notable technological changes such as electrification and self-driven capabilities, OSG will strive to enhance its competitiveness by expanding business partners and offering a wider selection of products to accommodate increasing demand in the electric vehicle (EV) sector.

In Germany, OSG acquired cutting tool manufacturer BASS on December 18, 2019 and the cold forming business of machine tool manufacturer MAG on November 29, 2019. BASS specializes in the designing and manufacturing of special tools in a short period of time, and is a major tooling provider for leading European automakers. More than 50 percent of its sales originates from Germany. The decision was made to complement European automakers with an expanded OSG sales channel, commented OSG President Norio Ishikawa.

MAG's tool business includes rolling dies and tool manufacturing machinery. The company specializes in tools for automobile drive shafts that transmit power to tires. Steady demand is expected of drive shafts as they are indispensable parts in general EVs. OSG's medium-term goal is to strengthen the existing business in Eislingen and to supplement it with additional products from the global coldforming network. The location, support team and machinery will continue to remain at its current location in Eislingen, Germany, but are organized under the new company OSG EX-CELL-O GmbH.

In Italy, OSG acquired diamond tool manufacturer Fiudi in September 2019. Fiudi is a leading company in the development and implementation of industrial diamond tools in automotive, aerospace, electronics, hydraulics, bioengineering and jewelry. Demand for diamond tools is expected to rise in the future, as they are commonly used for the finishing process of metals.

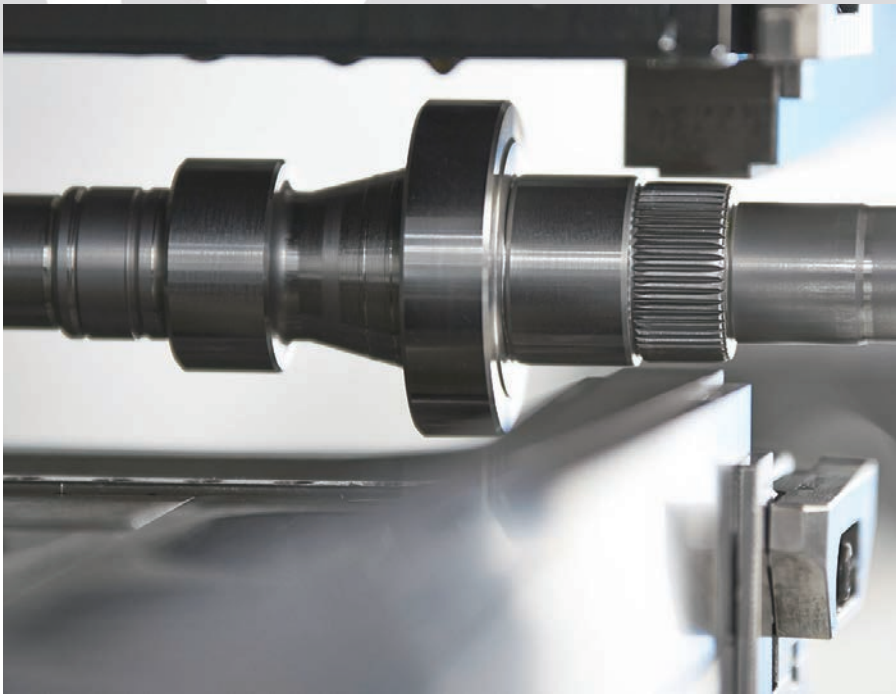


## About BASS

BASS GmbH & Co. KG is a dynamic, medium-sized family business based in Niederstetten, Germany. Since its foundation in 1947, BASS has been developing, producing and marketing high-precision products for industrial, efficient thread production. Companies worldwide from the automotive and aviation industries, as well as mechanical engineering and medical technology, rely on leading manufacturing solutions from BASS.

## About MAG Coldforming Technology

For more than 65 years, MAG Coldforming Technology stands for high productive coldforming of splines, threads, oil grooves, knurls and other similar shapes on rotatory components. The new company OSG EX-CELL-O GmbH will continue this successful history and position itself as a technology partner devoted to innovative manufacturing solutions. EX-CELL-O's product portfolio includes state-of-the-art CNC spline rolling machines, retooling and retrofits on existing machines. Furthermore, high-precision rack dies, prototyping and small batch productions are also a part of EX-CELL-O's technology-oriented businesses.



## About Fiudi

Fiudi was originally founded in 1959 in Turin, Italy by Ing. Mauro Mantecchini, with the aim of introducing monocrystal diamond in the local industry. In the early 1970s, the company began manufacturing tools with PCD (polycrystalline diamond), sensing before the economic boom of the millennium that light alloys and composite materials would have revolutionized the modern industrial sector. Over the years, Fiudi has expanded its sales throughout Italy and has significantly increased its range of products in both quality and quantity to fulfill market needs.

# OSG Around the World

Employee Interview with

# Akiko Yamamoto

During her 30-year tenure at OSG Corporation, Akiko Yamamoto has served as supervisor of the international sales department, manager of the global marketing department, and has recently been assigned as manager of the corporate planning department.

**Tell us about your work and experience at OSG.**

I joined OSG Corporation shortly after graduating college in Nagoya, Japan. For more than 20 years, I worked in the international sales department, taking charge of overseas orders, imports and exports. In 2014, I was assigned to the then newly established global marketing department as manager, overseeing areas such as ecommerce, exhibitions, catalog production and branding. In the next couple of years, through annual global marketing meetings and a newly constructed intranet, we are able to better unite our employees from overseas to further strengthen the OSG brand globally.

**Tell us about your daily routine.**

I was recently transferred to the corporate planning department in December 2019. Some of my key responsibilities include investor relationship, budget planning, performance management and medium-term management plan creation. Since this department is very involved in the company's management policy, it requires accurate information management and analytical skills. There is also an executive assistant team within the corporate planning department. Because our team often works with company directors and executives, we have to be quick and flexible in order to accommodate their busy schedule.

**What is most challenging about your work?**

The corporate planning department is an important section where management policy of the company is determined. Decisions must be made based on data and facts. Sometimes, however, information required for judgement can be difficult to obtain. It is crucial to continuously improve communications with internal and external stakeholders.

**What is unique about OSG's global marketing department?**

I think OSG's global marketing division is still evolving. OSG has a global network in 33 countries around the world. Our overseas employees are very talented and are capable of making great contributions to the group with their specialties. At OSG, our staff have high communication skills, which is a great strength of the company, allowing us to listen, develop and fulfil evolving customer needs.

**Akiko Yamamoto**
Company Location: Japan
Position: Manager of Corporate Planning
Joined OSG: 1990
Motto: "It's not about when you do, but how you do it"


Far left, Yamamoto poses for a group photograph with her students at OSG Corporation in Toyokawa, Aichi, Japan. Yamamoto is a certified ikebana instructor and belongs to the Ohara Ikebana School. She also teaches a class weekly at OSG Corporation to allow employees to explore and study the art after work.

### What is your favorite OSG tool?

My favorite OSG tool is the A-Tap. Among OSG's tap product lineup, the A-Tap is one of the most popular items due to its superior performance and reliability. I hope that the A-Tap can continue to maintain its position as the "best choice" for manufacturers around the world.

The A-Tap is known for its superior chip evacuation capability. It is an all-purpose tap series developed to accommodate a wide variety of materials and machining environments, helping manufacturers simplify tool management.

### How do you spend time on your day off?

During time off, I often spend my days on ikebana, which is the Japanese art of flower arrangement. I began studying ikebana when I started working at OSG, about 30 years ago. There were times when work was too busy that I was unable to study. I think I am able to continue because I truly enjoy the art. I am currently a certified ikebana instructor and belong to the Ohara Ikebana School. A study group is held once a month and I would be assigned to other branches of the school in Japan to teach. In addition to Ohara, there are over 1,000 types of schools of ikebana throughout the world today. Ikebana has opened up a new dimension of life. It has taught me to appreciate Japanese tradition and culture, and to better understand the characteristics of aesthetics rooted in Japanese people. Ikebana is an art requiring patience and discipline. I will continue to learn as ikebana is a lifelong study.

Yamamoto's work was on display during OSG Corporation's annual new year celebration held at the company guest house in Toyokawa, Aichi, Japan on January 24, 2020.

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