

# SHAPE IT

OSG Global Tooling Magazine | SUMMER 2021



## NEO Shinshiro Zero-One Factory: Imagination to Create from 0 to 1

The fusion of traditional  
craftsmanship and smart factory

### Technical Insight

**AE-BM-H, AE-BD-H and  
AE-LNBD-H Carbide Ball End  
Mill Series for High-hardness  
Steel Applications**

### Customer Report

#### **Gear Up Performance**

Exotap DC oil tap boosts tool life  
and productivity in gear drive  
production

### Meet OSG

**Employee Interview  
in the UK**

# *Breaking away from the traditional way of the past to thrive in the era of VUCA*

## A Message from the President

My name is Nobuaki Osawa. Please call me “Nobu.” I have been appointed President and COO of OSG Corporation at the Ordinary Shareholders’ Meeting held in February 2021.

2020 was confronted with an unprecedented crisis caused by the coronavirus (COVID-19) pandemic. OSG also experienced a very challenging year in manufacturing and sales. As China’s economy bounces back, the domestic market, especially the automobile industry, is accelerating recovery. However, the number of people infected by the mutation of the new coronavirus is increasing, and the situation remains severe.

VUCA is an acronym for volatility, uncertainty, complexity and ambiguity. In a nutshell, VUCA indicates a condition that is uncertain and unpredictable. The COVID-19 pandemic is an intense example of the VUCA world, one that unmercifully disrupts all activities that were once deemed “normal” and reminds us that nothing in life should be taken for granted.

The future of manufacturing is evolving, with climate change and decarbonization taking center stage and the automobile industry accelerating toward electric vehicles (EVs). Nevertheless, the supply chain reforms that accompany the EV shift present new opportunities for OSG, which is expanding its business globally and is one of the few global players who can provide equivalent services anywhere in the world. Although uncertainties will increase due to the transition to EV, OSG will strive to maximize this opportunity to increase market share, as “attack is the best form of defense.”

To succeed, we must overcome the traditional way of the past and challenge new markets as we approach the company’s 100th anniversary. A strong determination to envision and shape the future of the company with our own hands will help guide us to the next chapter of OSG. Let’s position 2021 as the starting point, where we create our own “new normal” in the era of VUCA.



A handwritten signature in black ink, appearing to read 'N. Osawa', written in a cursive style.

**Nobuaki Osawa**  
President & COO of OSG Corporation

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SUMMER 2021

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Taiho's state-of-the-art Ben Jhou Factory in Kaohsiung, Taiwan is equipped with the most advanced equipment and is maintained under the condition of constant temperature.

# You Dream It, OSG Shapes It

## OSG's global network provides tailored nut tap solution for fastener manufacturer

**Lynn Lin**, Taiho Tool

**Hakan Erdogan**, OSG Turkey

OSG Corporation has been manufacturing taps since its founding in 1938, and they have become key products of the company ever since. OSG currently holds the number one position in the Japanese cutting tool market, as well as a top-ranking position globally. In addition to OSG's domestic sales and manufacturing output, subsidiaries overseas also play a crucial role in contributing to the global status the company enjoys today. Taiho Tool Mfg. Co., Ltd., the OSG group company in Taiwan, in particular has been a major factor in establishing OSG's position as the world's number one nut tap manufacturer.

### Taiho

Headquartered in Kaohsiung, Taiwan, Taiho Tool Mfg. Co., Ltd. was established on May 15, 1969, and is the second overseas subsidiary of OSG Corporation after OSG USA in America. More than 50 years have passed, Taiho today

employs over 330 staff and has transformed from a traditional SKS tap factory into a major high-quality cutting tool manufacturer with a total of eight production sites, stock centers and sales offices located throughout Taiwan and mainland China. Taiho's key products include taps, nut taps, rolling dies, drills, end mills and gauges. Taiho's production sites employ advanced technology and manufacturing systems to supply customers with a vast range of products. The company continuously strives to maintain its comprehensive quality management systems as well as to give first priority to environmental protection, security and accident prevention.

## Taiho Nut Taps

Nut taps are used to thread nuts. Taiho's nut taps are manufactured with OSG's original grinding machines with high quality thread grinding techniques that can strictly control thread limit. Taiho's nut taps' unique flute geometry enables trouble-free chip evacuation. Furthermore, they are coated with Taiho's exclusive coating with smooth surface property that can enhance tool life. Taiho's nut taps are engineered to excel in a wide variety of materials and nut processing applications.

## Types of Nut Taps

### 1. Short Nut Tap (SNT)

A short nut tap can either be used by connecting it to a bent shank or a short shank. With this specification, manufacturers can replace used taps easily. SNTs are widely used in fasteners and nut processing industries. In order to meet international market requirements, Taiho offers SNTs with metric, unified screw threads, and standard design with different tolerance classes in stock.

### 2. Nib Tap (NBT)

A nib tap is used by directly screwing it onto a bent shank with a threaded hole. With the screw-in configuration, adjustment time can be substantially shortened. Using couplers to connect taps and bent shanks can also lower the possibility of tap breakage caused by the strong torque during machining.

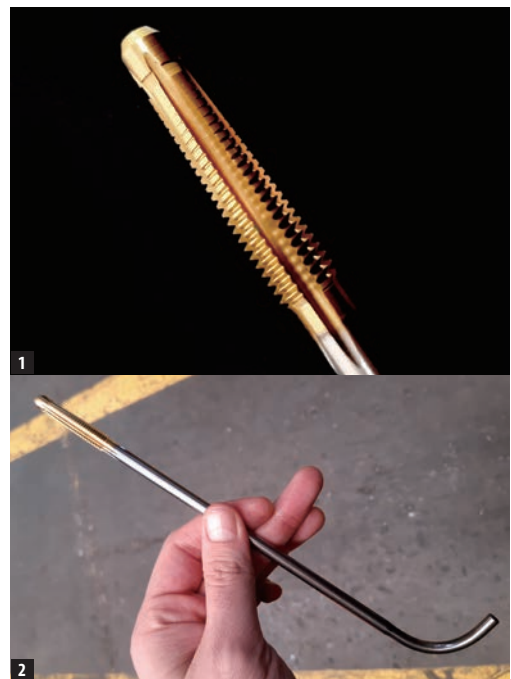
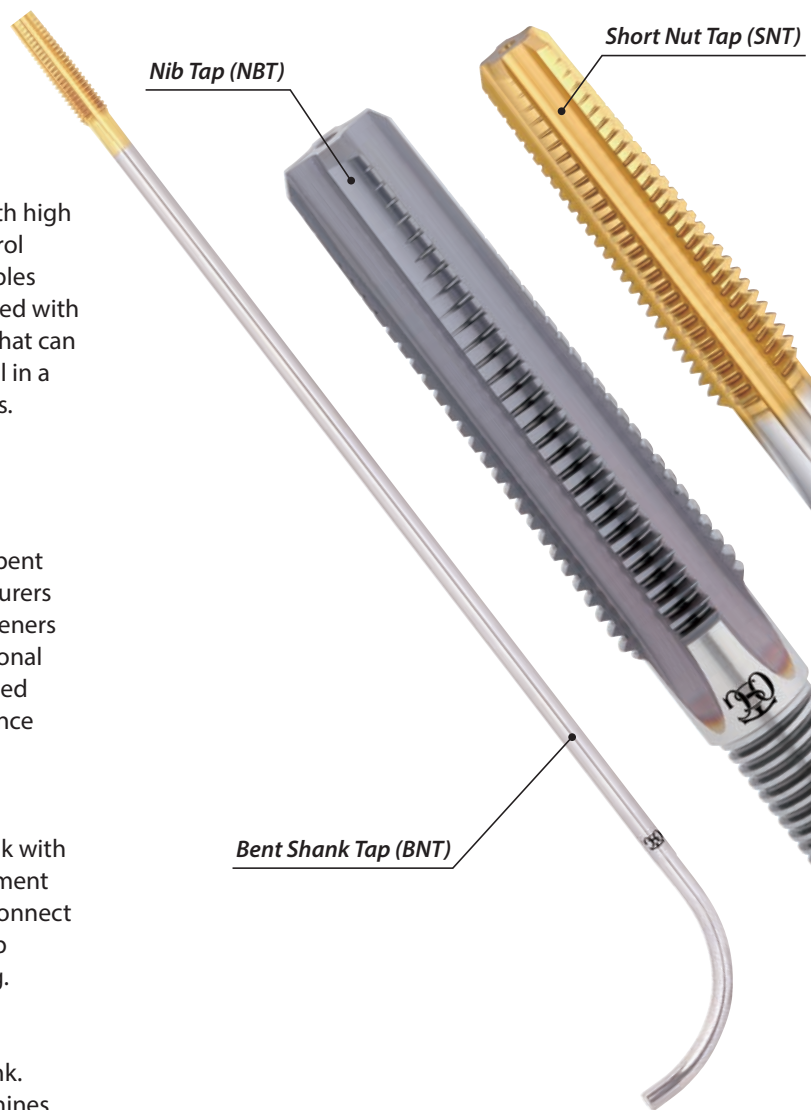
### 3. Bent Shank Tap (BNT)

A bent shank tap is composed of an SNT and a bent shank. The bent shank tap is used with automatic tapping machines that eject nuts via the shank. This enables continuous tapping operation without reversing or stopping the machine. Every process – from tap forming, precision grinding and welding of the bent shank – are all conducted at Taiho. Taiho offers tailored solutions in various sizes based on samples provided for a wide variety of tapping machines.

With over 50 years of experience and success, Taiho plays a key role in supporting other OSG group companies in providing innovative nut tap solutions around the world. Recently, Taiho was able to assist an automotive fastener manufacturer through the contact of OSG Turkey.



Taiho Tool Mfg. Co., Ltd., the OSG group company in Taiwan, in particular has been a major factor in establishing OSG's position as the world's number one nut tap manufacturer.



1. Custom tap by Taiho with a special male point with radius configuration.

2. A special tap with bent shank made by Taiho. Taiho offers tailored solutions in various sizes for a wide variety of tapping machines.



From left to right, Norm Somun Production Engineer Atıl Sungur, Norm Somun Production Leader Zeynel Çelebi, Norm Somun Machine Operator Mehmet Alkan and OSG Turkey Area Sales Manager Fatih Etik pose for a photograph with the customized nut tap at the Norm Somun manufacturing facility in Izmir, Turkey.

## Norm Somun A.Ş.

Founded in 1977, Norm Somun A.Ş. is a world leading manufacturer of fasteners for the automotive sector. Some of its key products include fibered nuts, weld nuts, flanged nuts, fibered flanged nuts, flanged tensioning nuts, prevailing torque type nuts, hexagon nuts, and more. The company can also provide custom products, such as bushes, square nuts, sleeves, rivets, and more. Employing more than 600 staff, Norm Somun's manufacturing plant is located in the city of İzmir, Turkey, with an estimate production floor of 30,000-square-meter. In addition to the İzmir plant, Norm Somun also has a factory in Salihli in the province of Manisa, with an estimate manufacturing space of 30,000-square-meter. Over the years, Norm Somun has proven its quality and success by earning quality certificates including the ISO 9001:2015, IATF 16949, EN 14399-1, TSE and EN 15048-1. The company is proud to be a leading manufacturer of fasteners that supplies directly to the assembly lines of many major automotive companies worldwide.

Tapping with nut taps is one of the most difficult processes as it cannot be easily controlled to prevent defected parts in huge batch size. For the production of nylon insert nuts used for the automotive industry, Norm Somun was experiencing excessive run-out of the nut tap. This causes unstable threading in the beginning of the process, which resulted with scrapped parts due to oversized threads.

The nylon insert nuts are made of cold forged low carbon steel and the company has an annual estimate production volume of 500 million pieces. Approximately 250,000 pieces are included per batch. Norm Somun has been manufacturing these nuts for 15 years using nut tapping machines running at a cutting speed of 20 m/min and 1.25 mm/rev using water soluble coolant. Each nut requires the threading of one through-hole at a depth of 10 mm with 6H tolerance.



Norm Somun Production Director Birol Durdu.



1. A nut tap machine at Norm Somun. Norm Somun has been manufacturing nylon insert nuts for 15 years using nut tapping machines.
2. The production floor of Norm Somun in izmir, Turkey. Founded in 1977, Norm Somun A.Ş. is a world leading manufacturer of fasteners for the automotive sector.
3. Norm Somun's machine operator checks go and no-go gauges.

Norm Somun was originally using a competitor standard nut tap for the application. The company and OSG Turkey have been business partners since the Fastener Fair that took place in Turkey in 2014. The engineers at Norm Somun came up with the idea of a special design tap with a different type of point, which aims to center the workpiece in order to prevent excessive run-out. Based on Norm Somun's specified specifications, OSG Turkey's Area Sales Manager Fatih Etik consulted with Taiho regarding the application. Upon a detail evaluation of the application, Taiho produced a number of custom HS-BNT M8x1.25 GH7 bent shank taps for trial. Taiho's BNT is able to maintain tolerance stably to prevent scrapped parts. With this processing improvement, Norm Somun estimated a savings of \$24,000 USD in tooling cost.

OSG has a global network of over 65 business offices in 33 countries, which provides production sites with accurate feedback about user needs so that the company can quickly design, develop, manufacture and deliver products that precisely meets those needs. OSG not only supplies powerful cutting tools for the automotive industry, but also provides tailored application solutions to facilitate better processing with higher efficiency and longer durability. OSG's special tools offer the precision and productivity that other tool manufacturers cannot duplicate.

"Our manufacturing process is better controlled thanks to OSG's custom nut tap that centers the workpiece perfectly just before tapping to prevent excessive run-out," said Norm Somun Production Director Birol Durdu.

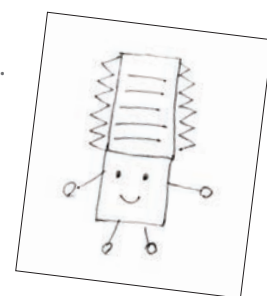
"With this improvement and preventive action on the process, customer satisfaction and our ability to meet their quality requirement has risen to the very top level," said Durdu.



Photograph of a nylon insert nut made by Norm Somun.



1. Tap-kun is OSG Corporation's official brand mascot. It is a fictional cutting tool character based on the imagery of a hand tap, which is the first product of OSG since its founding in 1938.
2. Kanako Mizutani plays pool with Tap-kun at OSG's Global Technology Center in Toyokawa City, Aichi Prefecture, Japan.
3. OSG's official brand mascot Tap-kun poses for a photograph with a newly made manhole cover advertisement in Toyokawa, Aichi on October 1, 2019. OSG Corporation's headquarters is located in the city of Toyokawa, Aichi Prefecture. It is the hometown of nearly half of OSG Corporation's employees in Japan. OSG takes great pride in Toyokawa and hopes to continue to contribute back to its hometown through meaningful initiatives involving its brand mascot.



A replicate of the original sketch of Tap-kun by Kanako Mizutani, who created OSG's brand mascot in 2008.

# Tap-Kun

## Meet OSG's popular mascot and hear his untold story

**Masatoshi Kageyama**  
OSG Corporation

Tap-kun is OSG Corporation's official brand mascot. It is a fictional cutting tool character based on the imagery of a hand tap, which is the first product of OSG since its founding in 1938. The friendly hand tap character Tap-kun serves as OSG's brand ambassador in the promotion of the company, the manufacturing industry, and local communities. The direct translation of Tap-kun is Tapboy.

### Behind the Birth of OSG's Mascot Tap-Kun

In late 2007, OSG Global Engineering Group senior staff Kanako Mizutani became involved in a cross-functional project for OSG Corporation's homepage renewal. One of the key objectives was to improve the career section of the website. Before joining OSG, Mizutani had a few years of experiences as a human resources officer and played a key role in the initiative.

"I knew how difficult it can be for B-to-B companies like OSG to attract job candidates fresh out of college," Mizutani said. "I thought the first step we should take was to make OSG better known among candidates," she said.

Mizutani had several ideas, and one of them was to create an official brand mascot. At the time, OSG already had three mascots called Nezilla, Drilla and Milla in the shape of dinosaurs that were meant to represent taps, drills and end mills respectively. However, the characters never gained the popularity the company had anticipated.

"The dinosaur characters were good-looking but a little old-fashioned," Mizutani said. "I felt that they needed an upgrade."

Mizutani wasn't confident with her drawing skills, but she did her best and provided a sketch of her idea to a partner design company and asked them to make it a super good-look 'yuru-kyara,' which can be translated as a 'loose character' that is cute and cuddly. After multiple reviews and edits, the design company was able to create what Mizutani had in mind, and Tap-kun was born.

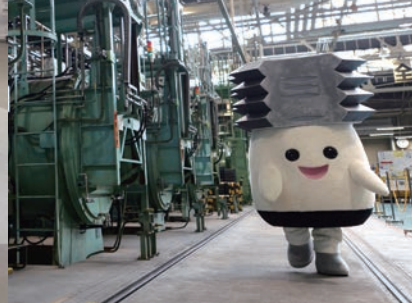
Mizutani stresses that it is crucial to enhance OSG's presence not only among customers and job candidates, but also all stakeholders including local communities. With a friendly and approachable character, Mizutani believes that a mascot can further facilitate public interest in OSG.

"People who are unfamiliar with OSG may become interested by seeing Tap-kun and may search for more information, which is one of the goals of having a brand mascot," said Mizutani.

**Engineered in 1938 - HT HSS Hand Tap**  
OSG's first product. Uncoated high speed steel straight flute tap for general threading applications.







4. Tap-kun poses for a group photo with employees from OSG Sulamericana at the EXPOMAFE in May 2017. EXPOMAFE is a leading Brazilian exhibition where the world's top manufacturing machinery, equipment and technology suppliers gain access to the most important buyers of the metalworking industry in Latin America.

## Tap-kun

### PROFILE



Hometown	Aichi Prefecture
Birthday	March 26
Gender	Male
Likes	Holes, Tedtsu fireworks, Inari sushi
Dislikes	Rainy days
Personality	Inquisitive
Origin of Name	From the cutting tool "tap"

Tap-kun was first unveiled at the renewed OSG homepage in September 2008. He served as the host of an online quiz called Neji no Ana on the career section of the corporate homepage. Initially, Tap-kun only appeared in mediums pertaining matters related to human resources. In the past couple of years, however, Tap-kun has gained substantial recognition and popularity thanks to OSG's global marketing team, which has been promoting the character as the company's official brand ambassador worldwide. Today, Tap-kun has become a beloved yuru-kyara in the manufacturing industry in Japan as well as overseas.

"Tap-kun is influential in a sense that it can enable OSG to connect with a larger audience, not limited to just the manufacturing industry," said Mizutani. "As the mother of Tap-kun, I'm very proud to see what he has become."



OSG's beloved mascot Tap-kun has a vast collection of original promotional merchandise that are given to customers during special occasions and events around the world.



### Kanako Mizutani

Mizutani joined OSG Corporation in 2003. She is currently a senior staff of the company's Global Engineering Group and manages joint projects with a German partner company and intellectual property. Prior to her current role, Mizutani worked in various fields within the company, with experiences in technical support, investor relations, financial analysis, management strategy, marketing and branding.

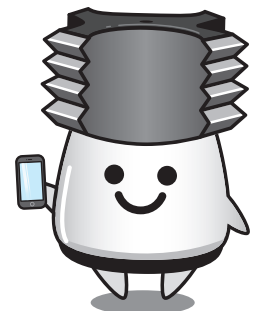
"One of my memorable projects was the renewal of OSG's corporate brand identity and the establishment of the company tagline "shaping your dreams," said Mizutani.

### Meeting Tap-Kun

Follow Tap-kun's official Twitter account for his latest updates and whereabouts.



<https://twitter.com/osgtapkun>



# AE-BM-H, AE-BD-H and AE-LNBD-H

## OSG's latest carbide ball end mill series for high-hardness steel applications

Oji Kawaguchi  
OSG Corporation Applications Engineer  
(End Mill Development Division)

In recent years, the die and mold industry has been demanding for shorter production time than ever before. Distortion caused by heat treatment and time reduction of heat treatment are being frowned upon, prompting a greater call for capabilities to directly mill high-hardness steels. In addition, requirement for higher precision is also increasing. In order to fulfill the current industry standard, OSG has recently developed three new products to accommodate these needs.

To complete a mold with high precision, not only is the accuracy of the cutting tool critical, but also is the longevity of the tool. Even if a cutting tool is made with high precision in a new state, if it lacks durability, wear will progress early, the contour of the tool will collapse, dimensions may change, and the accuracy of the mold will decrease. To resolve these challenges, OSG is pleased to introduce three new ball end mills, the AE-BM-H, AE-BD-H, and AE-LNBD-H, with capabilities to contribute to faster mold production and higher precision.

The AE-BM-H, AE-BD-H, and AE-LNBD-H are coated with OSG's innovative new coating "DUROREY" engineered for hardened steels, which was released in April 2019. As depicted in figure 1, the DUROREY coating is composed of a super-fine nano-periodic laminated structure that has an excellent wear and heat resistance layer containing silicon carbide (SiC) on the surface layer and exhibits excellent toughness underneath. As a result, even with work materials exceeding 60 HRC, chipping resistance is much greater than the conventional hardened steel coating, and tool life can be significantly prolonged.

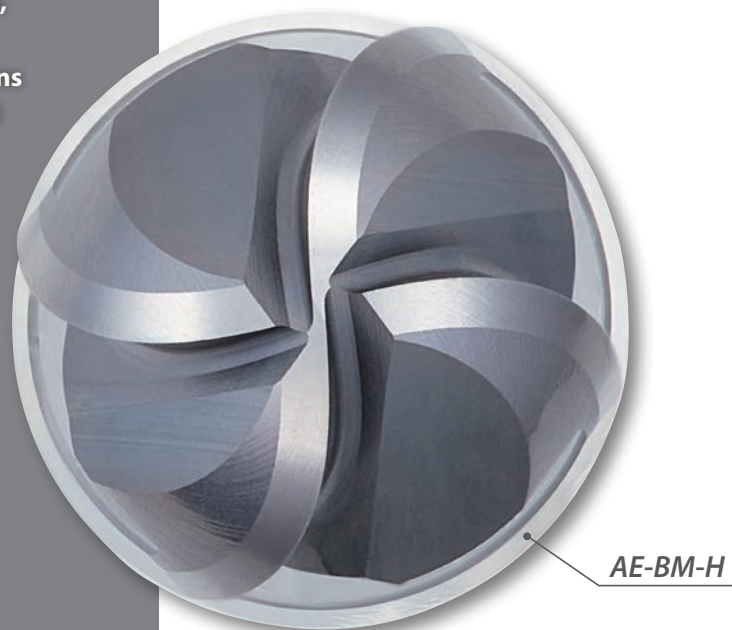
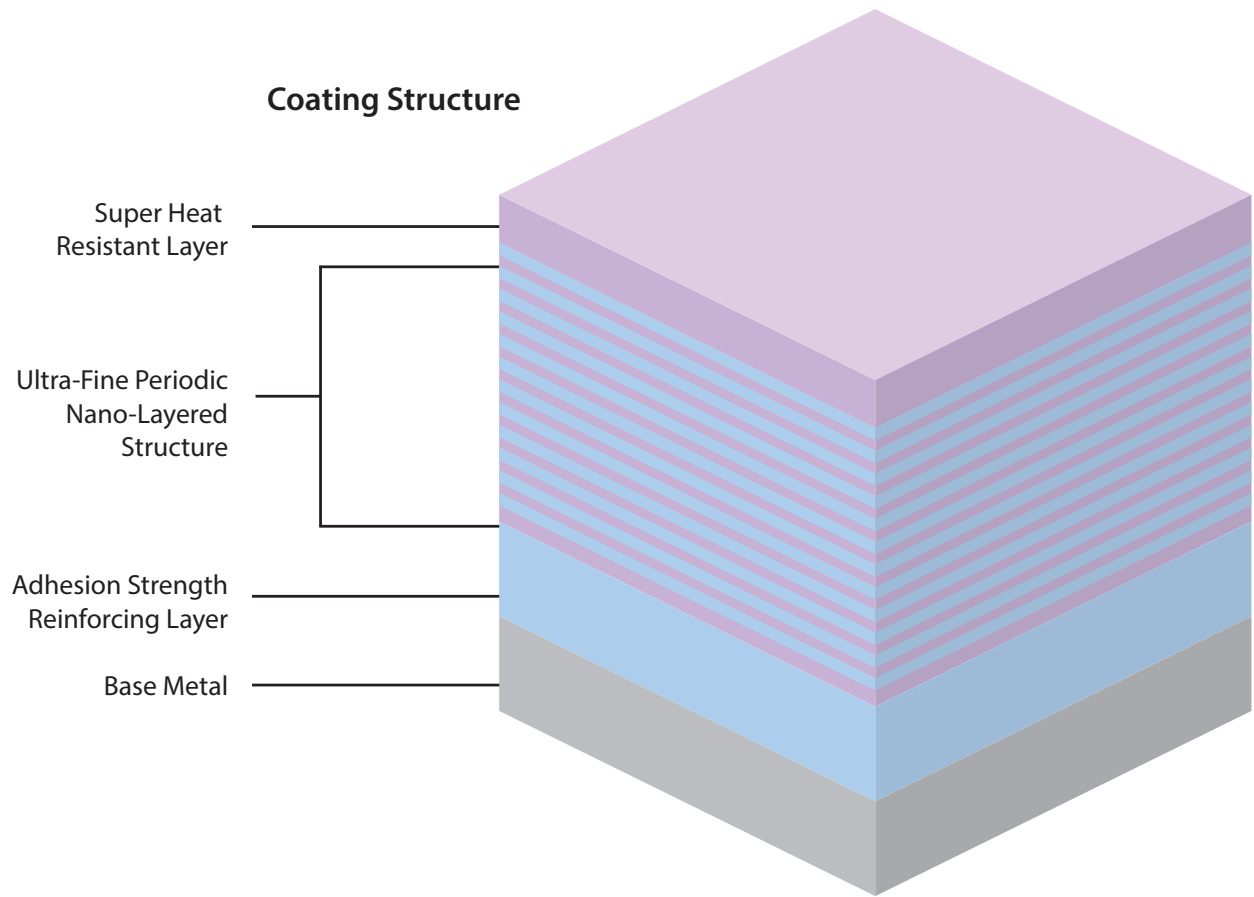




Figure 1. Properties of DUROREY coating



Coating Color	Coating Structure	Hardness (GPa)	Oxidation Temperature (°C)	Heat Resistance	Adhesion Strength	Surface Roughness	Wear Resistance	Welding Resistance	Toughness
Black Gray	Ultra-Fine Periodic Nano-Layered	41	1,300	☆	◎	○	☆	◎	◎

DUROREY is a registered trademark of OSG Corporation.

(Fair) ○ → ◎ → ☆ (Best)

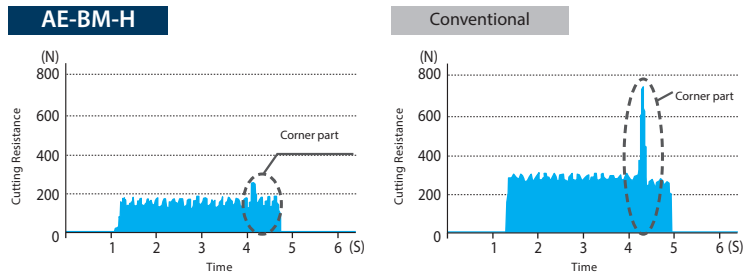
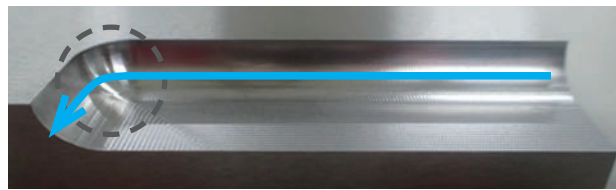
## AE-BM-H: 4-flute High-efficiency Carbide Ball End Mill

The AE-BM-H is a 4-flute carbide ball end mill designed based on the concept of high-efficiency and stable processing of high-hardness steels. It is most suitable for forging dies, press dies and die-cast dies. The AE-BM-H features a sharp spiral curve for reducing cutting resistance compared to conventional specifications. In addition, the AE-BM-H's unequal flute spacing geometry enables greater control of harmonic vibration commonly

generated during milling with multiple flutes in hardened steels, thereby allowing higher efficiency milling. Figure 2 illustrates a comparison of cutting force. Amount of edge contact with the workpiece is at its highest at the corner region. With the conventional product, cutting resistance spikes at the corner, whereas that of the AE-BM-H increases only slightly.

Figure 2. Effects of sharp spiral curve and unequal flute spacing enable stable milling with low resistance

Tool	AE-BM-H R5	Conventional
Work Material	SKD11 (60HRC)	
Milling Method	Corner R Milling	
Cutting Speed	80 m/min (2,550 min <sup>-1</sup> )	
Feed	2,000 mm/min (0.196 mm/t)	
Depth of Cut	ap=5 mm, Pf=0.1 mm	
Coolant	Air Blow	
Machine	Vertical Machining Center (BT40)	

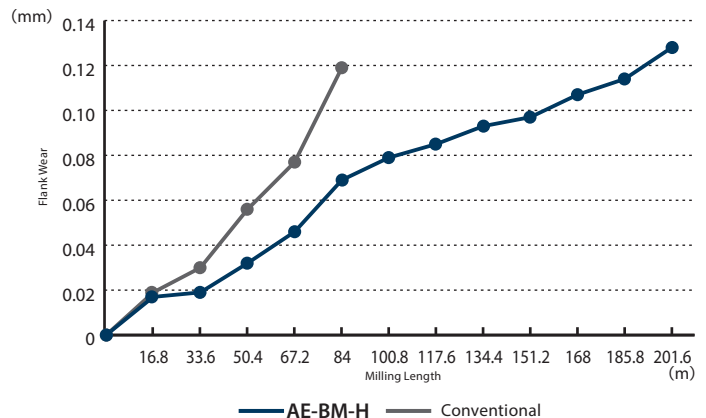


Next, figure 3 demonstrates tool durability comparison in high-hardness steel milling. As depicted below, the AE-BM-H is able to achieve stable, high-efficiency and long

tool life even in materials with a high degree of cutting resistance such as SKH51 (65 HRC).

Figure 3. Tool durability comparison in high-hardness steel milling

Tool	AE-BM-H R5	Conventional
Work Material	SKH51 (65HRC)	
Milling Method	Pocket Milling	
Cutting Speed	125 m/min (4,000 min <sup>-1</sup> )	
Feed	2,000 mm/min (0.125 mm/t)	
Depth of Cut	ap=0.3 mm, Pf=1.2 mm	
Coolant	Air Blow	
Machine	Horizontal Machining Center (HSK63)	



Processing time can be significantly reduced with the AE-BM-H's capability to enable high-efficiency machining of high-hardness steels, which is difficult to achieve with conventional products. Manufacturers who are currently performing roughing and semi-finishing with a 2-flute

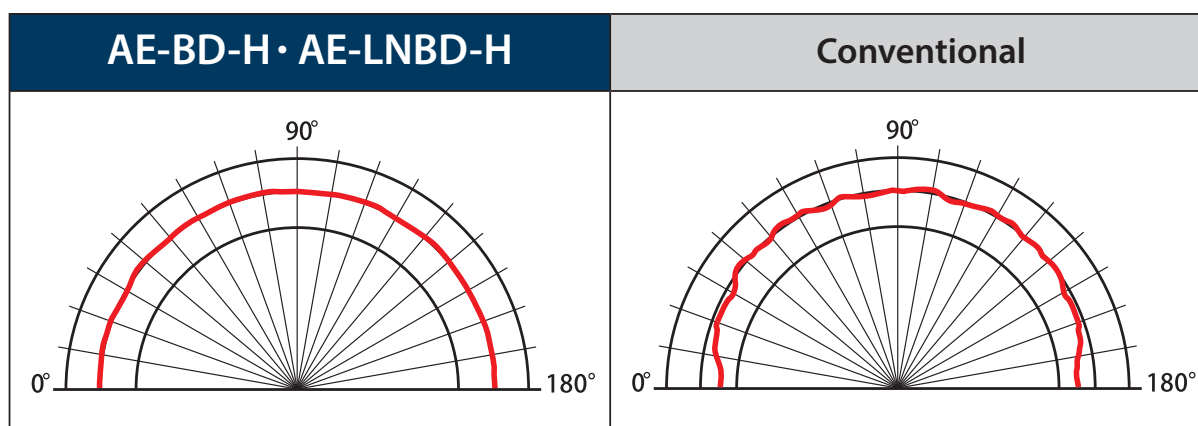
ball end mill can particularly benefit from this 4-flute end mill to experience much improvement in machining efficiency and stability. The AE-BM-H is available from R1 to R6, with a total of eight items.

## AE-BD-H: 2-flute High-precision Finishing Carbide Ball End Mill

The AE-BD-H is not just a change of coating from the conventional product. The shape of the cutting edge and the carbide base material have been completely reviewed and revamped with special attention to the machining surface accuracy. By adopting a variable negative spiral gash and a thick center core geometry, the cutting edge of the ball tip is less likely to be deformed during machining. By optimally utilizing the outer peripheral cutting edge, the tool is able to make better contact with the workpiece to improve processing quality.

Moreover, the helix angle is also different from the conventional product. The conventional product adopts a 30-degree helix angle while the AE-BD-H adopts a 25-degree angle. By reducing the helix angle, the strength of the cutting edge is improved and the reliability of the cutting edge in machining hardened materials is increased. The R accuracy is  $\pm 5 \mu\text{m}$  (1 / 1,000,000 in micro size) for all sizes from R0.5 to R6. The AE-BD-H's superior ball R precision ensures a stable radius accuracy across 180-degree as illustrated in figure 4.

Figure 4. Superior ball R precision



Furthermore, the AE-BD-H is engineered with a superior shank accuracy that supports h4 tolerance, with specifications that surpass those of conventional products. Its short shank type lineup help minimize tool protrusion, enabling stable machining. Last but not

least, the AE-BD-H and AE-LNBD-H are processed with a smooth surface treatment to remove hard foreign substances called droplets (excluding AE-LNBD-H that are R0.25 or under). The surface quality has been improved significantly as depicted in figure 5.

Figure 5. Smooth surface treatment

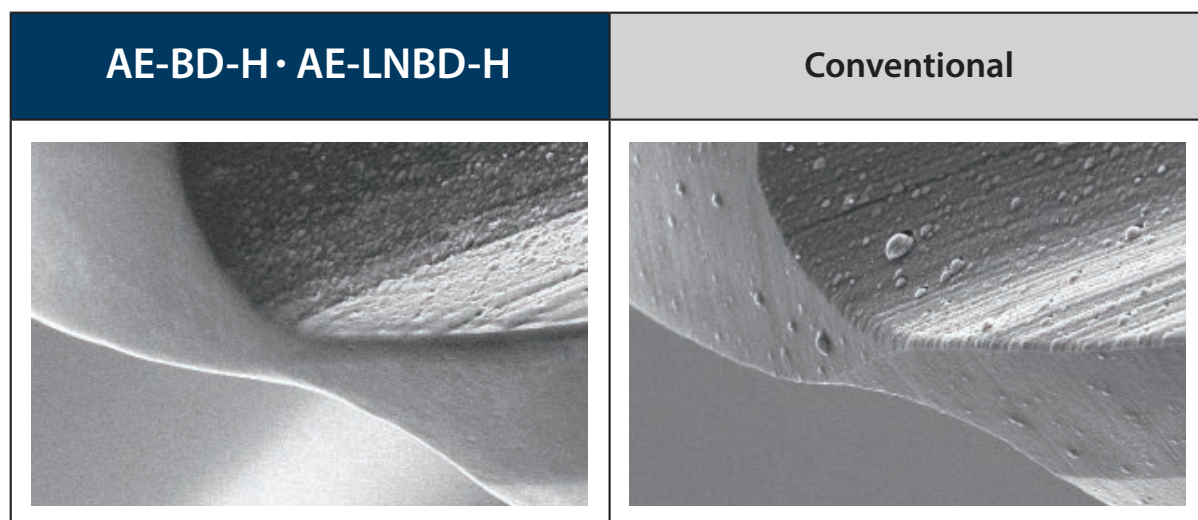
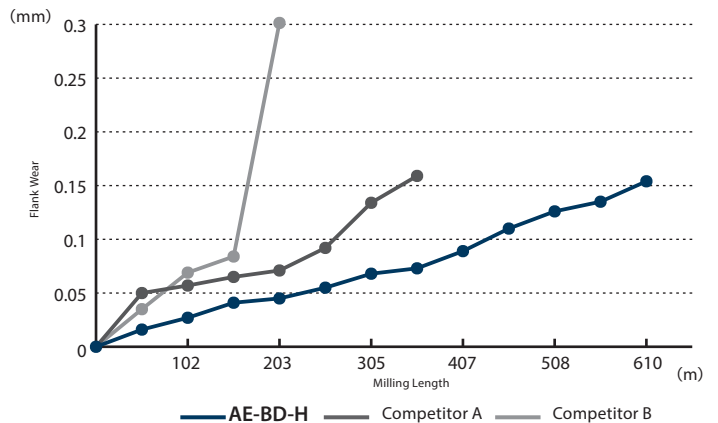


Figure 6 shows the excellent durability of the AE-BD-H versus two other competitors in high-hardness steel SKD11 (60 HRC).

Figure 6. Long tool life in SKD11 (60 HRC)

Tool	AE-BD-H R5×30	Competitor
Work Material	SKD11 (60HRC)	
Milling Method	Pocket Milling	
Cutting Speed	150 m/min (4,800 min <sup>-1</sup> )	
Feed	870 mm/min (0.09 mm/t)	
Depth of Cut	ap=0.2 mm, Pf=0.5 mm	
Coolant	Air Blow	
Machine	Horizontal Machining Center (HSK63)	

As described above, the AE-BD-H is a high-precision finishing ball end mill that is ideal for machining environments where the overhang length can be



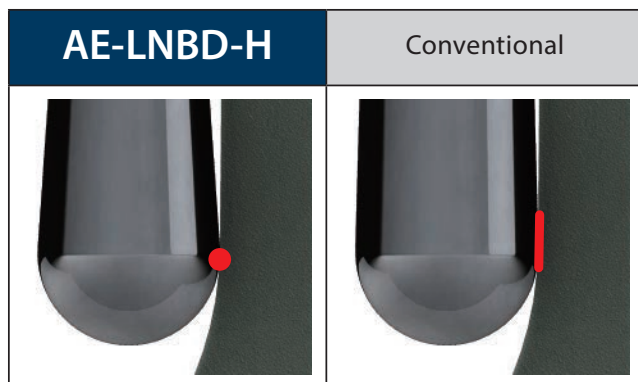
suppressed, such as in 5-axis machining, and for machining with a relatively short overhang length. The AE-BD-H is available from R0.5 to R6, with a total of 17 items.

## AE-LNBD-H: 2-flute High-precision Finishing Long Neck Carbide Ball End Mill

Although the AE-LNBD-H is positioned as a long neck type version of the AE-BD-H, it does not only offer extended neck length, but is also capable of achieving good surface finish with excellent accuracy even in unstable long overhang length machining environment. It is a product that has been optimized specifically for long overhang length with exceptional precision. The R accuracy is +/-3 µm for R0.25 or less, and +/-5 µm for all items exceeding R0.25. For R0.25 or less, higher accuracy is achieved compared to conventional products. In addition, as with the AE-BD-H, high precision machining is made possible with the tool's superior ball R precision across 180-degree and the superior shank accuracy construction that supports h4 tolerance.

Bending of the tool is prone to occur with the long neck configuration, which is the biggest challenge in developing a long neck tool. If the tool is bent, it will not be finished to the intended dimensions and will directly affect accuracy of the mold. The AE-LNBD-H uses a cemented carbide base material different from the AE-BD-H, which requires a short protrusion length. In order to minimize deflection, the AE-LNBD-H features a thick center core to help prevent deformation of the ball tip to improve chipping control. In addition, the adoption of a teardrop-shaped outer periphery strong back taper geometry enables milling by point, which prevents chattering and chipping, resulting in improvement of surface accuracy (see figure 7; excludes R2 or above).

Figure 7. Teardrop-shaped outer periphery



The AE-BD-H employs a 25-degree helix angle while the AE-LNBD-H adopts a 30-degree angle. This is because the AE-BD-H has a short overhang length and emphasizes on the reliability of the cutting edge. The AE-LNBD-H, on the other hand, is designed for high overhang length machining, which tends to be more unstable, thus rather than emphasizing on a sharp cutting edge, it emphasizes on superior biting properties.

Figure 8 demonstrates AE-LNBD-H's superior durability versus two other competitors in SKD11 (60 HRC).

Figure 8. AE-LNBD-H exhibits superior durability in SKD11 (60 HRC)

Tool	AE-LNBD-H R1 × 10 × 4	Competitor
Work Material	SKD11 (60 HRC)	
Milling Method	Scanning Line Cutting	
Cutting Speed	107 m/min (17,000 min <sup>-1</sup> )	
Feed	1,400 mm/min (0.041 mm/t)	
Depth of Cut	a <sub>p</sub> =0.05 mm, P <sub>f</sub> =0.1 mm	
Coolant	Air Blow	
Machine	Vertical Machining Center (HSK32)	

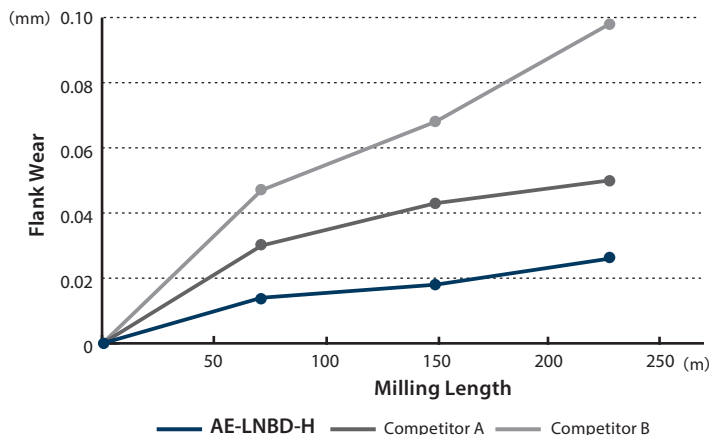
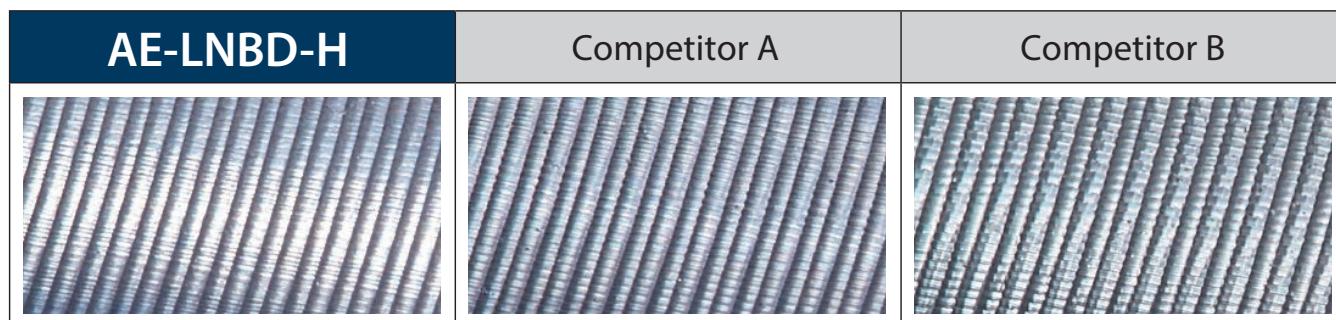


Figure 9 shows the machined surface between the AE-LNBD-H and two other competitors in STAVAX (53 HRC). As with the AE-BD-H, a smooth surface treatment is

applied to the AE-LNBD-H to help attain high accuracy and high-quality mirror-finished surface.

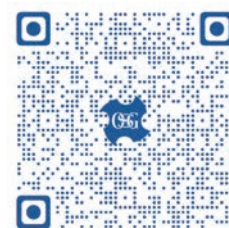
Figure 9. AE-LNBD-H exhibits excellent durability and surface finish in STAVAX (53 HRC)



As depicted in figure 8 and figure 9, the AE-LNBD-H offers the best specifications for long neck applications, with exceptional performance in comparison to other competitor tools. However, specifications alone would be incomplete without a full lineup since there are many scenarios where long neck end mills are required. To satisfy manufacturers' various needs, the AE-LNBD-H is offered from R0.05 to R3, with a total of 261 items to accommodate a wide range of applications.

In order to manufacture high-precision dies, it is also important to select high-precision machine tools, high-precision cutting tools, and high-precision tool holders. OSG offers high-precision holders made by HAIMER of Germany, and all of the test data introduced this article are processed using the company's high-precision shrink

holders. By employing these end mills in combination with OSG's high-precision holders, maximum performance can be guaranteed in high-hardness steels. To manufacturers who are working in high-hardness steel applications, look to the AE-BM-H, AE-BD-H and AE-LNBD-H carbide ball end mill series to experience greater performance.



Scan for details



From left to right, NAMCO President Bernard Vukovic and OSG Canada Western Regional Sales Manager Jason Kennedy pose for a photograph at the NAMCO manufacturing facility in Edmonton, Alberta, Canada.

# Gear Up Performance

Exotap DC oil tap boosts tool life and productivity in gear drive production

## Kelly Zago

OSG Canada

Founded in 1976, NAMCO Machine & Gear Works Ltd. is a high technology manufacturing company specialized in the production of gears and gearboxes, power transmission equipment, rotating equipment, and other high-quality production machined components. NAMCO products are compact, sturdy and economical to suit most engineering applications. Employing over 70 staff, NAMCO is headquartered in Edmonton, Alberta, Canada, with an estimate production area of 60,000-square-feet. With over 40 years of success, NAMCO has built a solid reputation for quality, service and reliability. The company continually strives to expand and evolve in order to meet the rapid changes and demanding standards of the industries they serve.

Recently, OSG Canada Western Regional Sales Manager Jason Kennedy reached out to NAMCO to provide technical support on an application where they were experiencing poor quality and tool life of threads. The part being manufactured is a gear case for a NAMCO split shaft PTO gear drive made of ductile cast iron. NAMCO has been making the part for approximately 10 years with a production volume of over 500 pieces

annually. More than 50 blind holes at a hole depth of 0.65-inch in various sizes are required to be drilled and threaded per part. The parts are machined using a DMG Mori NHX 6300 horizontal machining center.

NAMCO was originally using a competitor tap for the application but was unsatisfied with the quality and tool life. Upon a detail evaluation of the application, Kennedy recommended OSG's Exotap DC Oil Tap (EDP# 1005300508) for the most common size on the job.

OSG's Exotap DC oil tap is a reliable and versatile tap series engineered for cast iron, ductile iron and cast aluminum applications. Its eccentric thread relief reduces friction during cutting, thereby minimizes heat generation and extends life. The Exotap DC features a straight flute rigid tap design suitable for both through and blind holes. Its multi-layered TiCN coating resists thermal cracking while increases surface hardness. The combination of ultra-strong rake with OSG's VC10 powdered metal substrate makes this tap series the absolute best solution for threading ductile castings.





1. An operator from NAMCO prepares for the machining of the gear drive.

2. The Exotap DC outperforms the competitor tool in both tool life and productivity in NAMCO's gear drive production. Moreover, a great deal of tool change time can be eliminated.

The competitor TiN coated tap was used at a cutting speed of 50 SFM and a feed rate of 34 IPM. The OSG Exotap DC Oil Tap was used at a cutting speed of 75 SFM and a feed rate of 51 IPM. The competitor tap averaged a tool life of 200 holes before there were quality issues with the threads. The Exotap DC, on the other hand, was able to complete more than 8,000 holes before having to be replaced due to wear. The Exotap DC outperforms the competitor tool in both tool life and productivity. Moreover, a great deal of tool change time can be eliminated.

By implementing OSG's Exotap DC, NAMCO is not only able to gain 40 times the tool life, but also improve productivity and efficiency to deliver the best possible results for its clients.

"We are very satisfied with the OSG product and the customer service and support from their local team," said NAMCO President Bernard Vukovic.

"We will continue working with OSG in the future and look forward to a mutually beneficial relationship," said Vukovic.



The Exotap DC oil tap series is OSG's premium line of taps specifically designed for cast iron, ductile iron and cast aluminum applications.



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# High Speed & High Quality

AERO-EXTL 3-flute carbide end mill improves cycle time and surface finish in aircraft component production

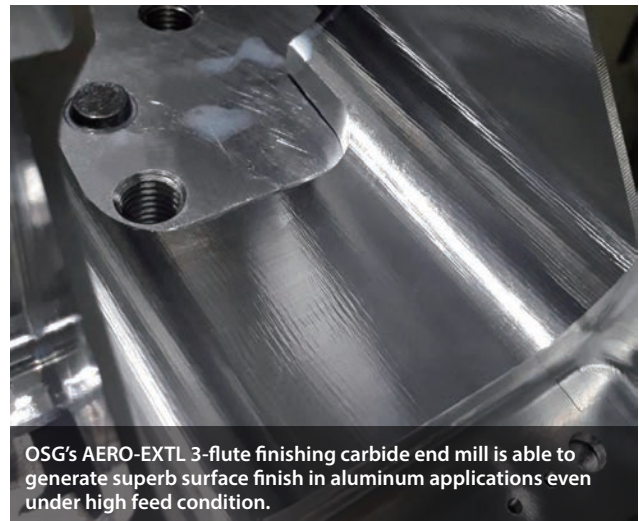
**Yoshi Saito**

OSG Thai



From left, Senior Aerospace's manufacturing engineer Narinchot Wiwachaiyachan and OSG's sales supervisor Suwimon Khamtorn pose for a photograph at the lobby of Senior Aerospace in Sriracha, Chonburi, Thailand.

Originally established as Weston SEA in 2005, Senior Aerospace Thailand Ltd. (Senior Aerospace) changed to its current name in 2014 and is a manufacturer of complex precision components and assemblies for the commercial aerospace market. Its key productions include compressor aerofoils, aluminum and hard metal structural parts and aircraft-seat structures. Employing 560 staff, Senior Aerospace is located in the city of Sriracha, Chonburi, Thailand, with an estimate production floor space of 22,000-square-meter. Senior Aerospace is a subsidiary of Senior plc, an international manufacturing group that specializes in high-technology components and systems in the aerospace, defense, land vehicles and energy markets. Established since 1933 in the United Kingdom, Senior plc today has approximately 7,500 employees and operates in 14 countries worldwide.



OSG's AERO-EXTL 3-flute finishing carbide end mill is able to generate superb surface finish in aluminum applications even under high feed condition.



1. Employing 560 staff, Senior Aerospace is located in the city of Sriracha, Chonburi, Thailand, with an estimate production floor space of 22,000-square-meter. Photo courtesy of Senior Aerospace.
2. From left, Senior Aerospace’s manufacturing engineers Narinchot Wiwatchaiyachan and Thanawan Desunthia are in charge of the company’s engines and aircraft-seat structure production.
3. From right, OSG’s sales supervisor Suwimon Khamtorn explains new tooling solutions to Senior Aerospace’s manufacturing engineer Narinchot Wiwatchaiyachan.

Recently, Senior Aerospace was looking to enhance tool performance on its engines and aircraft-seat structure production made of aluminum and hard metal. Senior Aerospace’s objective was to improve cycle time and quality. Due to confidentiality reasons, details such as the production volume, part tolerances and specific machining conditions cannot be disclosed. However, the company has been producing these parts for approximately five years using a Mazak machining center. Side milling including roughing and finishing are required to manufacture these parts. Senior Aerospace was originally using cutting tools from two European manufacturers as well as domestic cutting tool providers in Thailand. OSG was given with an opportunity to evaluate the applications and proposed the AERO-EXTL 3-flute extra-long type carbide end mill to Senior Aerospace.

The AERO-EXTL 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 aircraft components. The AERO-EXTL 3-flute finishing carbide end mill features sharp cutting edge to enable excellent cutting, and an optimal flute geometry to facilitate trouble-free chip evacuation. Furthermore, its DLC coating provides a shiny surface with optimized end mill

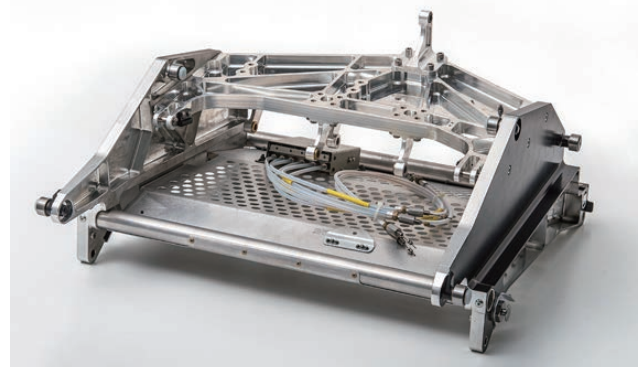
A photograph of a completed seat-structure. In general, all of Senior Aerospace’s structure works consists of machining intricate shapes from billet aluminum, surface enhancements of raw materials followed by detailed assembly work. Photo courtesy of Senior Aerospace.

performance particularly in aluminum alloys that require welding resistance and lubricity. Its thin coating layer enables a sharp cutting edge, which contributes to smooth and superb surface finish, even in high feed milling.

Although details of the surface roughness cannot be disclosed, Senior Aerospace is extremely pleased with OSG’s AERO-EXTL and mentioned that no other cutting tool was able to provide them with such great result.



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# Complete Chip Control

OIL-S-XPF forming tap enables stable and chip-free tapping in cylinder piston production

**Mark Coryea**  
OSG USA

OSG's XPF forming tap is able to reduce 10 seconds of machining time per workpiece. The cost per unit dropped from \$0.017 to \$0.006 per part, enabling an estimate annual cost savings of \$37,775.

Saving a few seconds may not sound like much at first, but when you are making over 1 million parts per year, every second counts. Consider what saving 10 seconds per part, reducing scrap rate, shortening final assembly time, all while enjoying three times the tool life could do! This is a reality for Flickinger Industries, a contract machining and manufacturing company in Fort Wayne, Indiana, United States.

Flickinger Industries started in Fort Wayne in 1960 primarily servicing the pump and pneumatic / hydraulic cylinder industries. Today with 45 full-time employees, Flickinger Industries is still leading these industries while also serving customers in the agricultural, automotive and medical fields. Over the years, Flickinger Industries' personnel have become adept at rapid changeover. Machining small batch parts has become one of the company's specialties. By utilizing its state-of-the-art

75,000-square-foot facility along with 23 modern CNC lathes and vertical CAT40 machining centers, Flickinger Industries can handle runs from two to 200,000 pieces with ease.

One of Flickinger Industries' larger customers is a well-known world leader in motion and control technologies. The company has been producing aluminum air cylinder pistons in sizes ranging from 1/2" diameter up to 3" diameter and in lot sizes of typically 2,000 to 5,000 pieces – totaling over 1 million pistons per year. The parts are made from T356 aluminum bar stock and each piston has a threaded center hole. The thread finish needs to be free of smearing and burrs that would hamper assembly. Threading the center hole is challenging because the tool is stationary, while the part is rotating. Flickinger Industries was using a competitor cut tap for many years and became accustomed to periodic catastrophic tap breakage



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inherent with long chipping materials like aluminum. In early 2019, a breakage damaged a lathe turret, causing excessive downtime and costly repairs. It was at this time that I visited Flickinger Industries with a distributor, and discussed the issues caused by the lack of chip control. The tool being used at that time was a competitor 5/16"-24 cut tap in bright finish, spiral fluted with modified bottoming chamfer in 2B class of fit. I showed Flickinger Industries OSG's XPF forming tap series and explained how chip control issues would be a thing of the past by utilizing form taps, something the company knew of, but had never thought would remedy to their issue.

Because a forming tap forms screw threads through plastic deformation of work material, no cutting chips are created. With no cutting chips, chip evacuation troubles can be completely avoided. The XPF is OSG's high performance forming tap that produces no chips and is optimized for machining materials up to 35 HRC. It is uniquely engineered with a low-torque design to facilitate longer life at faster speeds. Its V coating also enables extreme wear resistance. The XPF is available with or without coolant holes, and in standard or long shank style.

After a detailed evaluation of the application, I offered to bring a test tool of the OIL-S-XPF tap under OSG USA's guaranteed trial order. The XPF tap has been one of my strongest weapons against the competition. It has claimed

victory in several materials, competing against every well-known manufacturer in the market. For the machining, Flickinger Industries uses a Mori Seiki SL lathe and WSO emulsion coolant at 12 percent. As anticipated, the trial was a major success. Within the first 10 minutes, the operator commented "That's twice as fast as the old tap!"

The competitor cut tap required approximately 20 seconds per part, whereas the XPF forming tap only needs 10 seconds. During periodic spot checks for pitch diameter and thread finish, all were well within optimal specifications. Normal tool life for the previous competitor tap was 3,000 pieces, which the XPF achieved and surpassed with ease. Flickinger Industries' Plant Manager Tom Schroeder said he was "...sold on the XPF since we are saving so much time per part."

The first test tap completed over 14,000 pieces before some slight thread galling was observed, but the tool could still continue to be used. The second test ran just as well as the first, and the next question from Flickinger Industries was "Does OSG make the XPF in 1/2"-20 and 7/16"-20 thread sizes?" And the answer is "Yes, we do!"

Tool life for the OIL-S-XPF is now set at 10,000 pieces as the standard, even though testing has proven that they could carry on further. Nevertheless, the cost per unit dropped from \$0.017 to \$0.006 per part, enabling an estimate annual cost savings of \$37,775. I'm proud to say that today, every aluminum piston made at Flickinger Industries uses taps from OSG's XPF series. By employing OSG's XPF forming taps, Flickinger Industries is able to resolve chip control issues, reduce breakage, and avoid future machine damage to maximize performance.

The XPF is a superior thread-forming tap that stably makes threads without creating cutting chips. Because a forming tap forms screw threads through plastic deformation of work material, no cutting chips are created. With no cutting chips, chip evacuation troubles can be completely avoided. The XPF is available with or without coolant holes, and in standard or long shank style.





## AE-TS-N and AE-TL-N

Carbide End Mills for Non-ferrous Materials

The AE-TS-N and AE-TL-N DLC coated carbide end mills are extremely effective for non-ferrous materials such as aluminum alloys that require welding resistance and lubricity. With excellent cutting sharpness, they are able to suppress burrs to achieve superb surface finish. The AE-TS-N and AE-TL-N DLC

feature a large core design for high rigidity to prevent chattering. Their center cutting edge configuration enables the tools to be used for plunging. Furthermore, with the addition of OSG's DLC-SUPER HARD coating, long tool life can be achieved.



## Thread Limit Gauge Long Neck Type

For Inspection of Deep Internal Threads

The long neck type thread limit gauge (LG) is a plug gauge used for inspecting deep internal threads. The long neck configuration enables the inspection of deep parts where measurement is difficult for normal thread limit gauges. OSG offers a wide

variety of high precision measurement tools manufactured with the same advanced technology the company uses for its world-renowned taps.



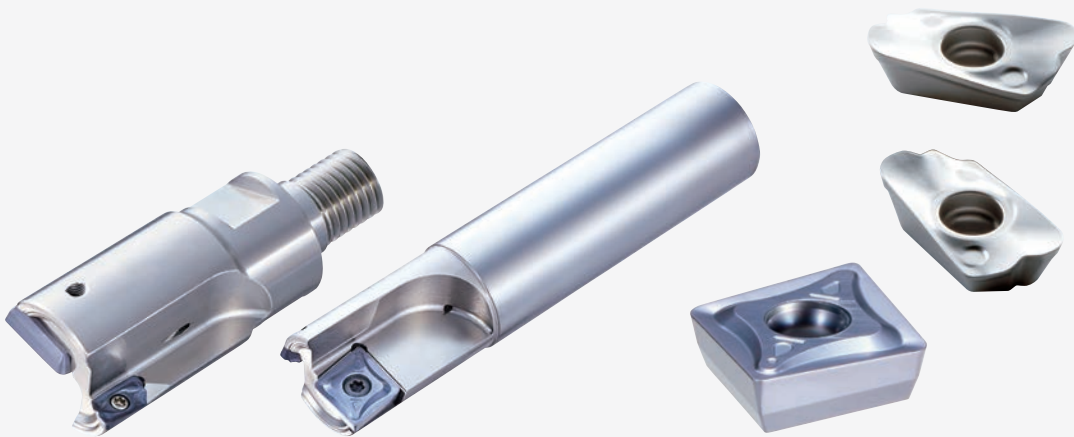


## Phoenix PMD

Multi-function Cutter

The OSG Phoenix PMD multi-function cutter is engineered to accommodate a wide range of applications with a single tool. It can be used for contouring, ramping, plunging, slotting,

side milling, helical drilling, and more. Two types of inserts are used to enable continuous cutting - from plunging to horizontal milling.



## Phoenix PLDS

Centering and Chamfering Cutter

The OSG Phoenix PLDS centering and chamfering cutter supports drilling operations with outstanding durability and versatility. It is designed to perform centering, countersinking and V slotting with a single tool. Economical 3-corner insert of the PLDS offers both chipping resistance and sharpness. The PLDS' optimal body design enables long tool life and excellent machining surface. Furthermore, the cutter body is equipped with a coolant hole to improve chip evacuation and

cooling effect on the cutting edge. Last but not least, the PLDS' negative axial rake angle configuration suppresses burrs on the work surface to guarantee quality. Two types of cutter bodies and high-strength insert grades can be selected according to the work material to maximize performance.





The construction of OSG's new NEO Shinshiro Zero-One Factory and the renovation of the existing adjacent building were completed in September 2020.

# NEO Shinshiro Zero-One Factory: Imagination to Create from 0 to 1

The fusion of traditional craftsmanship and smart factory

OSG Corporation has completed the construction of its new NEO Shinshiro Zero-One Factory and the renovation of the existing adjacent building in September 2020. OSG's overall manufacturing system was reorganized in May 2020, and the NEO Shinshiro Factory is now dedicated as a manufacturing hub for carbide drills, carbide taps, high-speed steel drills and high-speed steel end mills. The newly revamped factory has the capacity to produce 650,000 high-quality solid tools per month. Currently, it is manufacturing approximately 5,400 types of products and 7,700 lots on a monthly basis.

The latest addition to the NEO Shinshiro Factory is named "Zero-One Factory" to emphasize digitalization and innovation through out-of-the-box thinking. OSG strives to nurture a culture in which employees are encouraged to take on new challenges and to break away from existing practices in order to craft new innovative products from scratch.





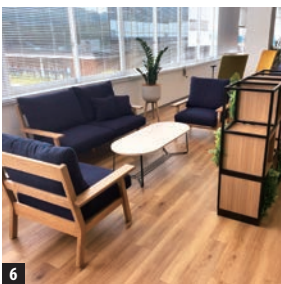
An aerial view of OSG's revamped NEO Shinshiro Factory located in Shinshiro City of Aichi Prefecture. The NEO Shinshiro Factory is a production site for carbide drills, carbide taps, high-speed steel drills and high-speed steel end mills. In addition to standard catalog items, OSG also manufactures customized products that are optimized for individual applications.





## NEO Shinshiro Factory By the Numbers

■ Total Land Area	■ Monthly Production Volume
<b>112,000</b> m <sup>2</sup>	<b>650,000</b> pieces
■ Monthly Production Variety	■ Monthly Production Lot
<b>5,400</b> types	<b>7,700</b> lots
■ Product Types	
	Carbide drills, carbide taps, high-speed steel drills, high-speed steel end mills
■ Number of Employees	
	<b>600</b>



1. Titled "Hanging Earth," the monument installed in front of the NEO Shinshiro Zero-One factory is made by sculptor Kenji Misawa.
2. A projector screen measured at approximately 3 x 5.8 m that is used to provide information regarding the facility.
3. The "Zero-One Square" lobby located within the NEO Shinshiro Zero-One Factory.
4. Trials are taking place to enable ultra-high-variety low-volume production at the NEO Shinshiro Zero-One Factory.
5. Inside the NEO Shinshiro Zero-One Factory.
6. The NEO Shinshiro Factory employs a free-seating open plan office layout to encourage employees to collaborate and to break away from existing practices in order to craft new innovative products from scratch.
7. Zero-One Cafeteria – an employee cafeteria that offers 27 types of lunch menu. The spacious area aims to provide employees with a comfortable space to rest, recharge and gather.
8. OSG has built a production, sales and technical support network spanning 33 countries. The NEO Shinshiro Factory includes world clocks in its office to keep track of the different time zones as frequent communications are made between OSG's overseas network.
9. OSG currently has manufacturing bases in 17 countries. The conference rooms at the NEO Shinshiro Factory are named after the country where OSG has a manufacturing base.

While making the best use of the manufacturing know-how cultivated over the years, OSG has refined its on-site capabilities by implementing improvements that have been identified through digitalization. What the company focuses on at NEO Shinshiro Factory is the thorough visualization of manufacturing. Information such as the operating rate of each machine, schedule, production status and volume are shared, and the collected data is analyzed. By eliminating waste in production and optimally making arrangements according to the situation, lead time can be reduced for both standard and special products. With a revamped

production system that is highly efficient and versatile, the NEO Shinshiro Factory aims to achieve ultra-high-variety low-volume production on a scale unparalleled in the world.

By transforming on-site know-how with digital technology, OSG is able to drive new efficiencies into the core of its operation. With the completion of the NEO Shinshiro Factory, which serves as an initiator of the renewal of the company's global production system, OSG will continue to improve its ability to fulfill the growing on-demand economy and to take manufacturing to a new level.

# OSG Around the World

Employee Interview with

## Hirozumi Kubo



Kubo speaks at the Protolabs Demo Seminar at the OSG Academy in Göppingen, Germany. Kubo often provides demo seminars to clients along with OSG's CAD/CAM team at OSG Germany.

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

Growing up as a third culture kid (TCK), I was raised in a culture and environment different from my parents' (who are Japanese and Mexican) and my own nationality. I have experienced a spectrum of lifestyles and have been exposed to a great volume of cultural influences at a young age. For primary school, I attended a Japanese school in Caracas, Venezuela. For middle and high school, I attended an American international school in Buenos Aires, Argentina. For university, I earned a BA (Hons) in architecture from the University of Manchester in the United Kingdom in 2009. Having graduated from a British University, my initial intention was to stay and work in the UK. However, times were extra challenging in 2009 for non-visa holders to gain any career prospect due to the aftermath of the Lehman financial crisis in 2008. This circumstance led me to relocate and explore a different path in my native country – Japan. Looking back, it was one of the best decisions I have ever made. Life in Japan has opened up my mind, perspective and moreover, matured me as a person. I joined OSG Corporation after two years of experience working as a sales engineer at a trading and distribution company in Tokyo that specialized in transmission parts such as clutch breaks

for industrial machinery. In 2013, I was assigned to OSG UK and is now serving as the company's engineering and marketing manager.

### Tell us about your daily routine.

I wear multiple hats at OSG UK. Normally, I am out of the office two to three days a week for sales activities. For the remainder of the time, I am involved in all sorts of activities pertaining marketing, factory support, liaison with the headquarters, managing staff, etc., serving my role as engineering and marketing manager. Having a deep understanding of various cultural settings and being native to three languages (Japanese, English and Spanish) are unique assets, so I try to thrive in every field of the company.



### Hirozumi Kubo

Location: United Kingdom

Position: Engineering and Marketing Manager

Joined OSG: 2012

Motto: "Do the right thing, the right way, for the right reasons."



1. Kubo plays the guitar at home on a Saturday afternoon. Kubo has been playing the guitar for nearly 25 years. Recently, he also added DJing to his list of hobbies.
2. Kubo enjoys the turquoise blue sea of Cancun, Mexico. Traveling is Kubo's passion, who is constantly seeking for breathtaking sceneries.
3. Kubo doing a headstand at Lao Valley, Maui. Kubo is a passionate yogi and has been practicing yoga for nearly five years.

### What is most challenging about your work?

Like in any other jobs, overcoming frustrations is most challenging. While understanding that nothing is perfect in life, the ideal often clashes with existing practices.

### What is unique about OSG UK?

Despite being a very small organization, OSG UK is able to achieve much more than expected with limited resources. OSG UK is highly efficient, and our team always strives to create the best outcome possible.

The A-Tap series includes the A-SFT spiral taps for blind holes and the A-POT point taps for through holes. As an all-purpose tap series, the A-Tap is compatible with various types of machining equipment – from manual drilling machines to the latest advanced machining centers.

### What is your favorite OSG tool?

My favorite OSG tool is the A-Tap. I feel that the A-Tap truly represents what OSG is best at. It is a product resulted from passion, meticulousness and technical know-how cultivated over more than 80 years. The A-Tap is a winner nine out of 10 times. Not giving me grieves when promoting this product is another reason why I like it.



Kubo enjoys traditional English Sunday roast with his wife in the village of Stock in Essex, England.

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

Sports, music, nature, animals, traveling and art are my passion. I am a passionate yogi, almost five years into my journey of finding internal peace. I also play the guitar for nearly 25 years. Recently, I added DJing and skipping ropes to my list of hobbies. Having traveled and lived in many different locations, I hope to continue to explore the world when opportunity strikes. Constantly seeking for breathtaking sceneries is the most therapeutic activity for me. Life has too much to offer that days off are never enough.



*shaping your dreams*

Helical drilling and threading combo tool for high-hardness steel applications

# AT-2

Carbide Thread Mill with End-Cutting Edge



scan for details

