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THE MAGAZINE

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Award

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The automotive industry in motion

Rosemarie Stahl
Editor
rosemarie.stahl@vogel.de

Currently, a lot is being stirred up in the automotive industry. Climate change, import duties for European cars in the United States and the so-called dieselgate have become part of political discussions and newscasts all around the globe. As a result, new laws come into effect: Recently, the Higher Administrative Court in Germany passed a ruling, giving cities in the country the right to ban vehicles powered by diesel engines. With this ruling, the judges intend to tackle pollution issues in order to meet EU requirements and to protect residents from heavily polluted cities. Concurrently, there are around 15 million diesel-run vehicles in Germany!

In Northern Europe, things are moving much faster. Norway decided in 2016 that all new vehicles sold by 2025 must have zero or low emission, allowing only electric, hydrogen or hybrid cars to be sold. By January 2017, electric vehicles had reached a market share of over 50 percent in Norway, bringing the combustion engine below 50 percent for the first time in its history. According to The Guardian, nearly a third of all new cars sold in Norway are plug-in models. While Tesla-CEO Elon Musk applauded the country's decision ("You guys rock!" read his reaction on Twitter), first problems have become apparent. Norwegian cities are experiencing increasing difficulty supplying enough charging stations for all the electric vehicles.

And, there is a deeper problem involved in the switch to electric vehicles: While actions like those in Norway and Germany are being applauded by environmentalists (and Elon Musk), the changes can drastically affect the automotive industry and, consequently, the suppliers industry. Electric engines may bring in new orders but the old supply chain is at risk: Will there still be orders for all the die-casting companies that produce parts for the good, old combustion engine once politicians and judges decide to abolish it? Our cover story takes a closer look at the production of electric vehicles, at their engines and the consequences for the die-casting industry.

Rosemarie Stahl

COVER STORY

E-Mobility and die-casting

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How will the supplier industry develop once the combustion engine becomes obsolete? Experts give the all-clear: Electric motors continue to rely on castings.

NEWS

SHOW REPORT/ PREVIEWS

TECH FOCUS

ETMM

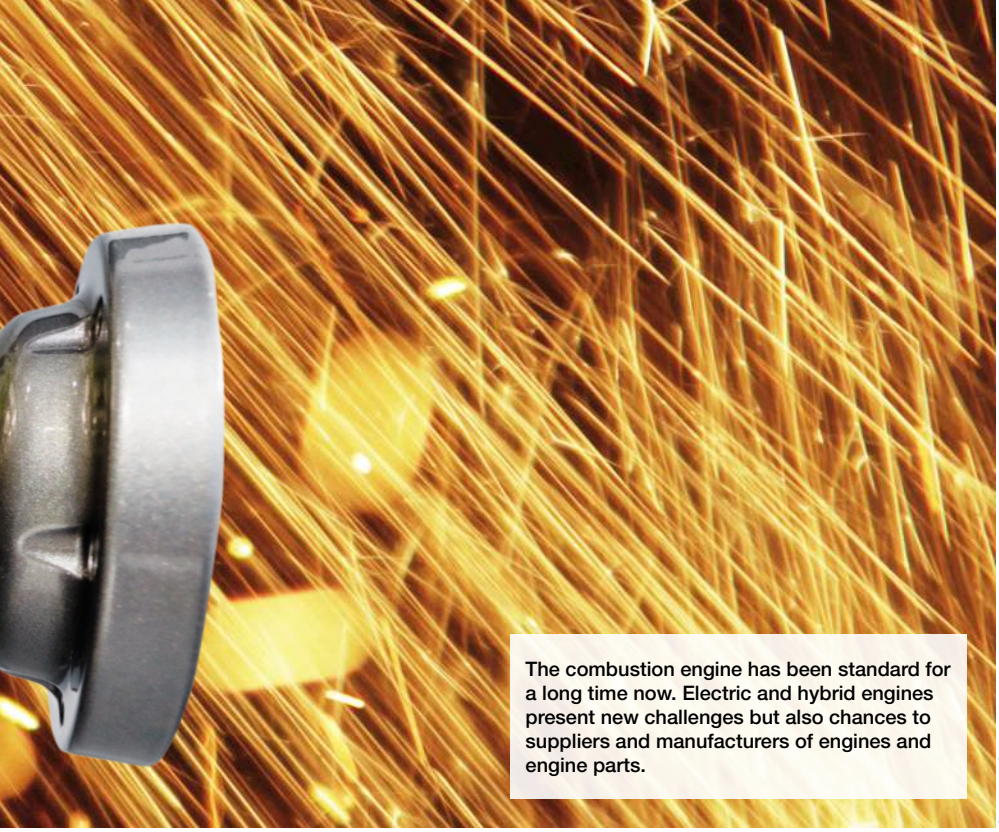
TIP

The hype on additive manufacturing is over. Now it is time for actual real-life applications. You can find great examples of how it is done from page 38 onwards

Rosemarie Stahl
Editor

Source: P.E. Schall

The interest in quality assurance is rising – and so is the interest in Control 2018.



The combustion engine has been standard for a long time now. Electric and hybrid engines present new challenges but also chances to suppliers and manufacturers of engines and engine parts.

Source: Schaeffler

INTERVIEW

CASE STUDIES

PRODUCTS & SERVICES

REGULARS

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Ranking

The month's best-clicked articles on etmm-online.com

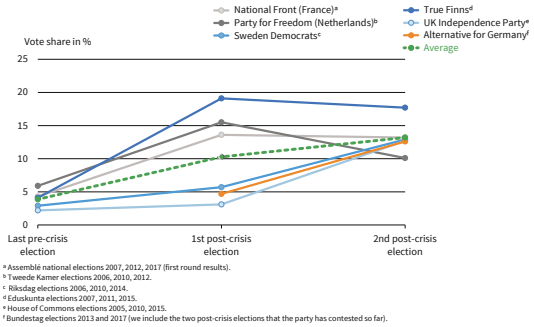
1. **Markets:** These are the most shameless plagiarisms of 2018
2. **Market intelligence:** Five steps to keep up with global competition
3. **Case study:** Investment in EDM machinery and HSC for growth
4. **Event:** Five-day celebration of UK manufacturing in Birmingham
5. **R&D:** Six fields of action for successful automation

QUOTE OF THE MONTH

There can and will not be one comprehensive solution for Industry 4.0.
Dr. Heinz-Jürgen Prokop
Chairman of VDW
(German Machine Tool Builders' Association)

Source: Schulz

Populist vote shares in EU



Right-wing populist vote shares in Europe on national elections since the Lehman collapse on 5 September 2008. (Source: Döring and Manow (2016)_ifo)

TRENDS

+0,4%

Industrial producer prices were up 0.4% in the euro area and EU28 in January 2018 compared to December 2017. Comparing January this year to last year, this rose 1.5% in the euro area and 1.9% in the EU28. (Source: Eurostat)

–1,4%

In 2016, the US had a total value of shipments of US$365 billion. For 2017, the value has been forecasted to be US$360 billion, to mean a decrease of 1.4%.

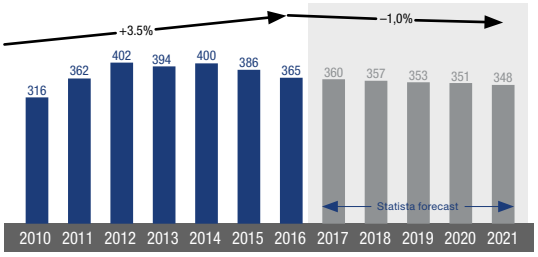
(Source: U.S.Census Bureau,IMF,Statista)

+5,7%

2015 recorded more deaths than live births in the EU28, with 5.22 million deaths, the highest since records began in 1961.Deaths rose by 5.7 %, compared to 2014, showing the growing size of elderly.

(Source: Eurostat)

Shipments in the US



Manufacturers' shipments, inventories and orders, which includes received or receivable net selling values of all products shipped, both primary and secondary. (Source: U.S. Census Bureau, IMF, Statista)

NUMBER GAMES

Based on 300 surveyed trademark professionals involving brands, victims of trademark infringement in 2017 (in %) 74

Trademark declarations worldwide in 2016 (in million) 6.6

Trademark declarations in Europe in 2016 135,000

Trademark declarations in the US Q1-Q3 2017 435,000

Companies that declared more trademark rights in 2016 than 2015 (in %) 43

(Source: Compumark, Auma)

NUMBER OF THE MONTH

20,000 USD

"A bitcoin is worth $4000 - why you probably should not own one," said Forbes in a headline on 15 August 2017. End of December 2017, a Bitcoin was almost worth US$20,000 as interest in cryptocurrencies reached an all-time high. On 7 March 2018 it was traded for about US$10,508.

TICKER

BULGARIA has a population of **7.1 MILLION**, which is 1.4% of the EU population. It has the lowest average age of first-time mothers in the EU (26 years). The country is the EU's third largest producer of aromatic, medicinal and culinary plants. (Source: Eurostat) +++ Multinational e-commerce company **AMAZON**'s net **REVENUE** was almost **US$178 BILLION** in 2017, up from US$135.99 billion in 2016. Most of its revenue is derived in the US and Canada. (Source: Amazon) +++ First observed on 28 February **1909** in the US, **8 MARCH** is International **WOMEN'S DAY**, celebrated in many countries to recognise women for their achievements with no regard for the divisions of nation, ethnic, linguistic, cultural, economic or political. It has gained a new global dimension for women in developed and developing countries and is strengthened by four global UN women's conferences. (Source: United Nations)

In good hands: Third generation running family-owned Mapal

Germany – Dr Jochen Kress is president of the Germany-based Mapal Group as of 1 January 2018, succeeding his father, Dr Dieter Kress, who retired from the executive board late last year. Heading Mapal the last 49 years, Dieter has ended an era that shaped and paved the success of Mapal, which was founded by his father, Dr Goerg Kress, in 1950. Under Dieter's leadership, Mapal grew from a small producer of tap drills into a global group with over 5,000 employees, of which 1,800 are based at the Aalen HQ. Last year, Mapal generated sales of over €600 million.

Jochen, born in 1975, studied mechanical engineering. He received a doctorate in 2007, having gained his MBA not long before. Having acquired extensive international experience in the US and Asia, he has been a member of the Mapal executive board since 2008. "I am taking on my new duties with the greatest possible commitment and will continue to manage the company in my father's spirit," the new president promises.

www.mapal.com

Source: Mapal

Dr Jochen Kress (r) and Dr Dieter Kress. D. Kress: "I know that the company is in good hands."

Innoform fair in Poland

Poland – 130 exhibitors have already confirmed their participation at Innoform, the International Trade Fair for the Tools and Processing Industry. Organisers Bydgoszcz Industrial Cluster and Targi w Krakowie say, as such, the show will very likely be one and a half times bigger than last year's fair.

Source: Targi w Krakowie

The show will include a conference and a brokerage event.

The second edition of Innoform will showcase the latest materials, processes and technologies in the tools and processing sectors from 24-26 April in Bygoszoz, Poland.

The Tool and Processing Conference that will be held on the first two days of the show is a highlight organised by the Bydgoszcz Industrial Cluster in co-operation with show exhibitors. The brokerage event is also part of the fair programme, providing a platform for business partners from Poland and from abroad to come together. A bulletin will be published to provide visitors with an extensive guide on premieres, news and exhibitor offerings at the show.

innoform.pl

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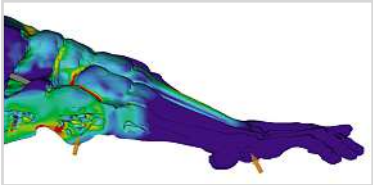
NEWS IN BRIEF

Polygonica expansion



Source: Machineworks

Machineworks and Ansys have signed an agreement to expand the use of Polygonica polygon modelling software throughout Ansys. Polygonica is used in Ansys's Discovery Live software, whose new tool enables fast computation of CAE analysis results using local GPU power. Discovery Live shortens the feedback loop between design and analysis by showing relevant results immediately during the conceptual design process.

machineworks.com

AMB Iran steady

Interest in AMB Iran, edition three, is as steady as ever. With a large number of international exhibitors attending for the third time, Sandvik Coromant will make its debut and Valerio R. Vertua, Sandvik's Sales Manager Middle East, says: "The objective of our participation in AMB Iran is to strengthen our customer relationships and build our brand for future business opportunities."

Source: Messe Stuttgart

messe-stuttgart.de

Injection Experience 2018 event

Source: Nortec

Soltau-based Nortec Maschinentechnik in Germany is hosting an in-house event titled Injection Experience 2018 on 22 March. Among the highlights are 12 expert technical presentations, live demonstrations on its machines and an exhibition.

nortec.biz

Developer of Mastercam software is 35

USA – CNC Software, developer of Mastercam CAD/CAM software, is celebrating its 35th anniversary this year. The company was founded by brothers Mark, Jack and Brian Summers, whose new concept for programming CNC machine tools was introduced back in 1983. They developed a PC-based CAD/CAM software package, which laid the foundation for what would become Mastercam. CNC Software notes that its Mastercam software had closed in on almost a quarter million installations by the end of 2017. Chairman Mark explains: " I was a machinist, while my brother was a mathematician. We combined our experience to put what was out of reach for most shops — NC programming software — onto their desktops."

Source: CNC Software_© 2015

(L to R): Brian Summers (vice-president), Meghan West and Mark Summers.

CEO Meghan West, Mark's daughter, says: "Mastercam users help drive our innovation. One of the biggest reasons for our success is our global dealer network."

mastercam.com

Barometer reveals SMEs must improve productivity in the manufacturing sector

UK – In the latest National Manufacturing Barometer survey on the business climate among small to medium-sized manufacturers (SMEs) in the UK, findings note the highest figure in sales in nearly three years. The quarterly survey discusses performance, focussing on productivity and the extent to which it is engrained in the manufacturing business culture.

Conducted by SWMAS (part of the Exelin Group) in partnership with Economic Growth Solutions, the Manufacturing Barometer surveyed 320 SMEs.

The report notes that these manufacturers say they must improve productivity by unlocking "their own hidden potential" for sales and profits growth to meet expectations. Some 72% anticipate an increase in sales in the next six months, which is the highest figure recorded in almost three years. Another indication of confidence in the sector is reflected by 59% who note that they are expecting increased profits over the next six months.

Source: Cucumber PR

Some 72% of respondents anticipate an increase in sales in the next six months.

On the other hand, only 45% of the manufacturers actually experienced increased profits in the second half of 2017. Thus, the gap between anticipated sales growth and actual recent improvements in profits continues to raise questions about productivity, especially the ability of manufacturers to meet their own growth targets.

On a more positive note, 56% of the manufacturers indicate that they aim to deliver against their growth targets by investing in machinery and premises, which actually is an increase of 13% over the last report.

Moreover, 48% plan to recruit new staff, which is 2% higher than the same time last year. This suggests that improving productivity through the existing workforce and facilities remains the key focus, so the report states.

The survey also explored the extent to which manufacturers have integrated productivity into their business and workplace culture. About 70% are confident that productivity is engrained at a strategic level but almost half indicated they would like to achieve better, and sustainable, productivity improvements, pointing to the need to improve engagement with staff to deliver and sustain change.

Simon Howes, CEO of Exelin Group, said: "Confidence levels are riding high in the manufacturing sector despite market uncertainties, demonstrating the strength and resilience of our SME manufacturers."

swmas.co.uk

PRODUCTFOCUS

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Booth W4289

plast 2018
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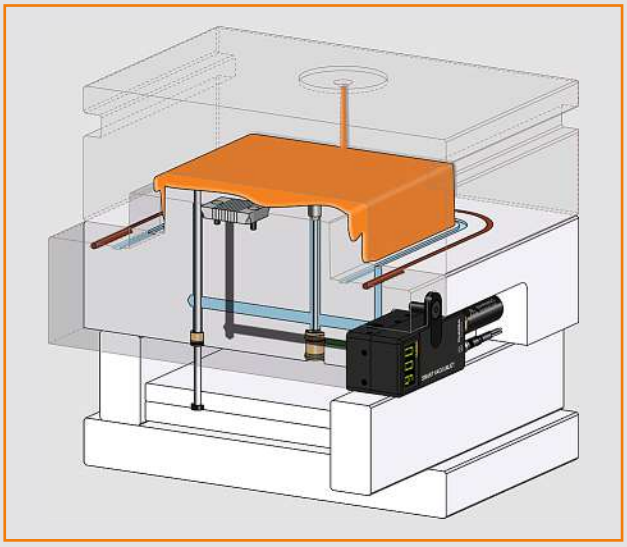

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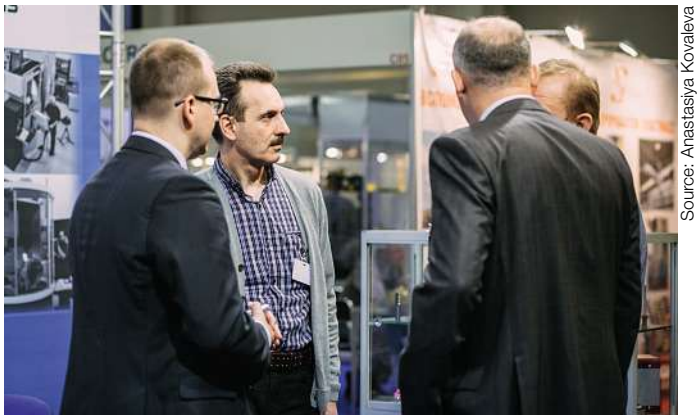


Source: Anastasiya Kovaleva

The organisers of Rosmould want the trade show to bridge the gap between industrial designers, product developers, manufacturers, suppliers and end-users.

Russia – The Russian trade show Rosmould will be held in Moscow from 15 to 17 May 2018. The focus of the show is on moulds, dies, stamps, and equipment for manufacturing. The show is divided into four thematic areas: Moulds, dies and stamps; additive technologies; raw materials; and machinery and tooling.

According to Messe Frankfurt, Rosmould is the only specialised show for moulding in Russia and Eastern Europe. The plastics processing industry will be particularly well represented. Key exhibitors include Milacron, DME, Hasco and Oerlikon. The intention of the organiser of this year's trade show is to present the full production chain, from design and prototyping, materials and tooling to machinery and the finished product. Rosmould will also feature several national pavilions. Germany, India, Spain, Turkey and China will all be present with their own delegation.

One of the main focuses will be on additive manufacturing. The organisers at Messe Frankfurt see Rosmould as a Russian equivalent of the German Formnext exhibition. A number of companies will exhibit their products around additive technologies and 3D printing, including Raise3D, Wanhao, Flash Forge, 3DSystems, 3DVision and many more.

Moreover, Rosmould also features the international business forum "Additive Manufacturing and 3D Printing in Industry".

Russia is among the ten countries most attractive for investment, the World Economic Forum in Davos announced on 23 January based on a survey of consulting company Pricewaterhouse Coopers. Some 57% of the managing directors assure of economic growth in 2018 in spite of sanctions and the embargo.

In the plastics moulding industry, volumes have been constantly rising (excluding 2009 and 2014). At the same time, the volume of foreign products dominates. The rising demand for moulds is due to the development of production of plastics items in Russia. As a result, the sector witnessed growth of 7% in 2017 with a value of RUB 22 billion. In 2018, an increase of 15% and exceedance of USD 466 million is expected. The positive forecast is based on permanently positive dynamics of deliveries of injection moulding machines to Russia since 2001: 1,246 machines in 2015, 1,339 machines in 2016 and 1,415 machines in 2017.

rosmould.ru

Horn opens subsidiary in Moscow for the growing Russian market

Russia –Tübingen-based tool specialist Paul Horn now has a subsidiary in Moscow, Russia. Horn Rus LLC opened at the start of 2018 and has its own Russian team. Horn Rus will be the centre of Horn's market activities for the Russian Federation and will focus on current and well-known customers from the automotive, energy and aerospace industries, and their suppliers, offering the whole range of Horn's products and services.

Covering an area of 300 m², the Moscow office houses the sales and administration departments, the storage area and the company's facilities for providing customer training. Horn says that the same short delivery times as those in Germany will apply to orders of special tools in Russia. Through its systematic approach, Horn notes that it will be able to replicate the company's competitive advantage together with quality and precision in Russia, which it says will be a key criterion for success in the Russian market.

Managing Director Alexander Dick notes: "Russia is a growing market. Quality, ever-increasing efficiency, speed and repeatability are core requirements. In 2018, the Metalloobrabotka and Neftegaz exhibitions will offer the ideal platform for presenting our solutions and capabilities."

According to a report by the Russian VDMA liaison office on current markets in Russia, in the first nine months of 2017, German machine-building industry exports to Russia amounted to €4 billion, registering a growth of about 23%. Growth in agricultural technology continues to reign as Number 1. In building and construction, the upturn is mainly attributed to road construction projects, with the building sector remaining at the previous year's level – a possible explanation being the construction industry experiencing a temporary boom in infrastructure because of the 2018 FIFA World Cup.

Source: Paul Horn

Horn Rus' team, l-r: Anastasia Dododnova (Operations Manager), Alexander Dick (Managing Director) and Pavel Glazyrin (Sales Manager).

Machine tools are seeing a small upturn, but the decline in sales over the previous years means there is more catching up than the mechanical engineering sector as a whole. Sanctions also play a big part here. For cutting tools, the negative sales trend that started in 2013 has been reversed. Overall, almost all of the ten strongest export sectors in Russia have been growing, suggesting that the upturn is not because of a few large projects, but is indicative of a general trend, the report notes.

horn.de

Source: ©Jakub Jirsák – stock.adobe.com

An observation by VDMA: By far the greatest proportion of product and brand piracy cases originates outside the EU.

European Commission vs. product piracy

Regulations – The fight against product piracy is one of the most pressing problems affecting the mechanical engineering industry. The industry therefore welcomes the latest lineup of measures by the European Commission, which calls for strict consistency in the protection of intellectual property rights across all member states. Without a doubt, it is important and crucial for the European Commission to take essential measures against product piracy.

VDMA, the German Mechanical Engineering Industry Association, has made the observation that by far the greatest proportion of product and brand piracy cases originates outside the European Union – and Europe definitely must exercise greater pressure on its trading partners in this matter.

"The fact that the Commission is turning its attention to the problem of product piracy right now is a positive sign," says Holger Kunze, head of the VDMA European Office. Kunze went on to say that: "Digitalisation creates new challenges for mechanical engineers in protecting their commercial secrets. It is important for Europe to present a united front in dealing with this problem, and that the rules on the protection of intellectual property are applied in a way that is predictable throughout all EU member states. But the European Union must understand that many countries engaged in plagiarism are outside Europe. Another task for the European Union is to stem the tide of copyright violations through both co-operation and political pressure on non-EU countries – in Asia, for example."

> *"The Commission turning its attention to the problem of product piracy is a positive sign."*
>
> *Holger Kunze, Head of VDMA European Office*

The German mechanical engineering industry suffers massive losses every year as a result of product piracy – the damage was estimated at € 7.3 billion in 2015 alone.

According to a VDMA study in 2016, 70% of companies are affected by product or brand piracy. Furthermore, 83% of the companies that suffered losses referred to China as the source of the pirated goods.

The European Commission itself assumes that five percent of all goods imported into the European Union are counterfeit or pirated.

Europol says that although the majority of counterfeit goods come from China, some counterfeiters, however, manufacture directly within the borders of the European Union using fake labels and packaging imported from outside the European Union.

vdma.org

The "winner" of this year's Plagiarius award is a plagiarism of the kitchen cutting device "Nicer Dicer Plus" by Genius (left). The counterfeiter Pingyang County Leyi Gift copies numerous products of Genius, including the trademark "Genius" and the product names, and promotes them online, at trade fairs, on street markets and via catalogue. The cutting blades of the forgery are blunt and break easily, the plastic contains harmful substances (right).

Source: Aktion Plagiarius e.V.

These are the most shame-

Each year, the Aktion Plagiarius society awards the most shameless forgeries and imitations of products to raise awareness about how companies deal with the topic of intellectual property. In 2018, ten products were awarded with the negative prize.

The trade of plagiarised and fake products is extremely lucrative. The offenders comprise unimaginative competitors, unscrupulous vendors and, at its most extreme, organised crime. Apart from the Internet and digital communication, gullible bargain-hunters and an insufficient penalisation of the offenders ensure the rampant spread of this problem. As the damages for the brand name producers and the safety risks for consumers are immense, a sensitisation of the consumer world as well as more drastic measures against manufacturers and distributors of counterfeits are crucial. On February 09, 2018, the "Plagiarius" negative award – created by the designer, Prof. Rido Busse – was bestowed at a press conference during the annual "Ambiente" in Frankfurt, one of the largest consumer goods trade fairs.

Aktion Plagiarius e.V. grants this anti-prize to manufacturers and distributors of the most flagrant plagiarisms and counterfeits since 1977. The goal is to denounce the unscrupulous business practices of counterfeiters who pilfer intellectual property and pass it off as their own creative achievement. The society also wants to raise public awareness of this complex problem, which concerns industry, consumers and politicians.

Product and brand piracy

The "Plagiarius" award remains silent about whether a plagiarism is legal or otherwise. Aktion Plagiarius does not, nor wants to, pass judgement, the society announced. Prior to selecting the "anti-prize winners", Aktion Plagiarius notifies each imitator that he has been nominated and provides him with an opportunity to share his point of view. The jury takes this response into consideration during its evaluation. The intention is to place special emphasis on clumsy imitations that deliberately look deceptively similar to the original product and that show absolutely no creative or constructive personal contribution. Due to fear of public disgrace and bad publicity, many of the nominated imitators have withdrawn their remaining stock from the

Source: Aktion Plagiarius e.V.

The second Plagiarius prize was awarded to an inflatable water park. The original is the "Wibit Sports Park XL" by Wibit Sports (left). Sunny Kingdom copied the complete product, meaning the sports park including all details such as life vests, and uses the original "Wibit-hand" design mark (right). Additionally, it adopted concept and music of the original Wibit commercial video.

Source: Aktion Plagiarius e.V.

Plagiarism also affects childrens' toys. This toy racer, oiginally made by Puky (left), won third prize. Design and technology of the plagiarism made by Xingtai Kurbao Toys are a 100% copy of the original product. The cheap materials (shell, wheels, steering wheel) and poor workmanship (surfaces) reflect the inferior quality (right).

less plagiarisms of 2018

market, have signed cease-and-desist letters or revealed their suppliers.

Product and brand piracy is often waved aside as a trivial offence. However, the figures speak for themselves: According to the European Commission, in 2016 alone, European customs officials seized more than 41 million fake and counterfeit products, with an estimated value of € 670 million at EU borders. One country in particular is often mentioned in connection to plagiarism. On the one hand, China is the number-one country of origin of counterfeits. At the same time, more and more Chinese companies are becoming seriously competing firms that successfully operate on global markets. Furthermore, companies from industrial nations are often those responsible for ordering or importing these imitations. To best secure their product know-how and trade secrets against theft, Aktion Plagiarius advises entrepreneurs to focus on a holistic strategy that involves legal, organisational and technical measures.

Globalisation and online shopping

Well-known global e-commerce platforms do not only offer original goods but also large-scale illicit plagiarisms and counterfeits. It is mainly the latter that are being distributed by third-party suppliers who change their identities whenever required and veil themselves in the anonymity of the Internet. Practice has shown that voluntary commitments and promises with public appeal of online platforms to fight product and brand piracy more strongly are insufficient. A legal obligation for more responsibility and commitment of the marketplace operators would be desirable and reasonable, Aktion Plagiarius states.

To develop high-quality products with an attractive design, it takes know-how and experience as well as talent, creativity, courage and entrepreneurial spirit, perseverance and passion. By deliberately buying counterfeits, consumers often think that a fake product procures the same brand experience as the brand name product. By no means is this true. An identical product appearance does not automatically imply the same quality, functionality, precision and safety. Aktion Plagiarius appeals to customers to choose legal products and appreciate these innovations. Especially when buying on the Internet, consumers should have a close look at offers. Premium brand-name products are not available "almost for free". However, in comparison to imitations, they are worth their price.

plagiarius.com

Despite favourable prospects in Korea, companies are complaining

Stéphane Itasse

South Korea's economy is growing steadily at a rate of about three percent per year and European companies consider the country to be an interesting market. Nevertheless, a number of criticisms do exist, as revealed by a recent survey of twelve European Chambers of Commerce.

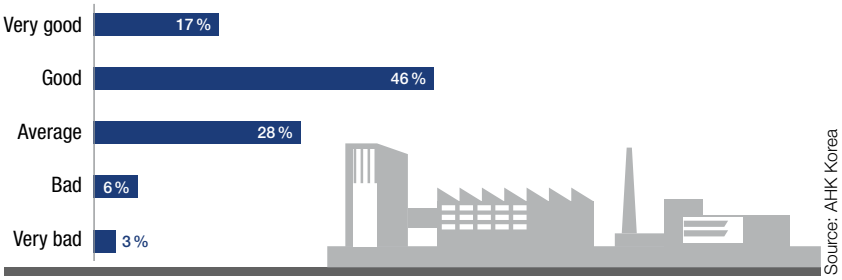
According to the Korean-German Chamber of Commerce and Industry (AHK Korea) in Seoul, the South Korean economy is expected to grow by about three percent in 2018. However, the Director of Germany Trade & Invest, Alexander Hirschle, stated at a chamber meeting that this year will be a good indicator as to whether the country is capable of healthy and sustainable growth, particularly since individual sectors have boosted the economy nicely in recent years, namely the construction industry in 2016 and the semiconductor industry in 2017.

Even without a boost like this, South Korea's economy does not need a special driving force this year. Hirschle is sure that the growth in South Korea will normalise itself in the coming phase. However, he is assuming that the semiconductor boom will continue, albeit not quite as dynamically. As a reason he states the continuing high demand from the Internet of Things, autonomous driving technology and smart factories. However, the current favourable economic situation in South Korea is not creating a favourable mood among European companies based in the country. AHK Korea, the Korean-German Chamber of Commerce and Industry, comments on a survey conducted on twelve European chambers of commerce: Various companies — about a third of which are German companies — have confirmed their optimistic business outlook for the Korean market. At the same time, they called for reforms for creating a clear and fair business environment.

South Korea's economy is seeing steady growth. However, the European companies in the country are not yet satisfied.

Source: Public Domain

How do you rate the business situation of your company in Korea?



According to the survey, the country remains one of the three largest sales markets in Asia. Some 77 percent of the German companies that participated in the survey have already been in the Korean market for over ten years. The investment intentions for 2018 also remain positive. One example of this is the fact that 46 percent of the German companies surveyed said they wanted to expand their business in Korea. The annual revenue generated in the country (the surveyed companies queried 2016 results) was over 50 million euros for 54 percent of the German companies surveyed. A three percent portion of the companies surveyed generated revenues of more than one billion euros.

Looking at the next two years, with 69 percent, German companies have predominantly optimistic expectations for a growth rate in their industries, whereby the development of profitability is assessed very differently. In contrast, the development of labour costs was seen as a definite challenge for the next two years as 57 percent o the survey feedback indicated pessimism for the coming period. Nor do companies anticipate to see any significant improvement in labour productivity from which they could possibly benefit.

Challenging business environment

The German companies operating in Korea also perceive the business environment as a challenging environment. Non-tariff barriers, ambiguous regulations, arbitrary interpretations, and also the availability of a qualified work force are among the most frequently mentioned difficulties in the survey. Accordingly, rule of law (97 percent), fair competition (89 percent) and openness on the Korean market to foreigners (89 percent) were seen as the most important factors influencing continued economic development of the country.

"The survey confirms that Korea is a very important and strong economic partner for German companies. This is reflected in the investment figures as well. In 2017, Germany was Korea's largest European investor," says Barbara Zollmann, Managing Director of AHK Korea. "Unfortunately, the survey also substantiates the fact that the business environment for German companies in Korea has deteriorated, despite the positive figures from recent years. We therefore appeal to the new Korean government to address the areas of action mentioned by the German investors to ensure the creation of a favourable business environment."

korea.ahk.de

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While South Korea is an interesting market for European companies, some very big brands have their headquarters in Seoul, including Samsung Electronics, Hyundai Motor, LG Electronics and Kia Motors.

Digitisation expected to transform Shenyang into a global force

Stéphane Itasse

Even though the products manufactured by Shenyang Machine Tool are relatively simple, the competition from Germany and Japan has a strong advantage. Since technical innovations for productivity leaps do not appear to be in sight, the Chinese manufacturer is focusing on digitisation.

Shenyang Machine Tool is setting its sights on easy-to-use machine tools for untapped markets.

Source: Shenyang Machine Tool Group

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Shenyang is the name of a city in the Chinese Liaoning Province and is located in Northeast China. It is the biggest industrial city in that region with a population of over 4.5 million. Its main industries are machine building and power generation.

Shenyang Machine Tool, one of the world's largest machine tool manufacturers, has experienced drastic changes in recent years, as explained at the autumn conference in Karlsruhe by Dr. Ömer Sahin Ganiyusufoglu, Advisor to the Chairman. The company still produced 96,000 machine tools in 2011, but only 31,000 of these were produced using CNC. In 2016, only an additional 30,000 CNC-manufactured machines left the factory floor. The manufacturer of cutting machine tools employes a total of 20,200 workers, 14,000 at the site in Shenyang, generating revenues of approximately 1.8 billion euros.

According to Ganiyusufoglu, all industries in China are being supplied with milling, turning and boring machines. However, on the home market of Shenyang, imported machine tools still account for a large portion of the machines supplied. The government in Beijing is ambitious and hopes that the industry will be able to catch up. However, this is not so easy for Shenyang according to the consultant who foresaw the stagnation in technical innovations, innovations that otherwise could have brought significant gains.

That's why Shenyang Machine Tool is taking a different approach. “Why can't a machine tool be as easy to use as an i-Phone?” Board Chairman Guan Xiyou asked himself this when Apple launched its product in 2007, according to Ganiyusufoglu. And he set the course: “This is the prototype for the machine tool of the future.” Thus, the Chinese company would also have a chance.

“The future lies in digitisation and it starts with control technology,” Ganiyusufoglu explained at the conference. The Chinese machine tool manufacturer has developed its own control system platform, referred to as the I5. The system is intended to serve as a platform for the digital world of the future. The control system was released in 2014 and by 2016 Shenyang had already sold 20,000 machines equipped with this control. The 2017 sales target was set for an additional 20,000 machine tools.

As easy to use as a smartphone

The Chinese are also currently looking for another way to access world markets. They are setting their sights on areas with little or no industrialisation. “80% of global machine tool exports go to countries inhabited by only 20% of the world's population,” the consultant clarified. He explained: “Over the long-term, the Chinese want to conquer markets nobody else sees.” In order to tap these markets, Shenyang is not preparing itself for a technical race, but for strategic innovation. This may come in the form of new product types and features, but also as new business models and “win-win co-operations”. However, the Chinese machine tool manufacturer is aware of the fact that it is not alone in its quest. “We would not be able to tap into these target countries by ourselves; co-operation is key,” said Ganiyusufoglu.

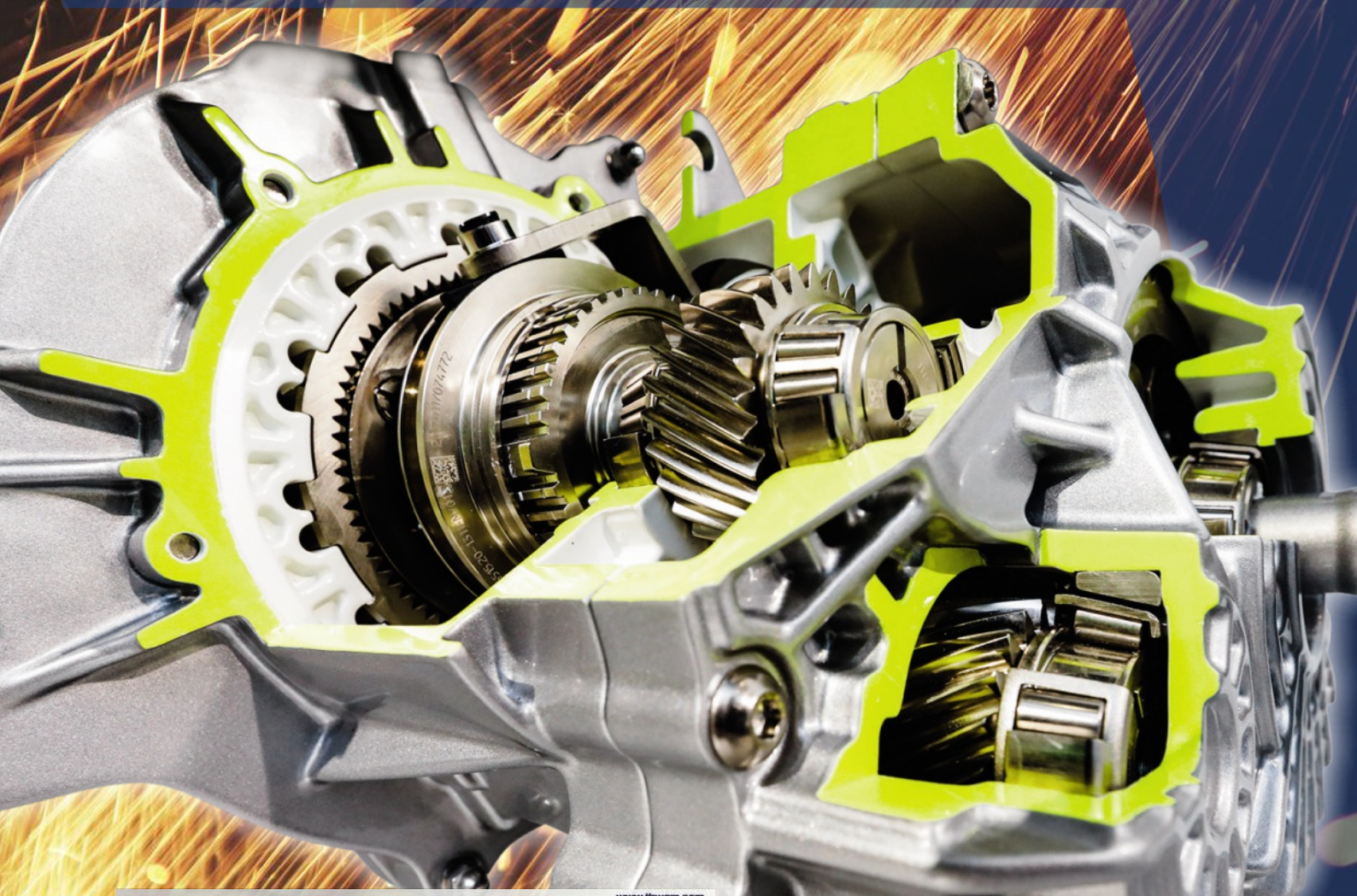
To help it maintain its perceptiveness for the world market, Shenyang has also launched an internal strategy: Go Smart. “Smart” is an acronym that stands for simple, maintenance-friendly, affordable, reliable and timely to market and profit. “If we are planning on targeting the markets of the future, our machines must meet these requirements,” the consultant states. “We need to come down from the world of high-tech and build machines for everyone using the i-Phone principle.”

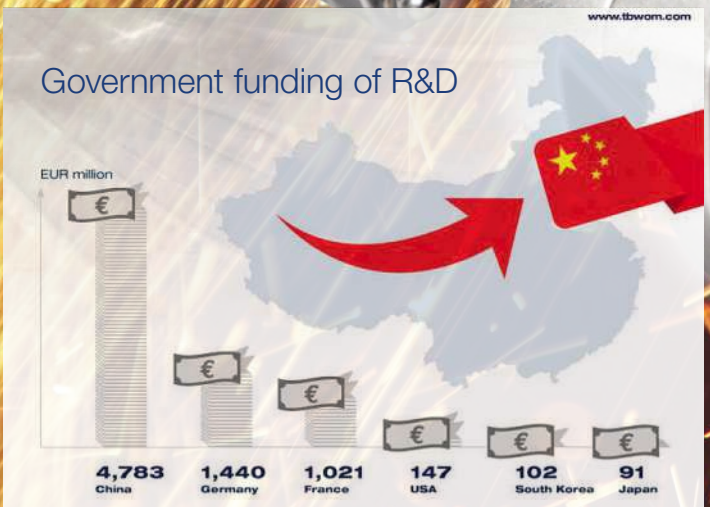
smtcl.com

E-mobility

How will the supplier industry develop once the combustion engine becomes obsolete? Experts give the all-clear: Electric motors continue to rely on castings.

Gerd Krause





China holds a huge lead in a worldwide comparison. The Chinese government spends the most on funding of electromobility R&D

Source: ©Kybele - stock.adobe.com

At the moment, there are several possible concepts regarding what drive systems will look like in future. Electric engine? Hybrid drive? Fuel cell? Or the good old combustion engine after all — powered by CO_2-neutral e-fuel, that is, with synthetic fuel produced with the help of renewable energy?

Electromobility is broadly considered to be the key to CO_2-neutral private transport in the long term. How long the combustion engine will continue to be the transitional solution depends not only on political decision-makers but also and above all on progress in the development of battery technology and on the widespread availability of charging infrastructure. After all, users require a longer range at economic cost.

In the meantime, experts think that combustion engines will be continuing to play a role for a long time in the transition period and afterwards as well. FEV (Foschungsgesellschaft für Energietechnik und Verbrennungsmotoren), an independent development service provider in the automotive field, has conducted a study on e-mobility. According to the results, less than one percent of all vehicles sold globally in 2016 were primarily driven by electricity. The experts expect that the majority of vehicles sold in Europe in 2030 will still have a combustion engine (75 to 85 percent), although most of them (about 90 percent) will be in hybridised powertrains. The global situation does not look any different. Even if there is a strong increase in electrification of the powertrain, most drives will still have combustion engines in 2030 as well. The experts at FEV emphasise that these combustion engines will need to operate in very varied drive topologies.

Professor Hermann Rottengruber from Magdeburg University is certain: "The switch to purely electrical vehicles will be taking place via hybrid drive systems." He expects a hybrid powertrain with a combustion engine and an electric motor to remain the optimum solution for many different applications and types of vehicles in the long term as well. The motor expert issues a warning, however: "It is nevertheless time to think about how the market for vehicle drive components will be transformed in view of these changes".

Nevertheless, traditional production processes will not be obsolete: Electromobility will not have a viable future without foundries and steel mills. Major components of the engine, the powertrain and the body of electric vehicles are made from steel or aluminium — either moulded or cast.

Electrification of the powertrain

The experience of driving an electric vehicle is powered by a great variety of systems. The reduction in fuel consumption and CO_2 emissions, which are the aims of electrification, begin with the comparatively simple automatic start-stop systems based on 12 V electrics and end with a completely battery electric vehicle (BEV) with high-voltage technology.

All of these systems have consequences for the design: Electrification leads to a fundamental change in the powertrain. Consequently, entire supply chains for engine manufacturing need to be rethought completely. While combustion engine drives are dominated by manual and automatic transmissions with up to ten gears, an exclusively electric vehicle manages without complex engines and transmissions. While the engine and transmission of a conventional car consist of about 1,400 parts, an electric motor plus transmission have no more than about 200.

Source: Schaeffler

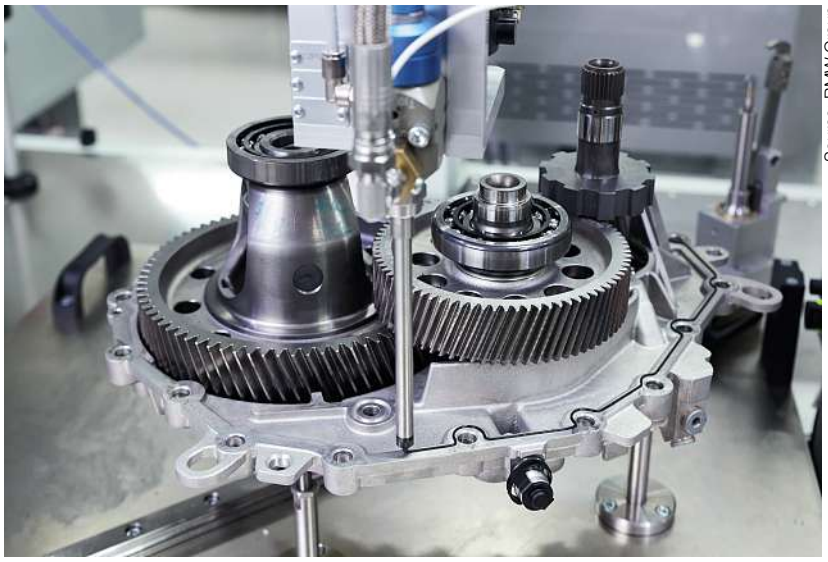
Aluminium die-casting on the outside, a lot of steel on the inside: This electronic axle drive with two-speed transmission was presented at IAA 2017 by Schaeffler.

The consequence for foundries of the elimination of combustion engines: no cylinder blocks, no cylinder heads, no pistons, no exhaust and other manifolds. Steel manufacturers lose forged crankshafts, camshafts and complicated transmissions. Yet steel mills and foundries have every reason to be relaxed about such developments. Classic combustion engines and new electric motors will need to be manufactured alongside each other for many more years anyway, which will initially even lead to an increase in components. Moreover, electric vehicles include forged and moulded steel parts and castings as well, so that new opportunities will be created. No battery vehicle moves without highly complex cast and steel components. The battery, electric motor, powertrain and power electronics are the crucial components in electromobility.

Lightweight structures are the key

The Tesla electric limousine with the longest range (600 kilometres) incorporates a battery that weighs 750 kilograms. Average electric cars have to move batteries weighing between 200 and 300 kilograms. In order for electromobility to reach the mass market in spite of the weight and expense of the batteries, economic lightweight structures are becoming a key technology in automotive manufacturing. Initially, the electric car pioneer Tesla started with a blend of aluminium, titanium and steel, while BMW chose expensive lightweight carbon fibre-reinforced plastic for its electric car i3. Now, a change is apparent thanks to new lightweight steel materials. The new Tesla Model 3 is based mainly on steel and BMW has in the meantime discontinued its joint venture with the carbon manufacturer SGL Carbon.

The need for lightweight structures and the weight reduction associated with elec-



Source: BMW Group

Casting and steel: prototyping of the prospective fifth generation of electric engines by BMW.

tromobility are an encouragement to foundries. Lightweight cast components made from non-ferrous metal – aluminium and, to a lesser extent, magnesium – are becoming increasingly important as rivals to steel and aluminium sheet and profile components for chassis and body parts. Struts and longitudinal bars made from die-cast aluminium are examples hereof.

Nemak, a leading lightweight metal foundry that supplies automotive manufacturers, thinks that structural components made from die-cast aluminium represent in general a very interesting combination of weight reduction potential, costs and component properties. In the meantime, structural casting is finding its way into higher-volume, mid-sized vehicle platforms that need to be manufactured in identical quality in several different markets all over the world at the same time, Nemak points out.

Economic lightweight design is dominated by a combination of high-strength steel and selected aluminium components. This is also true for lightweight components in electric cars. The car supplier Kirchhoff, for example, presented a concept for a crash-resistant and economic battery housing with an integrated cooling function made from a hybrid steel-aluminium structure at the International Motor Show (IAA) in 2017.

According to Professor Christoph Wagener, Vice President Research & Product Development Kirchhoff Automotive, the objective was to produce a battery housing that is as light as possible while still being inexpensive at the same time. He explained that, for corrosion protection reasons, a steel underbody must have a wall thickness of at least 1.5 millimetres, which makes it comparatively heavy. The lightweight structure produced by Kirchhoff with a framework of aluminium profiles satisfies all the requirements, such as passive safety, flat design, thermal management, electromagnetic compatibility, sealing and corrosion protection. Thyssenkrupp Steel also presented its concept for a battery housing at IAA. The module developed from high-strength steel is said to weigh no more than a comparable aluminium version, but costs only approximately half as much.

In the cost-sensitive market of large quantity sales, high-strength steel is the favoured solution. Philippe Aubron, Chief Marketing Officer at the Arcelor Mittal Automotive Europe Corporate Division, says: "Electric cars can be built 50 to 60 kilograms lighter with steel." The portfolio supplied by the steel manufacturer includes not only flat steel but also long products for exclusively electric cars. According to the company, the demands made on the components are similar, though the transmissions of electric cars are less complex than classic powertrains. The powertrain of a BEV apparently includes, for example, drive shafts and transmission components that are manufactured from special bars and rolled wire. Competitors like Saarstahl and the Georgsmarienhütte steel group are also carrying out similar development work in the long steel sector.

Electrical strip – a core material

Both steel and cast products continue to be essential for the engine and powertrain as the switch is made to electric cars. "Electromobility is not possible without steel," says Andreas J. Goss, CEO of

Source: Audi AG

The electric engine of the first purely electric model by Audi, the E-Tron Quattro.

Source: Audi AG

The Audi E-Tron Quattro will be available from August 2018.

Thyssenkrupp Steel. The company considers itself to be the market and technology leader for electrical strip, the core material for all electric motors. Motor torque depends to a large extent on the quality of the magnetically soft steel product. The iron-silicon alloy determines the efficiency level, which is supposed to be as high as possible, and the energy loss due to remagnetisation, which is supposed to be as low as possible. Only a few manufacturers anywhere in the world supply this expensive special material; the competitors that do so include Arcelor Mittal and the Austrian company Voestalpine.

Research and development work in the electrical strip area has not been completed by a long way yet. Vacuumschmelze from Hanau in Germany recently demonstrated just how much potential the electrical strip technology has. Equipped with material from Vacuumschmelze, the world record-holding electric racing car "Grimsel" accelerated from zero to one hundred kilometres per hour in only 1.513 seconds. No car in the world that is produced in series can get anywhere near acceleration of this kind, not even the 1,000-horsepower "Project One" model manufactured by the Daimler subsidiary AMG. This "Hypercar" with Formula 1 technology, which was presented at IAA 2017, took 2.5 seconds to reach 100km/h. The four electric motors in the "Grimsel" have sheet metal packages made from a special material that would be prohibitively expensive for series production. Yet Vacuumschmelze is thinking of launching a modified electric motor material for premium vehicles on the market.

Motor housings made from cast aluminium

Plenty of castings from foundries such as Georg Fischer (GF) or Nemak are also common in electric cars. From 2019 onwards, for example, the GF Automotive Division based at the Mettmann location in Germany will be producing battery housings made of aluminium with an integrated cooling system for a French car manufacturer. Competitor Nemak also confirms that additional growth is being generated by the change in drive concepts and the introduction of new structural electromobility components like battery housings.

Electric drive systems for cars require a large number of new components. Besides housings for batteries, these are, first and foremost, housings for electric motors and power electronics, which are designed preferably as castings due to their complexity, as Christian Heiselbetz, R&D Director Global at Nemak Europe, reports.

Combustion engines made from die-cast aluminium have been standard for a long time now. Electromobility is creating additional market opportunities for foundries. Cast motor parts are premium key components in both partly electrified and battery electric vehicles. Since 2013, Nemak has been supplying the die-cast electric motor housings for the BMW models i3 and i8. Particularly for complex parts and when the integration of functions is needed, casting technology is able to show its strength and meet varied challenges – be it with low-pressure casting and such casting processes as lost foam, sand and investment casting. If complex cooling circuits are necessary then low-pressure casting permits the use of sand cores or the inclusion of tubes in order to be able to carry out optimised cooling, as Heiselbetz emphasises.

Source: BMW Group

Facelift after four years: The new version of BMW's i3 will be run by an e-machine in a complex, aluminium die-cast housing like its predecessor.

Franz-Josef Wöstmann, foundry expert and departmental manager at the Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM, thinks there is a promising future market for foundries not only in lightweight structures or housings for electric motors, batteries and power electronics. He considers rotors with aluminium or copper and even hybrids to be an issue. The foundry expert stresses that coils can be cast and new magnetic casting materials could become a market.

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Many of the presentations and discussions at Gifa, the international foundry trade fair and technology forum held in Düsseldorf, Germany, from 25 to 29 June 2019, will be focussing on the issues of electromobility and new drive concepts. It has traditionally been the case that innovative cast components for automotive applications have been displayed on the exhibitors' stands.

gifa.com

New drive concepts with formed steel and die-casting

Another component that will still be needed for the drive technology of electric vehicles is the transmission, and thus highly complex die-cast aluminium components as well as equally complex steel components manufactured via forming technology. This is confirmed by Astrid Wilhelm-Wagner, Marketing Manager at Voit, an automotive supplier from Saarland in Germany that has its own foundry. The company intends to strengthen the production of conventional transmission parts (primarily for the supplier ZF) and expand the electromobility business at the same time.

"The established manufacturing segment for conventional powertrains is already being substituted in the hybridisation of existing drive concepts up to and including completely integrated electric drive modules," says Wilhelm-Wagner. In her opinion, some existing components will be eliminated entirely in future, while other components such as control units for power electronics will be integrated directly into the transmission. Wilhelm-Wagner is sure that the product range will be extending more and more in the coming years. The expert lists such components as internal transmission parts, housing structures for electromobility applications, housing structures for power electronics, electric motor housings, energy recovery components and fuel cell stacks.

gifa.de

Metav 2018 confirms ongoing economic boom in metalworking

Sylke Becker

After five days, the twentieth international exhibition for metalworking technologies ended on 24 February. The trade show stimulated and encouraged investments even though there was a slight decrease in the number of visitors.

Source: Messe Düsseldorf

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The key topics of the Metav trade show are machine tools, production systems, high-precision tools, automated material flows, computer technology, industrial electronics and accessories, complemented by the topic areas of Moulding, Medical, Additive Manufacturing and Quality.

Reiner Hammerl, Managing Director of Sales and Marketing at Index in Esslingen, summarises the event: "The quality of the customers is encouragingly high. And we have succeeded in selling our machines here, too."

Andreas Lindner, Director of the German subsidiary of the Spanish manufacturer Bimatec Soraluce in Limburg, has even more impressive news to report: "Only this morning, we concluded a huge contract worth more than one million euros at Metav with a customer who we were not expecting to see today and to whom no quotation had been submitted, either. That is exactly the point and underlines the quality of Metav: A customer comes to the trade fair and spends one million euros. We are satisfied!"

The currently excellent economic state of the industry was demonstrated at Metav 2018, too. In the visitor survey, about one third of the visitors indicate that they are planning investments, primarily in machine tools, measuring technology, manufacturing and process automation and precision tools. "This shows us that we are exactly right to focus Metav on the core area of metalworking and the supplementary topics in the areas," says Dr Wilfried Schäfer, Director of VDW (German Machine Tool Builders' Association) in Frankfurt am Main, which organises Metav. Another interesting fact: About a quarter of the visitors who intend to invest aim to increase their capacities by installing new machines.

New Metav exhibition concept is established

"There is a downside to the booming economy for us, too, however. Company capacity utilisation is very high. It was therefore only logical that many companies would find it difficult to delegate staff. As a result, 26,500 trade visitors came instead of the 30,000 that we expected," says Wilfried Schäfer. The proportion of visitors from countries outside Germany remains constant at 11 percent, however. They came from about 50 different countries, with the largest contingents arriving from the Netherlands, Switzerland, Belgium and Austria.

As was expected, three quarters of the German visitors came from West and North Germany. About

Some 560 exhibitors from 24 countries, among them 56 first-time exhibitors, showcased the entire spectrum of production technology in Düsseldorf.

one fifth came to Düsseldorf from South and South-West Germany. Nina Bruckner, Director at Karl Bruckner GmbH in Weinstadt, confirms: "Our main objective is to cultivate relationships with customers. As a result, we can extend a welcome to our top customers from Southern Germany, too, and we expect to do good follow-up business after the trade fair." As things stand, more than half of the visitors intend to place orders after Metav.

The area concept, which was launched two years ago and focusses on specific topics (quality, additive manufacturing, tool and mould production and medical technology) is now fully established with both exhibitors and visitors. "We took part in Metav for the first time in 2016, because we found the new area concept convincing. Hasco's entire process chain, from machines to standardised part requirements and software, is reflected in the moulding area," says Axel Fehling, for example, the Regional Sales Manager at Hasco Hasenclever in Lüdenscheid.

The areas highlight both topics and products. Additional information is provided in the associated forums. Trade visitors have become familiar with this concept in the meantime. They are very interested in machine and precision tools, with a special emphasis on tool, mould and model production, testing and measuring technology, quality management systems and additive manufacturing, where there has been substantial growth. More than 90 percent of the visitors are satisfied with the range covered.

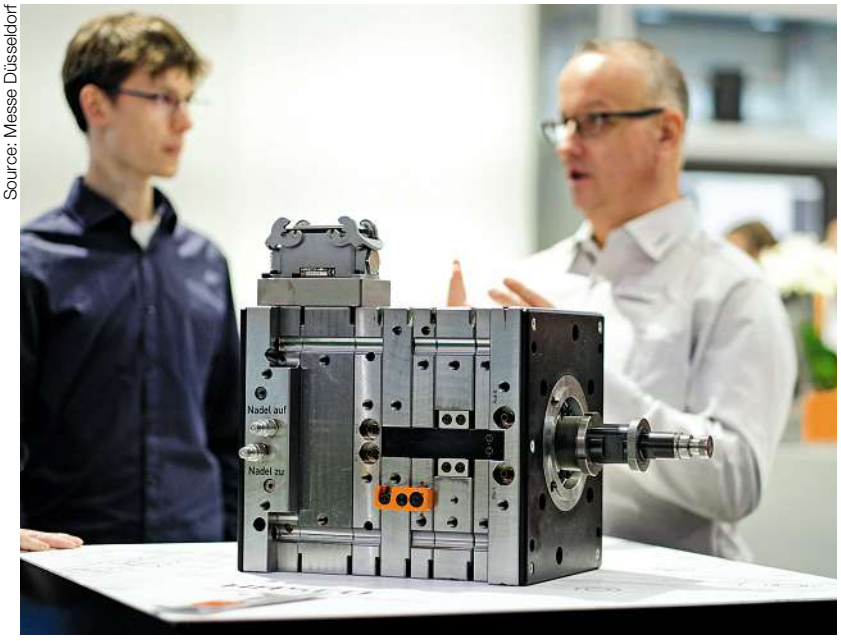
Source: Stahl/ETMM

Dr. Wilfried Schäfer at the opening press conference: "The forecast for the metalworking industry in 2018 is positive."

Skills shortage reflected by initiatives at the trade show

The shortage of skilled staff is a major issue the industry is facing. The Machine Manufacturing Recruitment Foundation has been working on this problem for many years now, for example, with the special youth show at Metav, and takes advantage of the trade fair to communicate the fascination of technology and the career opportunities in the industry to young people. "In view of the digitisation process and the changes associated with Industry 4.0, sustainability in recruitment development is the key to corporate success in future. These were among the central issues in the talks we held with instructors and teachers at the special youth show," says Peter Bole, Head of the Machine Manufacturing Recruitment Foundation.

The exhibitors appreciate the activities carried out by the Machine Manufacturing Recruitment Foundation. "The shortage of skilled personnel is already having a strong impact on us. We have a live platform here to arouse the interest of young people in new technologies. It is difficult to establish contact with potential recruits otherwise, particularly in view of the fact that there is no classic apprenticeship for additive manufacturing," says Lars Markus, Application Engineering and Service Manager, Additive Manufacturing, at Renishaw.



Source: Messe Düsseldorf

Since 2016, Metav features various specialist areas. The Moulding Area is one of them.

Will to invest strong in the metalworking industy

The response to the additional events at Metav 2018 was good as well. They focussed on additive manufacturing, grinding and clamping technology and fire protection. One of the highlights was the Inside 3D Printing conference. Programme Director Franz-Josef Villmer, Professor of Product Development, Innovation Management and Rapid Technologies at the Ostwestfalen-Lippe University of Applied Sciences, said: "Once again this year, the participants were extremely happy with the content, professionalism and organisation of the leading international Inside 3D Printing conference at Metav 2018."

"All in all, Metav 2018 confirmed the good economic situation of the industry and the willingness of industrial customers to invest," says Wilfried Schäfer. Most of the exhibitors share this view: More than 80 percent already know that they will be participating again in the next Metav. It is planned to take place in March 2020.

metav.com

Cutters for roughing and finishing steel and cast materials

Source: Jongen

The solid carbide milling cutters can be used for both wet and dry processing.

Cutting Tools – Jongen presented the Uni-Mill solid carbide milling cutter, VHM 487W TN12, for universal steel machining at Metav 2018.

According to the company, these milling cutters were specifically developed for roughing and finishing steel and cast materials. They are also suitable for drilling and plunge milling up to 0.25xD thanks to cutting edges applied over the centre.

The cutting corner is stabilised by the face groove and the edge chamfer. The positive chip geometry combined with a high spiral angle enables a mild cutting manner. The cutting material TN12 consists of finest grain carbide, ISO-application range K30-K40, and offers a high degree of toughness with very high wear resistance. The AlCrN coating has a very fine layer structure and high oxidation stability.

This combination is suited for machining all common steels and cast iron materials. The coupling is designed to DIN 6535-HB (Weldon) and ensures stable clamping of the tool. The solid carbide cutters are available in diameters ranging from 4 to 20mm.

jongen.de

Boost in cutting speed

Machining Equipment – With the High Speed Eagle V9, OPS Ingersoll presented a highly productive machine for steel applications at Metav 2018. According to the company, the double-gantry drive in the X-axis allows for higher dynamics and rigidity.

Additionally, the C-axis is equipped with a direct-drive and enables speeds of up to 100 rpm. Concerning the spindle selection, the High Speed Eagle V9 can be equipped with the HSK A63 (1 - 18.000 / 26.000 rpm, 25 kW) as well as the HSK E40 (1 - 42.000 rpm, 15 kW) and HSK E50 (1 - 36.000 rpm, 17 kW).

The machine has compact floor space dimensions of 3.064 × 2.177 mm, and axis travel of (X/Y/Z) 800 × 600 x 500 mm, the company notes.

ops-ingersoll.de

Source: OPS Ingersoll

The High Speed Eagle V9 was on show at Metav 2018.

Grooving system with extended working range

Cutting Tools – Horn's 25A axial grooving system with cartridge design and round shanks is more versatile now thanks to new versions that allow for grooving diameters of 50 to 65 mm and 65 to 80 mm.

The previous system with single-edged or two-edged indexable inserts achieved grooving depths of up to 18 mm with an external diameter of 15 mm or more. According to Horn, the new versions achieve cutting widths of 3 and 4 mm, while the previous system achieved widths of 2 to 4 mm. With the introduction of these products, the company intends to offer its customers tools with an extended working range capable of new applications.

Source: Horn/Sauermann

Thanks to the extension of the range, Horn's 25A system supports deeper axial grooves.

The cartridges are designed for Horn's K220 standard cartridge interface and are therefore compatible with all base holders for this system. The internal coolant supply ensures efficient cooling without any negative effect on chip flow. The tool holders can be equipped with single or double-edged carbide inserts of type 15A or 25A in carbide grade TH35 and with a TiAlN coating. The .10 geometry for long-chipping materials ensures safe chip flow, even with deep grooves.

The single-edged cutting insert also allows for grooving along an interfering contour, such as a collar. This is said to make the inserts suitable for universal use. As the dimensions of the cutting insert designs are identical, the single-edged inserts also fit into all 25A system holders.

phorn.de

The advantages of solid carbide and indexable end mills

Cutting Tools – Mitsubishi Carbide has expanded its iMX series. The end mill system combines the advantages of solid carbide and indexable end mills. Different to conventional end mills, the head can be simply unscrewed instead of unclamped from a chuck or shrink-fit holder. This interchangeability reduces tool change times and also negates the costs of extra-long solid carbide end mills.

The series has been expanded with two types of ball nose heads and two carbide grades, EP8110 and EP 8120. These grades are designed for hardened steel applications. They have a multilayer coating that has increased adhesion to the substrate.

Source: Mitsubishi Carbide

The coating of the two new grades increases wear resistance needed when machining harder materials.

mitsubishicarbide.com

Rapid-Tech + Fab-Con 3D are expecting an exhibitor record

Rapid-Tech + Fab-Con 3D, the international trade show and conference for additive manufacturing will be taking place in Erfurt from 5 to 7 June 2018. Already, the event is on its way to break records in the number of exhibitors and reserved exhibition space.

By the end of February, 20 percent more exhibitors had registered a whole three months before the event, compared to the same time last year. The increase is even more evident when looking at the exhibition space reserved, which is up 30 percent compared to the space booked by February 2017.

"This growth is a clear indication that additive manufacturing is still expanding and that Erfurt is the right place to present the latest developments in this technology of the future. With the support of the leading experts from industry and research on our advisory board, we focused on this issue very early on and, thanks to our consistency and commitment, have established ourselves as the first port of call for exhibitors, visitors and conference participants since 2004.

Erfurt can quite rightly claim the title of "3D printing capital" for the three days of the show as the whole world of AM gathers here to exchange knowledge and experiences. This is also what we will achieve with the 15th edition of the show," says Michael Kynast, CEO of Messe Erfurt, the organiser of the event.

June will show whether the growth will also be evident in visitor and participant numbers. In 2017, 4,800 trade visitors and conference participants as well as 207 exhibitors from 13 countries attended Rapid-Tech + Fab-Con 3.D in Erfurt, the organiser reports.

Conference programme with 3D printing user experience

Alongside the exhibitor presentations, a conference programme with high-profile keynote speeches is the key to the event's success, Messe Erfurt reports. Inventors and users of 3D printing from different industrial sectors will provide insights into current and future developments in this field and will demonstrate the broad spectrum of applications for additive manufacturing (AM) in keynotes.

The opening speech on the first day (5 June 2018) will be given by Dr Dominik Rietzel. He runs the non-metals department at the BMW Group's Additive Manufacturing Centre, where he is responsible for R&D activities, prototyping and series production using AM. In his presentation entitled "AM on the Road", he will outline how the Bavarian automaker has worked and is working on making additive manufacturing processes usable in series production with the aid of a strategic road-map. The aim is not to produce "showcases", but instead to leverage the advantages specific to this process, e.g., for tool substitution in small batches, product individualisation and/or component design customised to the processes and loads of the series.

The second day will be opened by 3D printing pioneer Scott Crump. He is the inventor of Fused Deposition Modelling (FDM), a technology now used in 90 percent of all 3D printers worldwide. Crump will present some current examples of various applications and also talk about the future direction for Stratasys and additive manufacturing in general.

On the third day, Christoph Wangenheim will address the potential of additive manufacturing for the oil and gas industry.

rapidtech.de

Source: Christian Seeling

Individualised production: At Rapid-Tech, visitors will be able to see the latest innovations in 3D printing.

The Control trade show grows along with the world of quality assurance

Control trade show will be held in Stuttgart this April. The trade show for quality assurance is profiting from the rising interest in measuring technology. Besides the latest innovations and products for quality control, the trade show also offers a supplementary programme with talks and presentations.

Source: P.E. Schall

The interest in quality assurance is rising – and so is the interest in Control 2018.

INFO

The supplementary programme is also intended to attract visitor interest, for example, the Vision Talks held by the EMVA (European Machine Vision Association), as well as the Fraunhofer IPA with its event forum.

Control will be held from 24 to 27 April 2018. According to the organiser, P.E. Schall, the trade show has recorded a growth in booked floor space. Consequently, an additional hall has been added to the floor plan this year. According to the organisers, the trade show is growing parallel to the increase in revenues generated with quality assurance technology.

Image processing is one particular sector that is showing growing demand. Sales figures in the image processing industry went through the roof in 2017. Compared to the previous year, there has been an increase of 18 percent. Double-digit growth is being forecast once again for this year. The reason for the increasing popularity of this key technology is its ability to integrate visual processes into any production sequence in an uncomplicated manner. Quality assurance processes with image processing support high-tech companies in analysing their manufacturing processes. At the same time, industrial image processing is penetrating new applications to an ever greater extent. A further growth driver, according to the VDMA, is digitalisation. The companies exhibiting at the leading trade fair for quality assurance would surely make even more ambitious claims: Comprehensive process automation would not be possible at all without fully integrated, digital quality assurance solutions. At the same time, inline quality assurance and embedded vision are dramatically advancing the quality of components, modules, medical devices and motor vehicles.

According to its organisers, Control is unique thanks to its global offer spectrum, covering components, modules, subsystems and complete solutions for quality assurance. Booming segments such as computer-aided systems and optoelectronic sensor technology will be on hand as well, presenting various practical applications. Many manufacturers and suppliers plan to unveil their world firsts to the expert audience at the event.

Interest in the trade show for quality assurance is increasing to the same extent as revenues generated with quality assurance technology, P.E. Schall states. The trade fair reportedly has been boosting its visitor numbers for years. Consequently, project manager Fabian Krüger added Exhibition Hall 8 to the floor plan, making more than 645,000 square feet of floor space available for this year's trade fair.

control-messe.de

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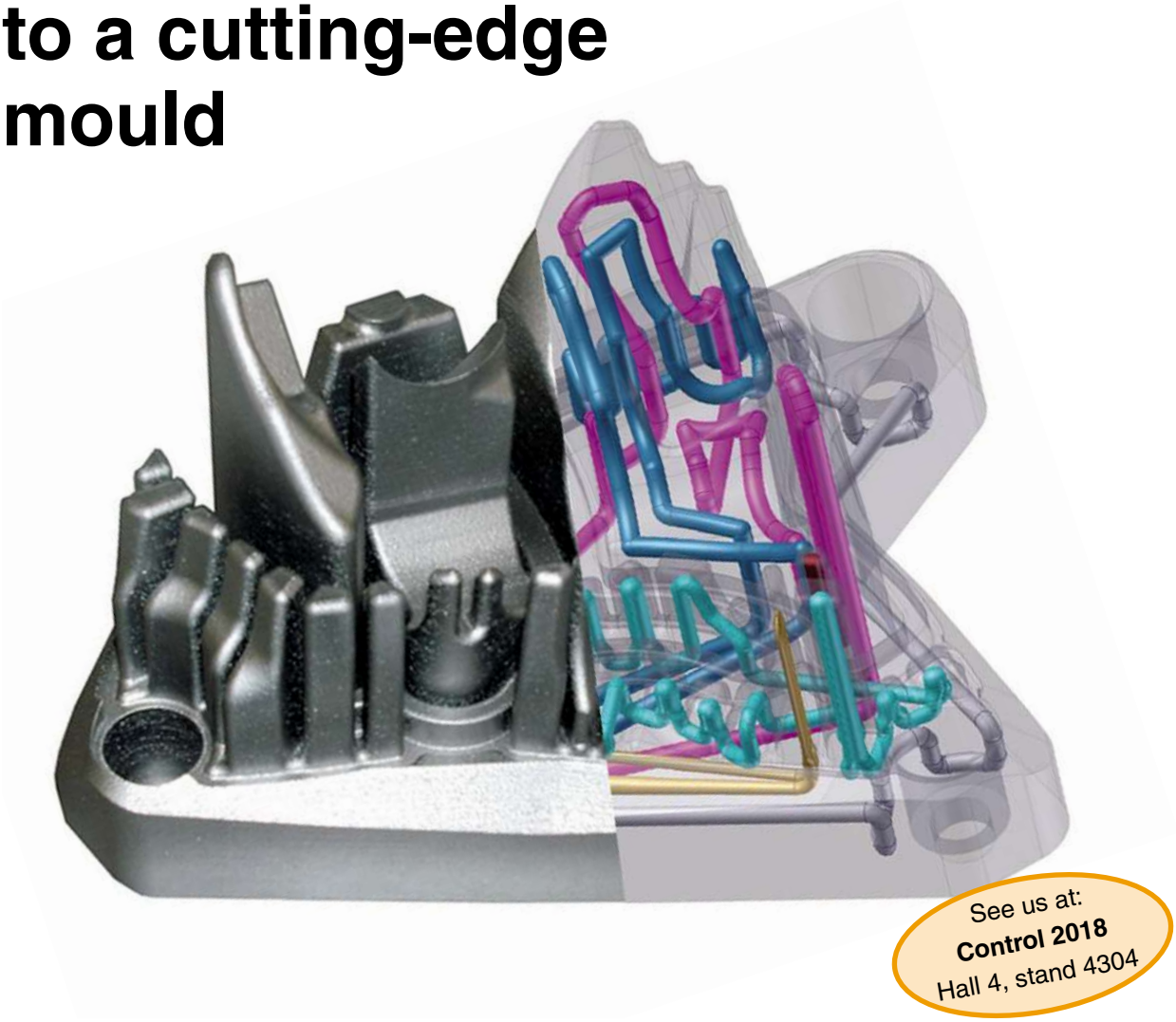






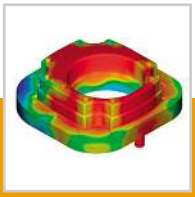

Cycle time reductions of up to 60%

Additive manufacturing introduces design possibilities in which fluid-bearing channels can be arbitrarily adjusted to the contour of a cavity. This offers a completely new alternative for the conformal cooling and heating of mould inserts. Besides the benefits of reductions in cycle times of up to 60%, mould and tool makers, as well as users, profit from considerably improved process control capability.

For more information visit www.renishaw.com/additive

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Comprehensive testing technology with performance capacity and compliance

The Kistler Group will showcase its portfolio of industrial testing and inspection systems at Control, spotlighting latest innovations. Among them are automated testing and sorting systems, force and torque sensors as well as fastening technology and a digital charge amplifier.

Customers are constantly looking for faster and more effective testing and Kistler says it continually develops new custom-made software modules, which ensure easier handling and more transparent test processes. Inspectpro, a mobile inspection system, is said to fulfill requirements for efficient, standard-compliant quality assurance of threaded joints as well as fastening tools and systems. The portable measurement and evaluation instrument offers a convenient way to test torque and rotation angles on threaded joints. This system provides graphic analyses of assembly processes to ensure fastener assemblies meet optimum quality standards, the company notes.

Another mobile inspection system on show, Combitest, features dual capabilities. It combines the calibration of manual torque wrenches with the testing of automated fastening systems. Combitest benefits all tools on an assembly line, which can be tested directly in situ to guarantee their process capabilities, Kistler explains.

The company's piezoelectric sensors have a rugged design and they keep precise track of quasi-static and dynamic force processes, even in difficult production conditions. Kistler says the advantages they offer are proportionality, low measuring deflections and long service lifetimes. These sensors can also measure very small forces. A portfolio of sensors including miniaturised versions for very small installation space will be presented.

The digital industrial charge amplifier (Type 5074A), Kistler says, is the only amplifier for quasi-static measurement processes with piezoelectric sensors on real time-capable industrial Ethernet.

Source: Kistler

World's first digital charge amplifier to premiere at the show

According to Kistler, the world's first digital charge amplifier, which enables the connection of any piezoelectric sensors to the control directly via Ethernet (using Profinet, Ether-Cat or Ethernet-IP), will make its debut at Control. With analogue disturbance variables excluded, users benefit from enhanced data consistency and transparency, in line with Industry 4.0 requirements. Moreover, the digital charge amplifier offers numerous measuring functions on four individually controllable channels, with up to 10,000 bus cycles per second and 50,000 measured values per channel. Further, this innovation is well-suited for high-precision, time-critical control applications.

Germany-based Vester Elektronik, now belonging to the Kistler Group, will also be at the show their own booth (Hall 6, Booth 6413). Vester will present three automatic testing and sorting machines for use in punching and forming processes as well as testing individual series parts. Additionally, high-performance image processing systems that enable users to perform fully automated dimensional and surface tests with gauging and hardness tests as additional options will also be showcased. The company says that digital camera technology is deployed for this purpose to ensure 100% testing of mass-produced parts with very high throughput rates. The Smart Ray 3D laser triangulation sensor for use in testing processes for automated glass plate plants will also be exhibited. According to Vester, this innovation makes it possible to measure height profiles as well as geometric and positional tolerances on the test objects, such as flatness, which could not be visualised until now.

kistler.com; Hall 7, Booth 7313 and Hall 6, Booth 6413

Heavy-duty measuring machine for large-volume workpieces

Measuring – The Scope-Check MB from Werth Messtechnik has been designed specially to measure large and heavy workpieces. It has sensors with which its position can be adjusted with a moving bridge.

Thus, there is no need to move the workpiece during measurement. Werth says the standard measurement dimension ranges are 500 to 2,000 mm in the X-axis and up to 3,000 mm in the Y-axis, while a range of up to 1,500 mm is possible in the Z-axis. Large-volume workpieces weighing up to five tonnes can be accommodated. Furthermore, to overcome temperature compensation, the multi-sensor coordinate measuring machine is equipped with air bearings to provide precise measurement results in production environments as well.

The integration of multi-sensor systems increases the machine's flexibility. The patented Werth Zoom is fully integrated in the Z-ram of the machine to enable unrestricted optical measurement capabilities. In addition to the Zoom and tactile sensors, the IP40T rotating and tilting camera head can also be added as with other sensors. This makes it possible to measure large components from different directions fully automatically.

With the use of a special exchange mechanism, the IP40T can also be equipped with the patented WFP Werth Fiber Probe. The Werth LLP laser line probe is available for rapid scanning and digitising large components. A park station in CNC mode easily exchanges all sensors.

werth.de
Hall 7, Booth 7102

Source: Werth Messtechnik

The Scope-Check MB can handle a five-tonne workpiece.

Software for in-depth surface texture analysis

Surface Analysis – Finnish company Focal-Spec has teamed up with France-based Digital Surf to launch the Focal-Spec Map software. The software has been designed for surface measurement and online testing in a wide range of industries including consumer and mobile electronics, plastics and medical devices. The companies say the software package provides a new set of tools for users of Focal-Spec's innovative Line Confocal Imaging (LCI) technology. Users can now visualise, analyse and report on measured surface data in greater depth.

The companies say Focal-Spec Map has tools that enable the characterisation of surface roughness and texture with its roughness/waviness filtering techniques in 2D and 3D parameters from Ra to ISO 25178. It also provides surface geometry analysis, including the volume of surface structures (bumps, holes), step heights and contours. Reports can be generated quickly and easily, and can be exported in standard formats. Analysis routines can be saved as templates and re-applied to batches. All images can be output at up to 1200 dpi for integration into posters and presentations. Focal-Spec Map also allows for automated statistical analysis of multiple static and dynamic data populations and process capability evaluation.

The software is available in 11 languages and has a ribbon interface and contextual tabs with icon-based tools. The interactive workflow is traceable and can be fine-tuned.

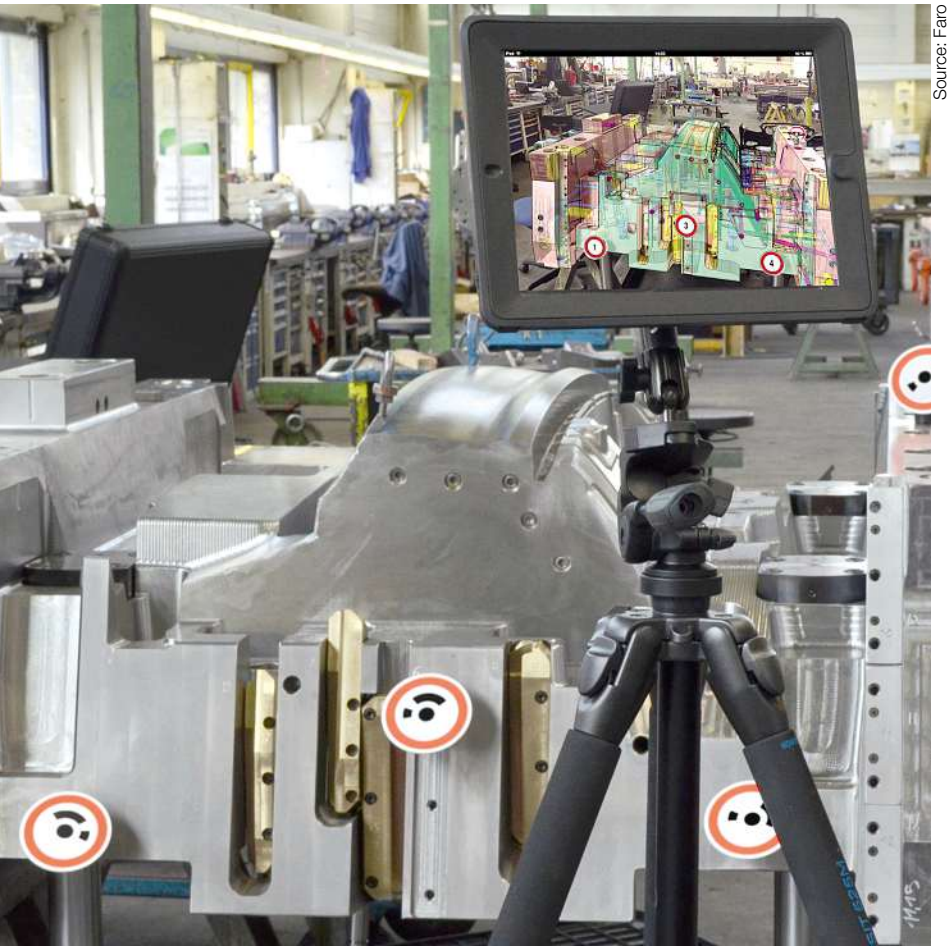
digitalsurf.com; focalspec.com
Hall 3, Booth 3412

Source: DigitalSurf_Studio Timo Heikkala Oy/Timo Heikkala

Surface measurement with the 3D Line Confocal Scanner Uula.

Augmented reality meets global and flexible production needs

At Control, Faro, manufacturer and developer of leading-edge solutions for high-precision 3D measurement, imaging and realisation technology, will present the company's Visual Inspect AR, which is also attractive for automotive applications.



Source: Faro

When creating a CAM programme, missed features such as holes or slots can also be identified within minutes using the design data.

Visual Inspect AR, Faro says, offers ready-to-use augmented reality for effective use in practice, and includes various additional functions.

Suppliers often provide polystyrene models for castings, rough and milled castings, which are assembled when these are received by the OEM or machine tool builder. Inspections on receipt and before shipping are usually based on drawings or simple checklists made specifically for this purpose, meaning more costs are incurred.

According to Faro, Visual Inspect AR superimposes a video image precisely over a CAD model so that the component is directly compared with the design data and deviations are immediately visible. The deviations are then documented directly in the programme with photographs or videos as evidence and the resulting documentation or error reports can be linked directly to the corresponding geometry. After inspection, reports can be exported, at the click of a button, as a document or sent directly to the corresponding PLM or PDM system. Post-processing of inspection results, for example, through manual input in these systems or through time-consuming Power-Point presentations, is thus no longer required. An alternative is checks being carried out using checklists or with step-by-step instructions to ensure more certainty.

No other media required for the inspection process

The device provides inspection access to all information as well as to the geometry, including metadata, ISO standards, master data etc., which also means no other media is required for the inspection process, Faro notes. This way, inspection of received goods is faster and simpler.

The same applies to brief inspections after a component has been machined. When creating a CAM programme, missed features such as holes or slots can be identified within minutes using the design data. This eliminates re-clamping and the setting-up of the machined part, which can also save hours.

This technology also offers new possibilities for avoiding errors when assembling components, the company adds. Parts are identified, their mounting position determined and components checked during the assembly process. As such, no time is wasted on creating 2D documents for the workshop nor running to fixed terminals.

During maintenance work, the technician can quickly and flexibly access all documents at the site and quickly find the installation location with the help of the AR overlay. As all additional information is directly linked to the 3D geometry, this data is immediately accessible by simply tapping the location on the video image, which then displays the required parameters.

Today, designs are normally done in 3D, which eliminates the need for 2D drawings for production, thus saving costs. The mobility of the system enables the need for fewer systems and fewer software licenses as well. An additional advantage of Visual Inspect AR is that fast, interim checks are now possible anywhere and at any time.

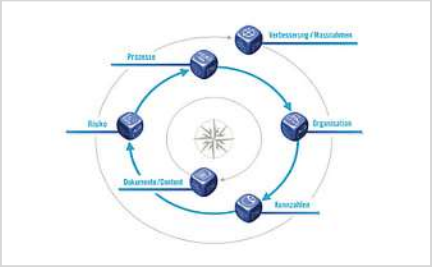
Visual Inspect AR meets global and flexible production needs and helps companies make processes more flexible, faster and safer, while saving costs.

faro.com; Hall 3, Booths 3402 and 3404

Management system for regulated sectors

Systems – IMS Version 3, IMS Integrierte Managementsysteme's latest version, now extends functionality and user-friendliness. It can design workflows and is used for highly regulated sectors. The new Standards and Legislation Management system meets all current standards for the controlling of complex sharing of information, regardless of the sector, IMS says.

Source: IMS



The display of the cubes information platform has also been revised.

Numerous design options link business processes easily with standard-related information and also ensure clear representation. The fully revised improvements/measures module now enables the workflow-driven processing of measures management, making controlling and risk management easier. Icons have been optimised, while the cubes-information-platform display has been revised. News is now easily integrated into cubes. The structure as well as change of processes and documents have also been simplified.

ims-ag.com, Hall 5, Booth 5011

Imaging software on turbo speed

Imaging Software – DHS Dietermann & Heuser Solution will present Version 17 of its image management software, which the company says has been completely revamped.

The Germany-based software, service and hardware specialist, which plans, organises and supports the entire workflow of QA labs, notes that all modules of the new version now have a uniform, modern design with a "hands-on" approach to programming and functionality. All modules have been completely redone, while new features have been added to several modules. The data-processing speed has been given a big boost, which is an advantage for image acquisition, the company adds.

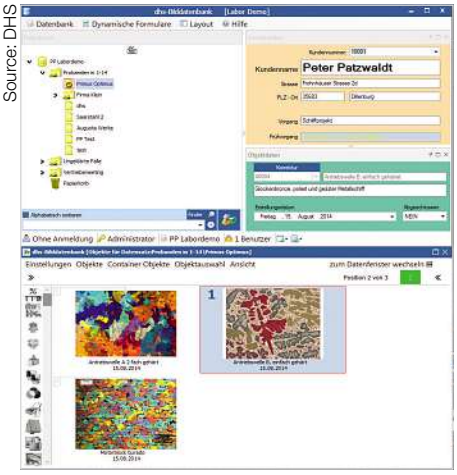
According to DHS, new features now packed in Version 17 include the speed of the DHS Image Data Base, which has been notably improved. Also, the design of the user and operating interface now has a clear menu guidance, better functionality as well as standardised modules in a new design.

Furthermore, for the DHS-Microcam, captured images are now loaded in lightning speed. Additionally, all images are stored in the image buffer until they have been actively processed by the user.

The new version has upgraded and enhanced measurement functions and several useful features. For example, set point limits and warning functions are now available to ensure thresholds are not exceeded. Moreover, tolerance deviations from set point values are displayed as well, DHS notes.

The measurement tool has been completely reprogrammed to attain maximum performance – functions are now available for two-dimensional measurements and labelling of previously captured images (distance, area, circumference, angles, circles etc.).

Source: DHS



Version 17 has a "hands-on" approach to the programming, functionality and design.

Furthermore, clear organisation of the menu guidance and design facilitates the use of a broad range of help functions, including the creation of overlays, digital magnifying glasses, the addition of scale bars or grid displays, measurement level previews, a calculator and a large number of storage options.

"The software's design reflects modernity and current needs," says an enthusiastic Peter Patzwaldt, who is the Authorised Officer and Head of Development in the company. "With our new Version 17, we have achieved yet another milestone in the decade-long development story of the DHS Image Data Base."

dhssolution.com
Hall 5, Booth 5109

3D inspection, deep learning with Vecid, parallel processing

The Eye-Vision software from EVT is a machine vision software with a graphical user interface, which enables the user to create inspection programmes with drag-and-drop programming. It has commands that solve every image processing application.

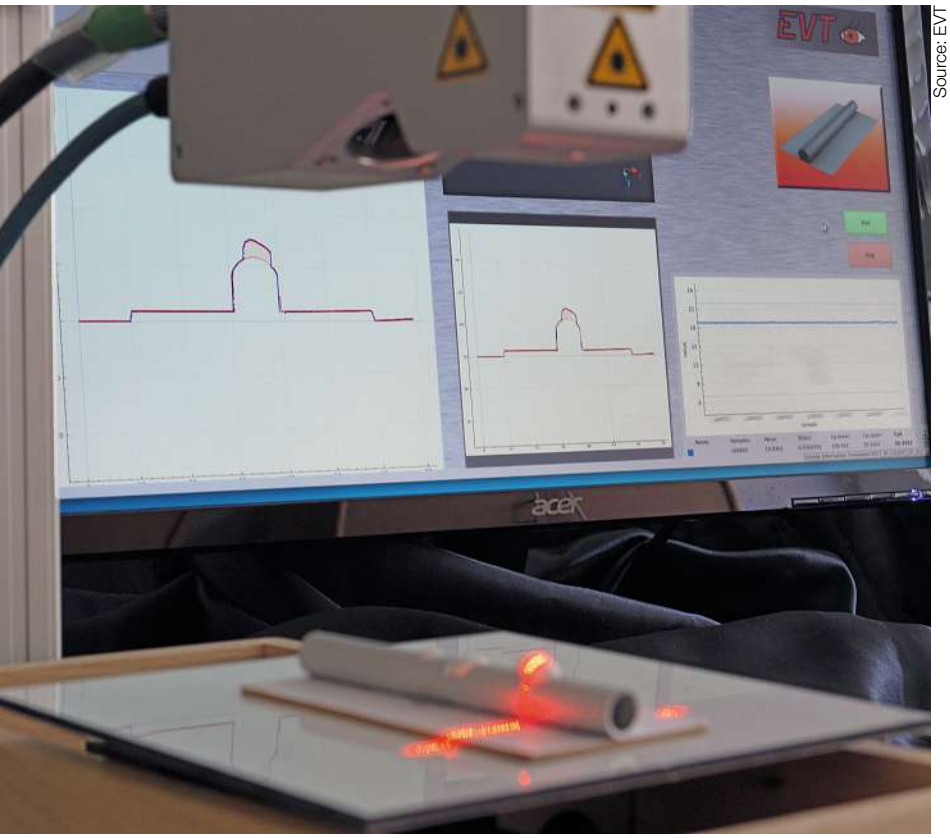
Pattern matching, object detection, object counting, 3D and colour inspection, reading of codes (bar code, QR, DMC), OCR/OCV, robot guidance, bin-picking, metrology and thermal imaging are among the numerous image processing applications the Eye-Vision software is deployed for.

EVT, a specialist in machine vision products for quality control and industrial engineering, says its latest software, which will be showcased at Control among other exhibits, is Deep Learning (EV DL). EV DL is based on state-of-the-art algorithms.

This year saw the release of Version 3.8, which now provides Deep Learning tools with the company's Eye-Vision software. Easy-to-train neural networks and easy-to-use tools are add-on commands and EV DL tools, EVT adds.

This software, the company notes, is used for the recognition of vehicle number plates and their make as well as the model of the vehicle. It is known as Vecid.

3D profile scanner for angles.



Source: EVT

According to Germany-based EVT, the identity of vehicles is perceived by convolutional neural networks, which are already pre-trained. Vecid tells one exactly which type of vehicle has just passed through the gate of a garage and it also reads the number-plate of the vehicle based on the trained CNN, which saves the nuisance of configuring a conventional OCR reader system.

Comprehensive Eye-Vision 3D commands on display

Another software to be presented at Control is Eye-Vision 3D, which has a new parallel processing function and thus offers commands, for example, for bin-picking, welding seams or performing adhesive bead inspections. In bin-picking, the software notes the shapes and positions of objects that it has been trained to remember. It can thus locate unsorted parts in a box and pick them up with, for example, a robot gripper. Eye-Vision 3D also sends the information on the position of each detected part in the box to a robot.

Eye-Vision 3D Profile-Match, the company says, offers commands that scan profiles and measure these profiles to check for errors such as holes and warts on weld seams and adhesive beads. Other functions include detecting profiles, which work even when the height of the profiles do not match. With this function, cracks, holes, warts and fusion lack can be detected as well.

The 3D Unrolling command of the EyeVision 3D software straightens 3D point-cloud images of tilt-scans and/or is able to “unroll” them, respectively. Examples hereof include a tilt-scan in which a laser triangulation sensor is rotated, or used with a laser line to scan a large area without the hindrance of a large linear axis.

Cost effective: Space-saving and fast processing

Eye-Vision Parallel Processing allows for multiple run-times with several 2D cameras and 3D sensors, simultaneously with each separate inspection programme. Furthermore, it only requires one computing unit and Eye-Vision software. Given the appropriate computing capacity (a minimum of a dual-core processor), the system enables faster processing, which apart from needing less space is also more cost-effective as it saves the need for additional hardware and software.

evt-web.com; Hall 6, Booth 6110

Five-MP camera systems offer larger view fields

Imaging – IDS Imaging Development Systems manufactures sensors and industrial cameras. Its portfolio now includes five-MP variants of the modular 3D camera system, Ensenso X, vision app-based cameras and sensors.

Five-MP cameras provide 3D vision, with larger view fields and more image details. Ensenso X can be deployed in factory automation (like bin-picking), warehouse and logistics automation (like pallet-picking). Compared to the currently available 1.3-MP sensors, the larger field of view means the distance between the camera system and the object is reduced. To completely capture a packed Euro pallet (volume 120 × 80 × 100 cm), the distance required is 1.25 m instead of 1.5 m. The Z-accuracy is now 0.43 mm instead of 0.2 mm. Furthermore, the new models enable an increase of up to 35% in lateral resolution, and are over 30% quieter, thus details and depth information can be captured more precisely. Vision app-based industrial cameras are convertible like smartphone apps, making them intelligent assistants.

IDS NXT applies the app principle to industrial image processing. Users benefit from its flexibility, for example, they can assign their required image processing task to the vision app-based cameras and sensors as per request. This allows for variable functionality of the device as well as the direct, device-internal processing of information provided by the image sensor. Based on the app development kit and a Halcon-embedded runtime license, users can create and install individual vision apps. IDS NXT comes with IDS NXT Vegas with a 1.3-MP CMOS sensor, a liquid lens with autofocus, an integrated ToF sensor and many other functions.

ids-imaging.de
Hall 6, Booth 6406

Source: IDS

The Ensenso X series, now with five-MP industrial cameras with an IMX264 CMOS sensor from Sony.

Source: Ametek

The upgrades enable the user to run data acquisition, while simultaneously analysing previously acquired data.

Self-calibration ensures higher throughput and 24/7 operations

3D Measurement – Creaform will present a productivity station and an auto-calibration kit for its R-Series scanners at Control. Both are key upgrades to its robotic metrology dimensional measurement solution, which are offered as efficient alternatives to traditional shop-floor CMMs.

The Metra-Scan 3D R-Series solution enables manufacturers to combine optical measurements and industrial automation, ensuring reliability and an increase in inspection cycles. It has a smaller factory footprint and offers an accuracy of up to 0.030 mm and a resolution of up to 0.050 mm, Creaform notes.

According to the company, the mechanical and software upgrades to the R-Series enable operators to run data acquisition and simultaneously analyse previously acquired data to maximise throughput. Also, self-calibration limits the need for human involvement, ensuring higher throughput and 24/7 operations.

The company's 3D measurement solutions are good for dimensional inspection of quality control in production environments, combining optical portable CMMs, 3D scanners, photogrammetry and fully integrated dimensional inspection software. They can measure any component made of any material in a size from 0.1 m to 10 m, with an accuracy of up to 0.02 mm. They are good for validating dimensional conformity and quality of production tools, jigs, parts, assemblies, sub-assemblies and final products.

creaform3d.com
Hall 5, Booth 5108

Inspection software measures, validates and reports

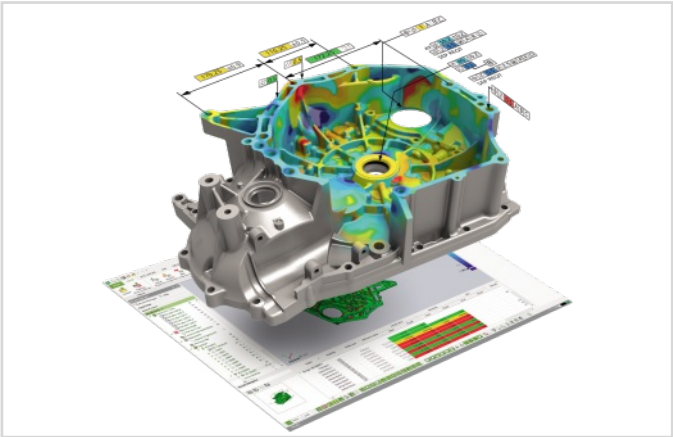
Software – At Control, 3D Systems will demonstrate new features for its Geomagic Control X 2018 inspection software, which is said to improve ease of use and workflow efficiency. It measures, validates and reports real world parts using advanced software inspection tools.

The Geomagic Control X service pack is based on the company's success in aerospace and heavy industry MRO applications, such as airfoil inspection, wear-surface trend analysis and surface inspection, regardless of the scanner type or the size of the part. The new features improve workflows for these industries as well as workflows for design engineers and inspectors with challenging inspection requirements for high-precision machine parts, casting, stamping and weldments.

VP Marketing of 3D Systems Europe says: "Since the introduction of Geomagic Control X 18 months ago, 3D Systems has continued to introduce successive, high-impact software updates."

3dsystems.com
Hall 3, Booth 3201

Source: 3D Systems



The new features improve workflows for various industries, design engineers and inspectors.

Quick Sourcing Grid: Quality Control

Source: P.E. Schall

Company | Contact	Ad on page	CMM	Inspection Machines	Inspection Probes
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Sensor Products Inc., Madison, USA | www.sensorprod.com				
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Wenzel Präzision GmbH, Wiesthal, DE | www.wenzel-cmm.com		●		
Werth Messtechnik GmbH, Gießen, DE | www.werth.de		●	●	

	Laser Measuring Systems	Measuring Devices	Measuring Software	Microscopes	Mould Test Machines	Optical Test Systems	Probe Software	Scanning Systems	Spotting Presses	Stress Analysis Equipment	Tool Breakage Detection	Tool-Setters
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Researchers collaborate to optimise steel classification process

Friederike Meyer zu Tittingdorf

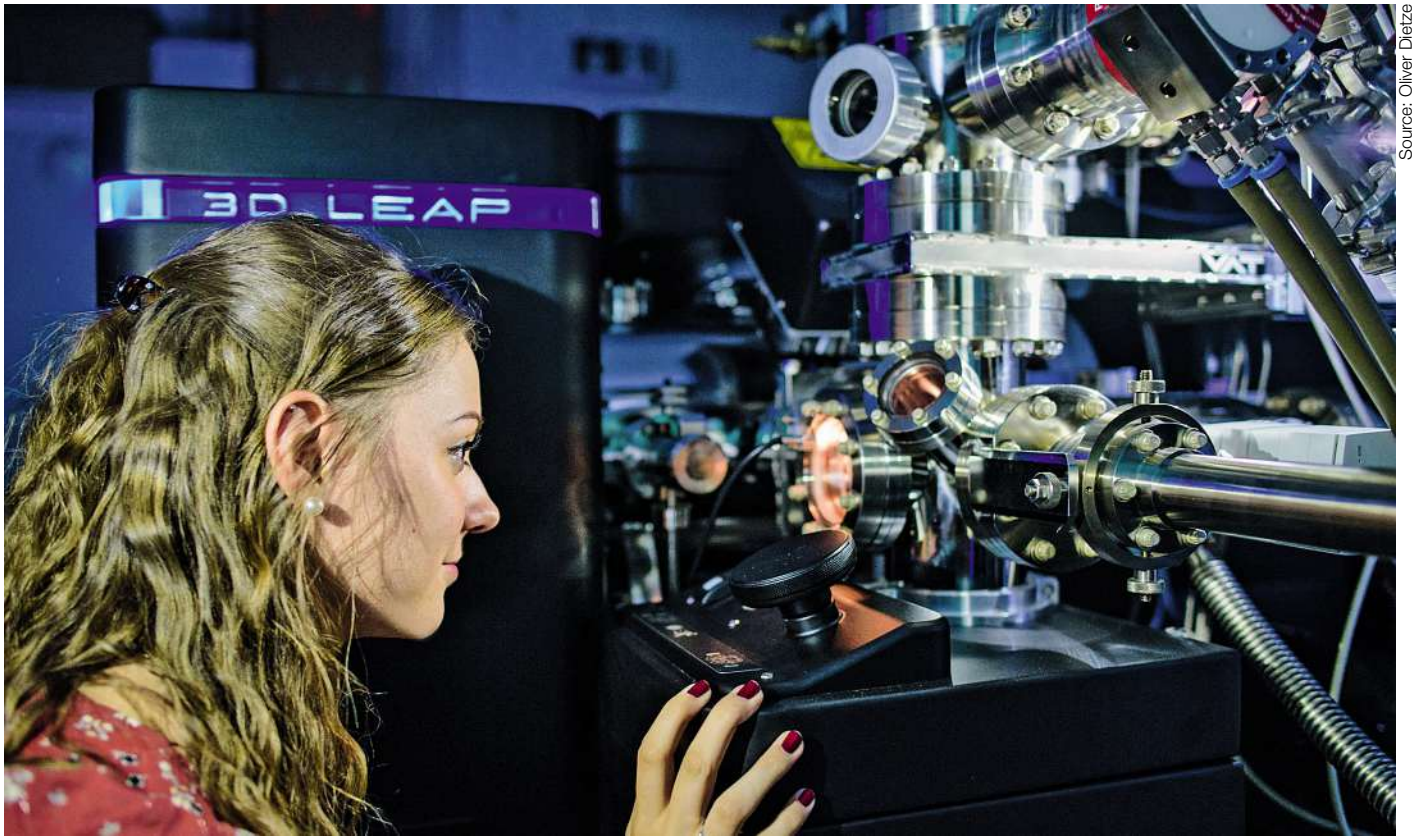
About 5,000 different types of steel are currently available on the market. How can steel producers guarantee that a particular steel always has the same quality? Scientists have now developed a method that is supposedly more accurate than conventional control procedures.

Up until now, experienced experts analysed material samples of steels under the microscope and carefully compared the results against reference images. But classifying materials in this way is not free from error. Using machine learning techniques, computer scientists and materials scientists in Saarbrücken have now developed a method that is much more accurate and objective than conventional quality control procedures. Their results have just been published in Scientific Reports.

"It took a fair amount of time before the computer scientists had understood why the internal structures of a material and their representation in image form play such an important role for materials scientists," says Dominik Britz, PhD student in the Department of Functional Materials at Saarland University. These internal structures are important because they are very closely linked with the properties exhibited by the material. For Seyed Majid Azimi, Britz's research colleague at the Max Planck Institute for Informatics, the job was first to produce significantly more accurate results than any of the image analyses conducted manually by expert materials scientists. To achieve such results, Azimi feeds his high-performance computer with image data that was previously "hand-classified" by experts. This data is used to train the computer models and these models are subsequently tested by comparing them against additional sets of human-classified image data.

"Manufacturing special steels is an extremely complex process that depends on many individual factors including the chemical composition of the material, the rolling process used and the types of heat treatment that the material is subjected to. Every stage of the production process influences the internal structure of the steel," explains Dominik Britz. Materials scientists refer to this internal structure as the material's "microstructure". The micro-

While practised experts are able to detect steel microstructures correctly in 50 percent of the cases, the machine learning method achieved an accuracy of 93 percent.



Source: Oliver Dietze

"We see this as just the beginning of a close cooperative partnership with Saarbrücken's highly respected computer science research teams. The new deep learning methods will not only help us assess the quality of steel more objectively and more accurately, we also anticipate that our results will be transferable to many other production processes and materials," explains Professor Frank Mücklich.

Source: Maximilian Schlosser

structure is composed of "grains", each of which is a tiny crystallite with a particular crystal structure. But neighbouring grains also differ in terms of their spatial orientation and, additionally, in terms of their individual shapes and their spatial connectivity, resulting in microstructures of high geometrical complexity. "These extremely complex structures can be made visible during the material development and the quality control stages by taking microscopic images. Specially prepared samples are evaluated using optical and electron microscopy," explains Britz.

Much better than the naked eye

Classifying a material involves comparing these microscope images with reference images that exhibit a typical geometrical microstructure. Over time, experienced engineers in company quality assurance departments develop a discerning eye that enables them to decide which particular steel microstructure they are dealing with. "But even these practised experts will sometimes make an incorrect call, as the differences between the images are sometimes barely discernible with the naked eye. Although humans are pretty good at distinguishing small relative differences, we are not very good at recognising absolute geometric standards," explains Professor Frank Mücklich, who supervised the study. Mücklich is also Director of the Steinbeis Materials Engineering Center Saarland (MECS) in Saarbrücken, whose staff were involved in the study.

The materials scientists were interested in finding an objective procedure that would be far less prone to user error and that could be applied irrespective of the user's level of expertise. "Machine learning methods allow computers to recognise complex patterns very rapidly and to assign the geometry of the microstructures in microscope images. They can learn the features of previously classified microstructures and compare these with recognised patterns," explains Mücklich. Using this approach, the research team in Saarbrücken was able to determine the microstructures of low-carbon steel at a level of accuracy that was not previously possible. "When using our system for microstructural classification, we achieved a level of accuracy of around 93 percent. With conventional methods, only about 50 percent of the material samples are correctly classified," says Mücklich.

uni-saarland.de

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The research team behind the study 'Advanced Steel Microstructural Classification by Deep Learning Methods' comprised Seyed Majid Azimi, a doctoral research student in computer science in the group led by Mario Fritz at the Max Planck Institute for Informatics in Saarbrücken, and the materials scientists Dominik Britz, Michael Engstler and Professor Frank Mücklich from Saarland University.

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R&D IN BRIEF

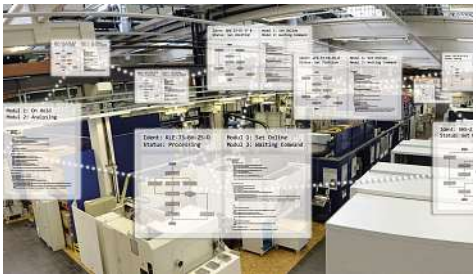
Monitoring temperature

Source: Universität Stuttgart IFF/Fraunhofer IPA

With "Logotherm 4.0", Fraunhofer IPA and Gesellschaft Wärme Kühltechnik (gwk) have together developed a solution that monitors the condition and process data of the temperature control system in plastics processing. It is intended to decrease waste and increase process quality, while simultaneously optimising maintenance.

ipa.fraunhofer.de

Industry 4.0



Source: Fraunhofer IPT

Researchers from three Aachen-based Fraunhofer Institutes are working together in the Fraunhofer High Performance Center for Networked, Adaptive Production to realise the complete connectivity of machines and sensors. The goal is to evaluate all recorded production data with intelligent algorithms in real time and flexibly adapt processes accordingly.

ipt.fraunhofer.de

Autonomous 3D scanner

Researchers at the Fraunhofer Institute for Computer Graphics Research IGD are taking the vision of batch sizes of one a big step closer to reality with a new type of 3D scanning system.

It is supposedly scans components autonomously and in real time. While the scan is running, intelligent algorithms create a three-dimensional image of the object in the background. After simulations and checks, the component can be printed using a 3D printer.

Source: Fraunhofer IGD

fraunhofer.de

Immaculate surfaces at the highest possible performance capacity

In the last decade, the manufacturing requirements for plastic injection moulding have become significantly more strict. Thus, the demand for pre-hardened plastic mould steels with uniform hardness combined with excellent burnishing qualities and high wear resistance has increased.

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Deutsche Edelstahlwerke is a member of the Schmolz + Bickenbach Group, a leading provider of customised solutions in the special long steel product business.

In order to comply with increasing market expectations, Deutsche Edelstahlwerke continually works on the development of these steel solutions. Daniel Frie is Technical Customer Service representative at Deutsche Edelstahlwerke, a producer and processor of special long steel products. For the three materials groups of engineering steel, tool steel and stainless, acid and heat-resistant steel, Deutsche Edelstahlwerke offers a wide range of product dimensions, from drawn wire with a diameter of 0.8 mm to open-die forgings with a diameter of 1,100 mm. As a technical partner, Deutsche Edelstahlwerke also develops innovative, individual special steels for complex applications. Over the past few years, the company constantly improved the quality of its steel products. Last year, Deutsche Edelstahlwerke has presented its latest pre-hardened plastic mould steel, Formadur 400.

In this interview, Daniel Frie explains how the requirements on the material have changed and which technological challenges the company has to face when it develops steel solutions.

Source: Deutsche Edelstahlwerke

Daniel Frie, Technical Customer Service at Deutsche Edelstahlwerke, is aware that the requirements for plastic mould steel are comparatively high.

In which way have the customers' requirements for plastic injection moulding changed in the past few years?

When producing for high-tech sectors such as the automotive industry, plastic injection processes are required that produce faultless products with the highest possible manufacturing efficiency. In the last few years, there has been a trend towards ever-higher injection pressures that are required to optimise the cycle times. At the same time, the surface finish of the plastic product must be high-grade and consistently repeatable. A prerequisite for the manufacturing of the required plastic moulds is tool steels that can be forged with the greatest accuracy grade while being robust in use. In application areas where large-sized, complex plastic moulds are used, the demands made on the material are disproportionately higher. Few steel manufacturers have the technological resources and material grade know-how to produce mould steel that meets these requirements.

Which steel grade solutions does Deutsche Edelstahlwerke offer and what is innovative about them?

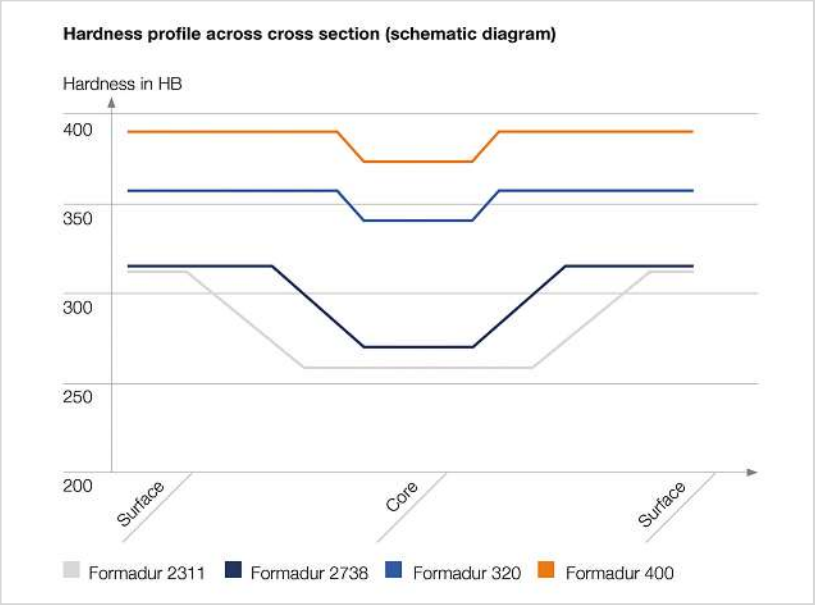
We had already initiated the development of the pre-hardened plastic mould steel Formadur 320 approximately ten years ago in order to fulfill increasing demands on improved burnishing qualities and resistance to wear and tear. The basis for this is standard steel grades 1.2311 and 1.2738, which are standard solutions for frames and moulds for plastic injection moulding.

We have significantly increased the hardness of the steel and optimised its machinability. In order to guarantee a consistently perfect surface finish, the hardness of the steel must be uniform from surface to the core of the block. Even at that point we had reached a milestone in the area of plastic mould steel by achieving delivery hardness of up to 355 HB with Formadur 320.

However, continuously setting new standards is the key point for being an innovation leader – and that is a guiding principle for the entire Schmolz + Bickenbach Group, to which Deutsche Edelstahlwerke belongs. In co-operation with our customers,

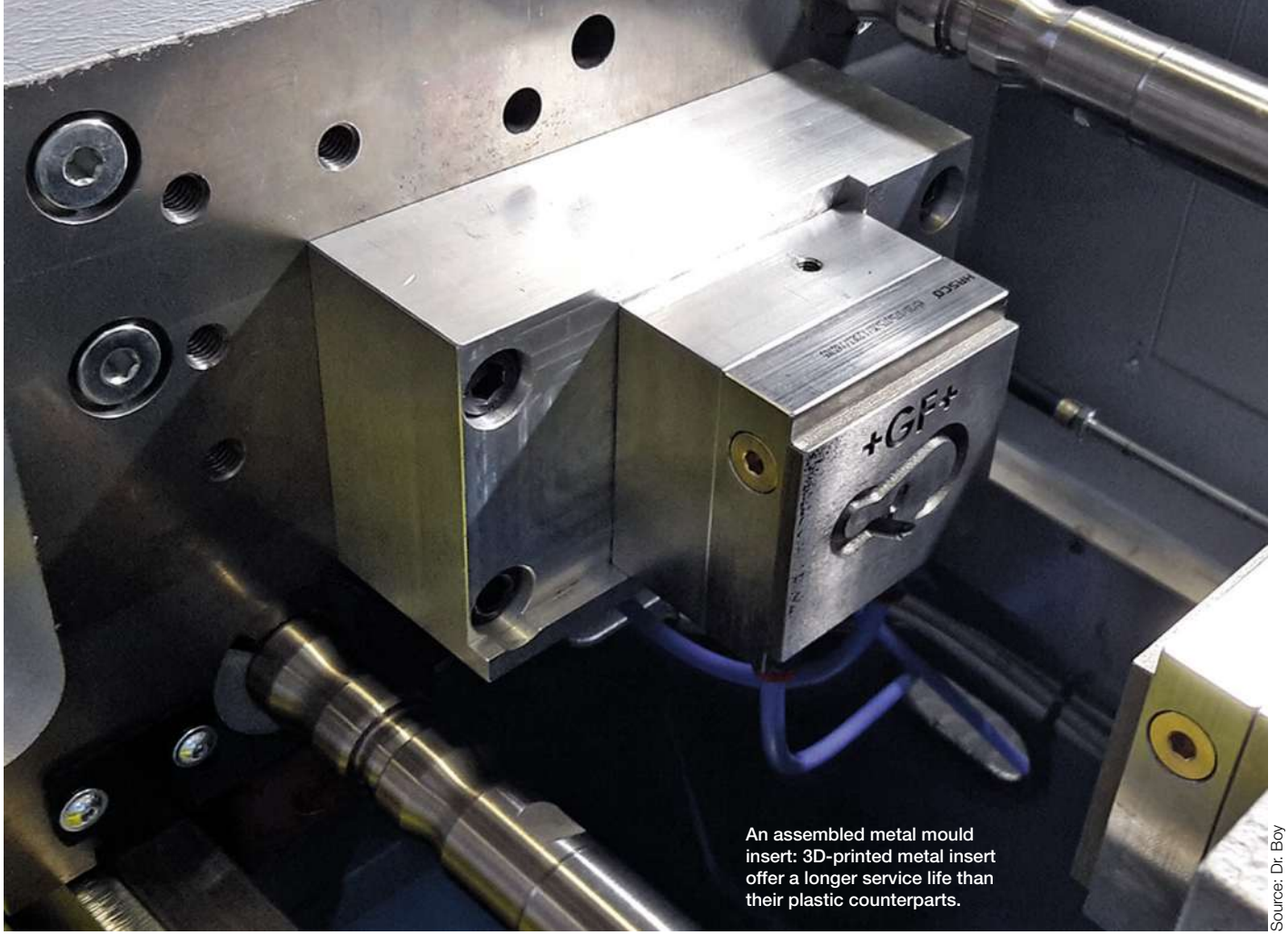
we now have the new product Formadur 400 ready for serial production. With a hardness of up to 410 HB, this high-grade steel provides an excellent hardness level for mould steels, which results in great burnishing qualities.

What are the biggest technical challenges in developing specifically requested steel, and how do you accomplish this?
One of the biggest challenges is to ensure the homogeneous hardness of large steel blocks. This must be guaranteed even at the core of the block in order to ensure uniform and repeatable surface qualities of the plastic product. The minimal differences in the hardness profiles of Formadur 320 and Formadur 400 show the advancement we have made in this area.
Our technological competitive advantage includes heat treatment furnaces and quenching tanks suitable for heat treatment of largest steel blocks. For end-users who require even higher steel standards, we also offer our Formadur steels in Superclean condition. By using the electro-slag-remelting process, we achieve the highest possible degree of purity and an extraordinarily homogeneous structure. This becomes noticeable with the excellent results in terms of polishing, texturing and durability. As a result, the quality, resistance and lifetime of the plastic mould are increased. The bottom line is that the production of high-standard plastic mould steels is in the end dependent on experience and technological resources.
dew-stahl.com



Source: Deutsche Edelstahlwerke

The properties of Formadur steels in comparison. Especially for injection moulding, the steel needs to have an optimal hardness uniformity from its surface to its core.



An assembled metal mould insert: 3D-printed metal insert offer a longer service life than their plastic counterparts.

Source: Dr. Boy

3D-printed mould inserts represent higher demands for the mould design

Prototyping and small-batch production are typical application areas of 3D printing. If the physical properties of injection-moulded parts are needed, however, 3D-printed moulds may be a viable solution. Depending on the requirements, plastic or metal 3D printing makes sense.

Especially in prototype construction and the increasingly individual designs of the components, more flexible and cost-efficient solutions are required instead of the complex construction of expensive steel moulds. If only small batch sizes of a plastic part are required or if the component is still in the development phase, modern 3D technology can help to save mould costs.

However, direct part production from the 3D printer differs significantly from an injection-moulded part. Thus, for example, the physical properties of a 3D-printed component differ considerably from injection-moulded parts. The solution is 3D-printed mould inserts. With these inserts, the plastic parts can be manufactured very cost-effectively in a cassette mould.

Based on the CAD data of the plastic part, the print data of the mould inserts can be processed accordingly and 3D printers create the mould. Depending on the size of the components, this can be done within minutes, while longer processing times are required for larger designs. Nevertheless, these mould inserts are designed much faster and more cost-effectively than their "steel competitors".

Low mould costs thanks to 3D-printed mould inserts as well as the fast implementation of modifications are the decisive advantages for the users. A "drop of bitterness" is, however, the lifetime of these moulds. High temperatures of the materials and large injection pressures affect the mould inserts more significantly and thus the operating times of the 3D-printed moulds dwindle. As a result of this, the service life of plastic moulds is very limited.

Especially in the case of small batches and average quantities, many users are looking for a more reliable solution. This solution is offered by the use of 3D-printed metal mould inserts. Higher stability and the possibility of a partly required mould temperature control/cooling are provided with these

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THE COMPANY

Injection moulding machines by Dr. Boy

Dr. Boy GmbH & Co. KG is a leading manufacturer of injection moulding machines with clamping forces up to 1,000 kN. The compact and durable machines work precise, energy-saving and therefore economical. Boy continually aims at setting new standards with innovative concepts and solutions.

Since the company was founded in 1968, more than 45,000 injection moulding machines have been delivered worldwide. The privately owned company continues to put special emphasis on engineered performance and high-class "made in Germany" workmanship, the company states.

metal mould inserts and thus they represent the next upgrade level of additive production.

However, the layer-by-layer print of the plastic or metal mould inserts is clearly different in terms of preparation and planning. In the case of the metal mould inserts, a large number of additional elements has also to be taken into consideration in advance.

Proper preparation is the be-all and end-all

For the complex and highly 3D-dimensional parts, temperature control channels and their connections must be provided during the planning stage of the mould inserts.

In the case of the metal-printed moulds, the parting line still has to be processed, since the structure of the surface of the moulding part comes from the printing process. For the achievement of a defined and desired surface, this additional processing step is necessary.

The fact that the technological and monetary expenditure for 3D-printed mould inserts is manageable and much more efficient for small quantities than conventional steel moulds is not fully applicable for metal mould inserts, depending on their design and complexity. The decision on a metal mould insert or a conventional aluminium or steel mould should be made is in the design phase of the moulds or metal mould inserts. The engineer should be familiar with the capabilities of 3D technology and be able to find a good and affordable mould in light of the additional possibilities.

dr-boy.de

Source: Dr. Boy

For small batch sizes, pastic moulds can be a cost-effective solution.

Source: Formlabs

Process engineer Christian Joebstl runs three Form 2 SLA 3D printers in Pankl's production facility.

Manufacturing with 3D-printed jigs, fixtures and toolings

Balázs Kisgergely

Pankl Racing Systems, a specialist in engine components for vehicles, often needs custom jigs and fixtures for its production processes. Implementing 3D printing helped them save a considerable amount of money.

What do Formula 1 race cars and Marine One, meaning the United States Marine Corps aircraft carrying the President of the United States, have in common? Many of their high-performance drivetrain and engine components started life in Kapfenberg, a quiet little town nestled in the Austrian Alps.

Pankl Racing Systems specialises in developing and manufacturing engine and drivetrain components for racing cars, high-performance vehicles and aerospace applications, with more than 1,500 employees and worldwide subsidiaries in Austria, Germany, the United Kingdom, the United States, Slovakia and Japan.

Every single part that Pankl makes requires a series of custom jigs, fixtures and other toolings that are designed and fabricated specifically for that part. The result is a proliferation of custom tools, adding significant cost and complexity to the manufacturing process.

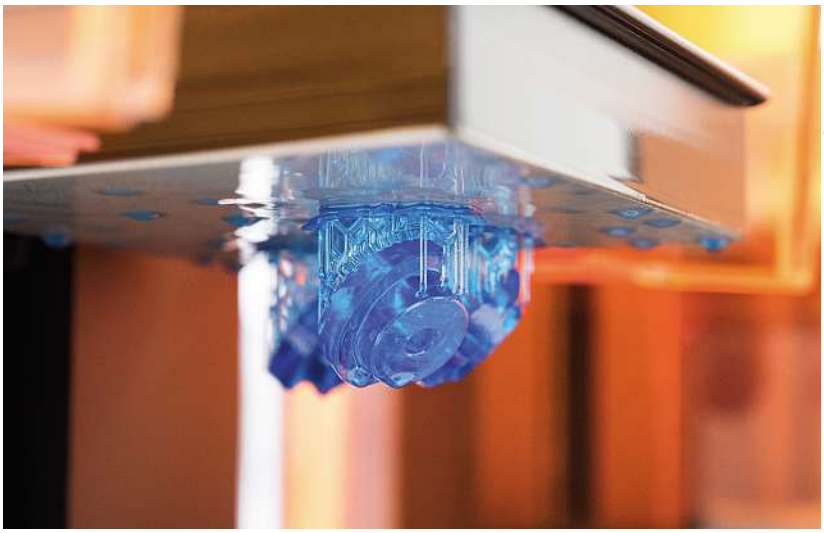
To fulfill tight production deadlines, process engineer Christian Joebstl and his team introduced stereolithography (SLA) 3D printing to produce custom jigs and other low-volume parts directly for their manufacturing line at the Austrian company's new €33.5 million state-of-the-art manufacturing facility.

Initially, 3D printing was met with scepticism. However, it turned out to be an ideal substitute to machining a variety of these tools. This was surprising, especially for Pankl's demanding engineers. In one case, it reduced lead time for jigs from two to three weeks to less than a day, which is a decrease of 90 percent. And it decreased costs by 80-90 percent, leading to €150,000 in savings. In the following interview, Christian Joebstl explains

how he and his team implemented the 3D printing-based process.

Pankl has been in the business for more than 30 years. Has 3D printing been a long-standing part of your practice?
Surprisingly, not at all. We didn't have any 3D printers until less than a year ago. A colleague of mine had a request for a custom cover to hide some areas from impact in a shot peening machine. We used to buy parts like this from an external supplier, and one such tooling cost about €1,200. I was thinking 'there has to be another way.'
Having been familiar with 3D printing from my education, I started looking and found the Form 2 3D printer after reading some reviews online. My colleagues understand the value in 3D printing now, but at the beginning, they were extremely skeptical. They thought 3D printing was more like a toy.
In our business, we expect that good equipment is inevitably also expensive. Most of our machinery starts at €100,000 and goes well beyond that. When my colleagues saw that the Form 2 only costs about €3,900, they asked me, "Why should we buy a toy?" We ordered multiple custom sample parts to conduct tests, and it turned out that the 3D-printed parts were capable. Holes and length tolerances were within the ±0.1 mm interval. I researched the material costs for my amortisation calculation and discovered that a 3D-printed set of the tooling for shot peening would only cost €45. I summarised this into a presentation for the board and took the parts to the kickoff meeting of the new gear plant. They were finally convinced, and we decided to buy our first Form 2, which we soon scaled up to three units.

In which cases has 3D printing helped trim production timelines and save costs?
Pankl was selected to manufacture entire gearbox assemblies for a well-known motorcycle manufacturer in 2016, and we swiftly began to set up the new production facility. Manufacturing these gears is an elaborate process. Forged steel parts go through multiple stages of machining using automated lathes, followed by heat treatment and stress relief. Each stage of turning in the automated lathes requires custom jigs for every individual gear type. Machining these parts is costly, and adds significant complexity and risk to the manufacturing process. Our schedule was tight because we had to produce many more gear types than expected. By the time we got to designing and ordering toolings, we were already supposed to start producing the first acceptance lots. We couldn't just design the custom jigs and get them next day. If we had outsourced to traditional machining service providers, we would have had to wait six more weeks before we could start production — so we decided to produce the parts in-house on our Form 2 3D printers.
With 3D printing, you can simply take the same design, send it to the printer, and then have the finished part ready by the next morning. This leaves time to check the part on the manufacturing line and make any necessary changes. It also simplified the design process, providing the design freedom to produce jigs in any shape. In conventional CNC milling or turning, you are constrained by the need to design machinable parts, and every extra curve, hole or chamfer adds complexity to the process. Using a single Form 2, we can print a single jig in 5–9.5 hours, and running all three of our machines enables us to produce about 40 jigs within a week. A simple machined jig costs about €40–€50, but more complex parts can cost up to €300. 3D printing reduces these direct costs to €8.5–€25, and significantly lowers overhead costs in design, purchasing and storage, resulting in more than 90 percent overall cost reduction. Considering we'll have to produce more than 1,000 jigs over the course of production, 3D printing will help the company save more than €150,000.


Source: Formlabs

According to Joebstl, one of the advantages of 3D printing is that the design can be sent to the printer, and then come back as a finished part the very next morning.

How did these parts fare on the production line?
We've had lots of problems in the past because the cooling media in the lathe is very aggressive on plastic parts and makes them brittle after some time. Parts 3D-printed with Tough Resin have shown resistance against our cooling media and they are strong enough to withstand the intermittent load that these parts have to endure. Holes and length tolerances normally lie within the ±0.1 mm interval, which satisfies the requirements for our jigs. We've already produced more than 300 3D-printed jigs to manufacture small batches of 200 parts of each gear for the trial production run. Soon, we'll scale up production to 1,000-2,000 parts per batch and the production capacity of the facility will increase to more than 1.5 million gears per year.

What are some other applications where you have used 3D printing?
Prototyping, shot peening, masking and manufacturing various jigs and toolings. For example, when we have a new connecting rod design, we 3D-print prototypes to discuss complex features on the part. It's much easier if you can look at the part and hold it in your hands.
Once we had to design a custom connecting rod for a customer, who wanted to verify if it'd fit into the building room of a cylinder and that it wouldn't hit the chamber or the cylinder head itself while turning. We 3D-printed a prototype and sent it to them. Once they confirmed that the design worked, we could start production with confidence. The

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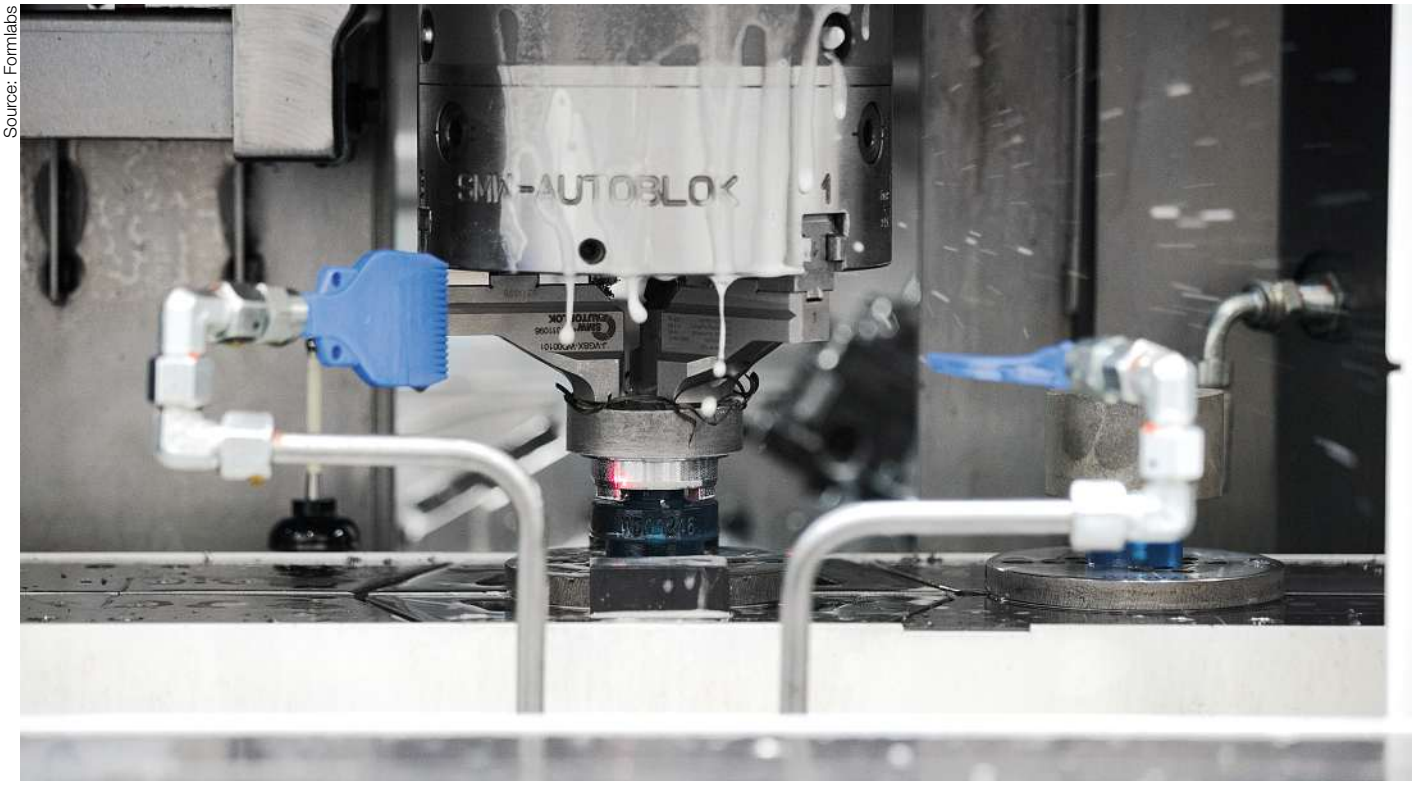
Stereolithography (SLA) printing technologies make use of photopolymerisation. Using a UV laser, photopolymers are selectrively cured layer by layer. SLA 3D printers often have a relatively small build volume but can achieve exceptional detail and surface finish with precise control of the laser beam.

Source: Formlabs



A machine gripper picks up the part from the first jig and places it on the second jig once the machining process is complete.

alternative would have been to produce a machined part, which would have been more expensive for the customer, with eight weeks of waiting time.
We also 3D-printed special adapters for grippers on an automated handling system. To achieve the perfect grip between the gripper and the part, you have to take the negative of the part and form the fingers of the gripper according to the shape of your part. Normally we would have milled or cast it, which would have been substantially more expensive. Recently, we used Flexible Resin in a shot peening machine to increase the friction between the self-cleaning jigs and some other parts. The friction between the metal parts was too low to transfer the turning movement. I added some 3D-printed elastic brakes in the tooling to increase the friction so that the turning movement was transmitted from the bottom to the top. Getting these parts from an external vendor would have taken weeks.

Do you have any other plans to use 3D printing within Pankl?

One of my goals is to get more orders from other divisions within Pankl. We've had success with 3D-printed parts in our production line, and I see countless other applications that could benefit from 3D printing. I want to show other engineers the parts we make and the applications where we use them, to make them aware that this technology is available to them in-house.
I started with this project when other colleagues showed interest in our new processes. I sent around information on the 3D printing materials, such as their mechanical properties, what they look like, and the particular use cases they're suitable for. I also printed sample parts for other departments, described the design specifications and how they can order something.
We've already printed parts for aerospace and drivetrain divisions. They send us the designs, we produce the parts for them, and they receive finished parts that are ready to use in their machines. Pankl is a large company, though, which makes this a slow process. We have to overcome the same hurdles as we did initially within our department, and I believe many other companies have these concerns about 3D printing. But looking at the results we've achieved, I'm positive that they'll recognise the value in the technology.

formlabs.com; pankl.com

Source: Formlabs

Pankl Racing Systems soon owned three 3D printing units after learning how efficient the company can work with them.

Selective laser melting for aerospace with high-performance materials

Italy-based Zare, a leading Italian company in precision engineering, trusts the reliable and high-precision technology from SLM Solutions for manufacturing in the aerospace industry. The company from Boretto is expanding its machinery with an SLM 280 2.0.

Zare is a company with headquarters in northern Italy and more than 50 years of experience and expertise in precision engineering. In 2009, Zare started to provide independent services in rapid prototyping and additive manufacturing. Since then, the company has steadily expanded its range of machinery and rapidly increased its expertise in this field.

Zare reportedly reached a new milestone in 2011 with the expansion of its service offer in the areas of post-processing, finishing of prototypes, and preparing dental technical and medical models. Among other things, the company now also offers special surface finishing and reverse engineering. According to the company, Zare is characterised by a high level of diligence and reliability and is therefore well prepared for cultivating new international markets.

Machine was able to convince with its construction chamber

Recently, the first selective laser melting machine, an SLM 280 2.0 from SLM Solutions, was delivered to its headquarter in Boretto. It was put into operation, embedded in Zare's own machinery. The company provides a wide range of machines for additive manufacturing and focuses on researching and testing individual materials.

The SLM 280 2.0 is currently being operated by Zare with the material AlSi7Mg0.6 (A357). The correct setting of the machine is the prerequisite for producing high-quality parts that require little post-processing. According to SLM Solutions, the selective laser machine is particularly suitable for processing high-performance materials and consequently ideal for manufacturing in the aerospace industry.

In addition, the company also uses the exclusive alloy Scalmalloy, which was developed by Airbus AP Works. Zare tests and defines processes in accordance with the standard UNI EN 9100:2009 to take full advantage of the construction chamber height of the SLM 280 2.0 with this high-performance alloy.

According to SLM Solutions, the SLM 280 2.0 has a construction space sized 280 × 280 × 365 mm³. Specialists from the industry maintain that the greater the Z-axis, the greater the quality. The designers at Zare were convinced by the substantial construction chamber height of the SLM 280 2.0.

"If you have a larger vertical expansion available, then that component in the machine can be aligned better and the number of necessary support elements reduced, which also reduces unwanted tension inside the component," said Andrea Pasquali, co-owner of Zare.

Additive manufacturing has certainly overcome the phase in which it only seemed useful for the production of prototypes. Metal-based 3D printing is advancing innovation further and is a cutting-edge technology that enables the production of functional components with unique properties as well.

slm-solutions.com; zare.it

The SLM 280 2.0 selective laser melting machine by SLM Solutions is installed at Zare's headquarters in Boretto.

Source: Zare

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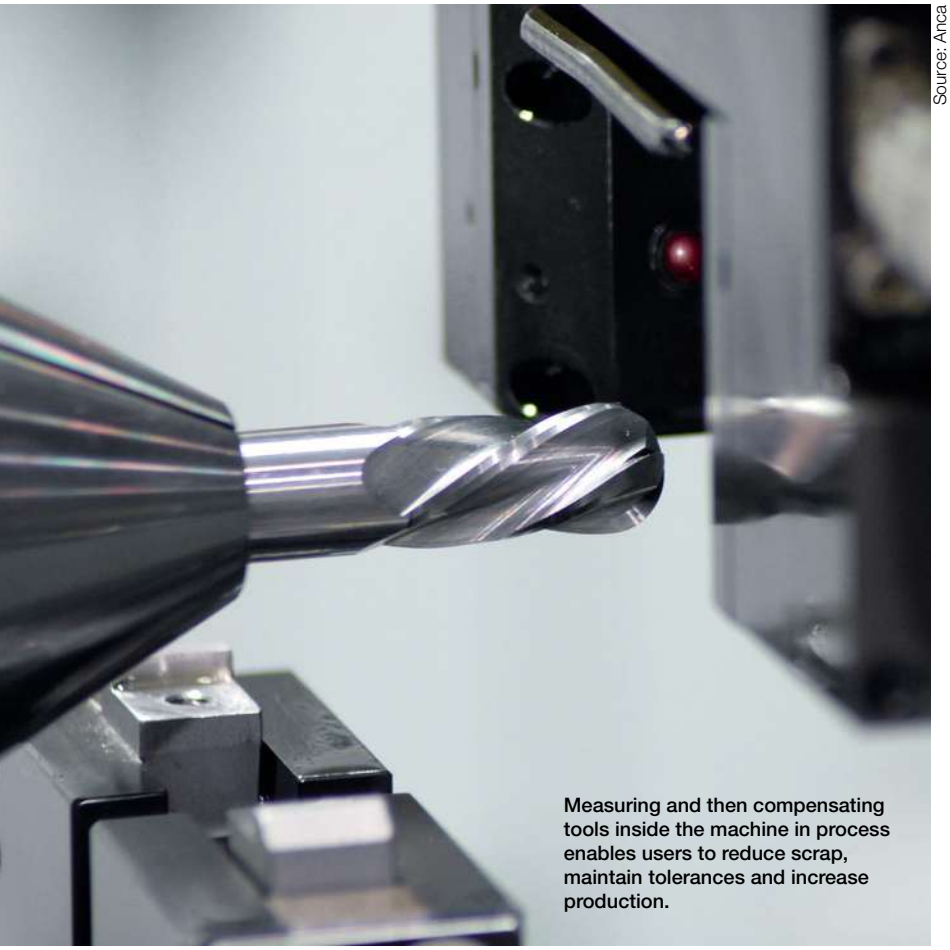
SLM is the abbreviation for Selective Laser Melting, an additive process in which fine metal powders are melted in an inert gas chamber to build up a metal part. Layers of metal powder are fused together selectively with a high-power laser.

Accuracy down under: Measuring endmill geometries within +/– 2 microns

CNC machine manufacturer Anca combines leading-edge technology with operating simplicity. The company's Laser-Plus and MX7 Linear tool grinding machine is the winning combination for producing superior-quality, high-performance cutting tools.



Source: Anca

Measuring and then compensating tools inside the machine in process enables users to reduce scrap, maintain tolerances and increase production.

In the tool industry, it is known that precision machining of moulds and die-casting requires line-form accuracy of ballnose and corner radius endmills. This accuracy is important for achieving high uniformity of the manufactured component. Australia-based Anca says it provides the technology to produce highly accurate endmill profiles for cutting tool manufacturers.

The company's Laser-Plus is a product for tool measurement. It is meant to improve the grinding accuracy of ballnose and corner radius tools with a built-in laser probe that can measure and compensate tool geometries in the manufacturing process within +/- 2 microns or less.

The second generation of Laser-Plus, according to Anca, has incorporated grinding data from customers that had used the laser in their daily manufacturing processes to develop a better and more accurate product. New enhancements help operators achieve high levels of precision and productivity when grinding cutting tools on the MX7 Linear, Anca says. Measuring and then compensating tools inside the machine in process enables users to reduce scrap, maintain tolerances and increase production.

Grinding corner radius and ballnose on pre-ground OD endmills

Many customers grind large batches of tools with the overall diameter (OD) finished ground, but do not grind the end face. This approach enables tool manufacturers to keep large amounts of OD-finished tools in stock waiting for end face grinding (ballnose or corner radius) in smaller batches to meet their customer's specific requirements. This strategy shortens lead times and offers improved service to the end user of the tools, Anca says. According to the company, Laser-Plus has the capability to measure pre-ground OD and match the end-face grinding for corner radius and ballnose tools.

Second-generation Laser-Plus has an option to digitise long and short flutes separately and find the larger diameter flute (long or short) and compensate. Maximum diameter compensation does not compensate the difference between long and short flutes, rather, it compensates all flutes by the error measured on the maximum set of flutes. In the case of three flutes, the laser digitises all edges separately, finding the largest diameter and then compensating.

In many cases, tool manufacturers need to supply measurement reports with the ground tool to verify tolerances and to meet compliance standards. Standard to the Laser-Plus feature is the capability to produce a measurement report for ballnose and corner-radius type tools (measurement reports for profile are already available). One important note is that the errors measured on Laser-Plus are based on the nominal arc radius whereas some external measurement device may be based upon the "best fit" profile. This feature is another significant enhancement to enable customers to meet the expected quality protocols demanded by the market.

According to Anca, the enhancements provide customers more flexibility in the in-process measurement capability inside a grinding machine.

anca.com

Tool for roughing and finishing in an expanded mill series

Milling – Tool manufacturer Inovatools says its new VHM-HPC roughing/finishing milling cutter from the Fightmax Inox series has a special geometry and chip clearance. Its defined cutting edge ability in combination with its micro-geometry coupled with the high-performance coating enables the new milling cutter to optimally fulfill special cutting requirements.

Whether cutting diverse materials like Nirosta, chromium steel, VA steel, rust-free steel or nickel-chromium steel, Inovatools notes that specific characteristics depending on the chromium, nickel, titanium and molybdenum share content in the tool will make the difference in the tool's cutting ability.

The tool basically has to contend with its edge zone hardening and the material's high level of toughness. Since their materials are poor thermal conductors, rapid chip clearance is particularly important. In addition, the tool should be designed so that the chips that tend to bond and stick to it are removed reliably. This is where Inox tools meet machining requirements, the company explains.

Source: Innovatools

According to Inovatools, Fightmax delivers up to 41% longer service life in the wear test compared to a comparable tool in the market.

According to Inovatools, Fightmax Inox is manufactured using a balanced mixing ratio of special ultra-fine grain carbide. The four-edged HPC power package has an unevenly split and unevenly twisted geometry with highly polished chip space. This gives the tool the necessary performance, ensures quiet, vibration-free concentricity and guarantees quick and reliable chip removal, Inovatools claims.

This is supported by the smooth, high-performance coating, Duocon, which also gives Fightmax Inox the necessary stability in cutting. The VHM-HPC roughing/finishing milling cutter is available in short and long versions with diameters from 6 mm to 20 mm.

The new milling cutter is particularly resilient thanks to its specific micro-geometry and its defined cutting-edge rounding, which allows for the Fightmax Inox to be have high edge stability when performing HPC milling.

This makes it suitable for special cutting requirements and also ensures long service life, even at high feed rates and cutting speeds. It has also been optimised for the unique cutting conditions of rust-free materials. Finally, Fightmax is said to deliver up to 41% longer service life than comparable tools.

inovatools.eu

Flexibility, quality and savings with wire EDM solution

EDM – GF Machining Solutions says its Agie-Charmilles Cut P series wire-cutting electrical discharge machine can do everything from producing very light surgical tools to machining a six-tonne die-casting mould. The Cut P machine series, according to GF, has been designed for demanding high-speed machining. It has an Intelligent Power Generator that enables precision-parts and mould-and-die manufacturers to increase their cutting performance by 20%.

The Cut P series has Automatic Slug Management as well as tooling and automation solutions, which are said to optimise machine uptime. Also, running costs are minimised thanks to functions such as Automatic Slug Welding, Automatic Slug Management, Eco machining, an improved econowatt function, automation readiness and ergonomics – which contribute to reduced time-to-market products and faster production at lower costs, GF says.

As the Cut P series can vary its performance, be it micro-machining or macro-machining, it helps manufacturers expand their business scope. The machine can achieve thermo-stabilisation and machining repeatability of down to 2 µm and finer surface finishes down to Ra 0.08 µm. Advanced taper accuracy below ten seconds with straightness, sharp contours and no lines is an easy job for the Agie-Charmilles Cut P series' Expert systems, GF notes. Its collision protection system prevents costly machine maintenance and ensures accuracy and reliability as well.

The Cut P series is also equipped with Smart and connected solutions. One example is the RFID chip, which is integrated into wires and filters and eliminates error risks. They facilitate the quick replacement of consumables,

Source: GFAC

The Agie-Charmilles Cut P wire EDM machine can be used in most critical applications in electronic components, automotive and medtech.

avert breakdowns, minimise stock and ensure process traceability, while System 3R's Work-Shop-Manager and Cell-Manager software takes process administration and surveying to the next level: E-Tracking digitises process monitoring and traceability, and GF's R-Connect suite of modular digital services keeps manufacturers connected to their machines at all times. The Cut P series increases tooling life, reduces scrapped parts and allows manufacturers to work fully automatically.

gfms.com

PRODUCTS IN BRIEF

Source: Mapal Dr. Kress

Inserts for boring

Cutting Tools – Mapal introduces a new series of cutting materials for ISO indexable inserts, as well as "press-to-size" inserts for the boring of steel, stainless steel and heat-resistant cast steel, to be used in turbochargers, for example. According to the company, tools with ISO elements are an integral part of the product portfolio. The tools are intended to allow users to achieve a clear reduction of the cost-per-part.

mapal.comm

Source: Meusburger Georg

Clamping system

Machining Accessories – Meusburger has announced that its clamping system is now also available for die-making. The die set plates are aligned and clamped where it is important for the die set function. Like the clamping system for mould-making, the H 3000 results in short set-up times during the machining of die set plates. The zero clamping system H 3000 is aimed at precision and repeatable accuracy.

meusburger.com

Source: Asco Carbon Dioxide

Dry ice blasting

Cleaning – The Ascojet 1208 is a compact and easy-to-handle dry ice blasting machine suitable for industrial applications. Consumption rates for average dry ice volume and blasting pressure can be easily adjusted manually. Asco dry ice blasting machines are used for cleaning moulds, tools and machines. In most cases, it is not necessary to dismantle the parts to be cleaned, which leads to shorter downtimes.

ascoco2.com

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The Last Alchemist

Isaac Newton was born 375 years ago. According to the physics and history books, he is the pioneer of the natural sciences. He is probably best known for Newton's law of universal gravitation. However, he did not only work on subjects in the field of physics but also on religious and philosophical topics. How does turning metals to gold fit into the image we have of Newton today? His experiments in the field of alchemy are virtually unknown.

One newton is defined as the force required to accelerate a mass of one kilogram at the rate of one metre per second squared. Every student learns this in physics class. However, the fact that Isaac Newton also conducted research in alchemy is largely unknown. Admittedly, it is difficult to reconcile this fact with his reputation as the father of modern physics, as Newton is so often described. But alchemy? Occult signs, secret rituals, and the search for the philosopher's stone? By God, that's not science!

No wonder Newton kept his research in alchemy secret throughout his lifetime. This mystical facet of his work was not discovered until closer examination of the natural scientist's estate by historians. A 22-page manuscript proves that Newton was increasingly involved in alchemical experimentation toward the end of his life. At that time he was already president of the Royal Society, the British society dedicated to nature research and a bastion for European Enlightenment. To find manuscripts about alchemy here, in the archives of the Academy of Sciences of all places, is extremely surprising. Alchemy, however, is well established in the history of science.

A life between religion, alchemy and classical physics

When Isaac Newton was born in a small farmhouse in the English county of Lincolnshire in January of 1643, science as it is understood today did not yet exist. Science at that time was still considered a segment of philosophy and wasn't offered as a subject in school until the nineteenth century. Newton's education began at Trinity College, Cambridge, where he first dealt with the problems of natural philosophy. Natural philosophy is considered the precursor of natural science. Experiments were conducted primarily in thought only and were closely associated with fundamental theological questions. Thus, Newton also was attempting to get to the bottom of the "Causa Prima" as a way of understanding how the world operates.

The church still had a major influence, in worldly matters as well. In 1667, when Newton was appointed as a professor at Trinity College, he was forced to take a vow of celibacy and was later ordained. As such, Newton's research was consistently guided and influenced by religious interests. However, regardless of how his observations were interpreted, his insights have found their way into today's physics books.

Source: Public Domain

This portrait of Sir Isaac Newton was painted in 1702 by Godfrey Kneller and currently hangs in the National Portrait Gallery in London.

ETMM

TIMELINE

1643

Isaac Newton is born on January 4 in Lincolnshire, England.

1669

Newton is appointed Professor of Optics and Mechanics at the University of Cambridge.

1687

His main work, "Philosophiae Naturalis Principia Mathematica", is published.

1703

Members of the Royal Society appoint Newton as their president.

1727

Newton dies on March 1 in London. He is buried in Westminster Abbey.

Newton put nature to the test in his experiments and reaped fruitful rewards such as equations related to mechanics, a universal theory for gravity, the foundations of fluid mechanics and the decomposition of white light into spectral colours. His main work was his "Philosophiae Naturalis Principia Mathematica", which he submitted as a manuscript to the Royal Society in 1686 and which the society later published in 1687 in Latin. And virtually as an afterthought he developed differential calculus and designed a reflector telescope.

Newton is not only counted as the father of classical theoretical physics, but also as a child of his era. And since alchemy is considered to be the precursor of modern chemistry and pharmaceutics, Newton is also referred to as The Last Alchemist. Just like many who were involved in the mystical experiments of the day, Newton was also in search of the philosopher's stone. The philosopher's stone was supposedly capable of turning base metals into gold. However, Newton also systematically explored the properties of metals in search of alloys with low melting points. His estate also contains treatises on metal oxides, acids and salts. However, a portion of his manuscripts were written in a secret language which to this day no one has been able to decipher.

Speculative transactions and struggles with counterfeiters

His career in the sciences came to an end in 1699 and he was appointed warden of the Royal Mint. He decided to accept the post so he could retire later. The research work he carried out at the university was poorly paid. Newton was considered rigid and unyielding in his fight against counterfeiters. He still found time to keep abreast of the issues and questions of natural philosophy and even authored theological essays. When Newton died in 1727, he was laid to rest in an official state ceremony held at Westminster Abbey. He was the first naturalist to receive this honour.

Newton's scientific legacy is immense. However, his material estate was likely less spectacular than expected. In 1720, Newton lost approximately £ 20,000 on speculative stock transactions. He invested in a company whose activities included involvement in slave trade and a veritable stock market boom ensued. After the burst of this speculative bubble a short time later, Newton is said to have responded to his loss as follows: "I can measure the motion of a moving body, but I cannot measure human stupidity."

Jonas Keck

ISTMA World News & Events

The International Special Tooling & Machining Association (ISTMA) is an international association representing 19 special tooling and machining associations throughout the world. Collectively, ISTMA member associations represent over 8,000 companies and over $40bn in annual sales. ISTMA World is in charge of the central coordination and organisation of all international activities

NEWS

Manufacturing Solutions Ireland

Source: GTMA

GTMA (UK National Association) and Limerick Institute of Technology (LIT) are organising an event themed Manufacturing Solutions, which will be held at LIT, Moylish Park, Limerick, Ireland on 13 June 2018. This event will provide an opportunity for visitors to learn about the latest developments and advanced technologies available to manufacturing and precision engineering companies in every industrial sector.

Over 80 of the most advanced providers of machine tools, workholding, cutting tools, metrology, inspection and CAD/CAM/PLM manufacturing software and ancillary products and services, will take part as exhibitors. A comprehensive programme of leading industrial keynote speakers is currently being developed as well.

istma.org

General Assembly programme released

The programme for the ISTMA Meeting and General Assembly taking place in Zurich, Switzerland, 11-13 April 2018, has just been released. The event includes networking activities, visits to local companies and industry suppliers. It is organised in close co-operation with Swissmem, the Swiss National Association.

istma.org

Source: Istma

Europe President keynote speaker

Source: Istma_Makino

ISTMA Europe President, Joaquim Menezes, was the keynote speaker at the recent International Die and Mould Forum in Kirchheim unter Teck, Germany. Organised by ISTMA Global partner Makino, the event included presentations and panel discussions with industry experts talking about "Digitisation" and "Industry 4.0". How one implements them in companies in a practical way was addressed too. Attendees also participated in practical demonstrations on machines for die and mould applications.

istma.org

EVENTS

Hannover Messe

- Leading trade show for industrial technology, with over 5,000 exhibitors from more than 75 countries.
- Themed Integrated Industry - Connect & Collaborate, the fair will also include 1,400 lectures and panels. It will take place from 23-27 April 2018 in Hanover, Germany.

Control 2018

- International trade fair for quality assurance
- Held at the Stuttgart Exhibition Centre from 24-27 April 2018, the show will provide suppliers and users a globally recognised technical event that is focused on relevant QA issues.

MEMBERS

Tool Factories Association
www.svaz-nastrojaren.eu

Estonian Special Tooling Association
www.estatools.ee

The Federation of Finnish Technology Industries
www.techind.fi

Association Française des Industries du Moule, Modèle et Maquette (AFIM)
www.afim-france.com

VDMA
www.vdma.org

The Gauge & Tool Maker's Association (GTMA)
www.gtma.co.uk

Szerszámgyártók Magyarorsazági Szövetsége (SZMSZ)
www.szmsz.hu

Unione Costruttori Italiani Stampi e Attrezzature di Precisione (UCISAP)
www.ucisap.it

Stowarzyszenie Techniczne – Tworzywa Sztuczne
www.stts.com.pl

Associação Nacional da Indústria de Moldes (CEFAMOL)
www.cefamol.pt

Slovenian Tool and Die Development Center
www.tecos.si

Toolmaking Association of South Africa (TASA)
www.tasaweb.co.za

Swedish Moulding and Press Tools Association
www.sinf.se

Swissmem
www.swissmem.ch

International Mould Manufacturers Union
www.ukub.org.tr

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