Connect edition 2020

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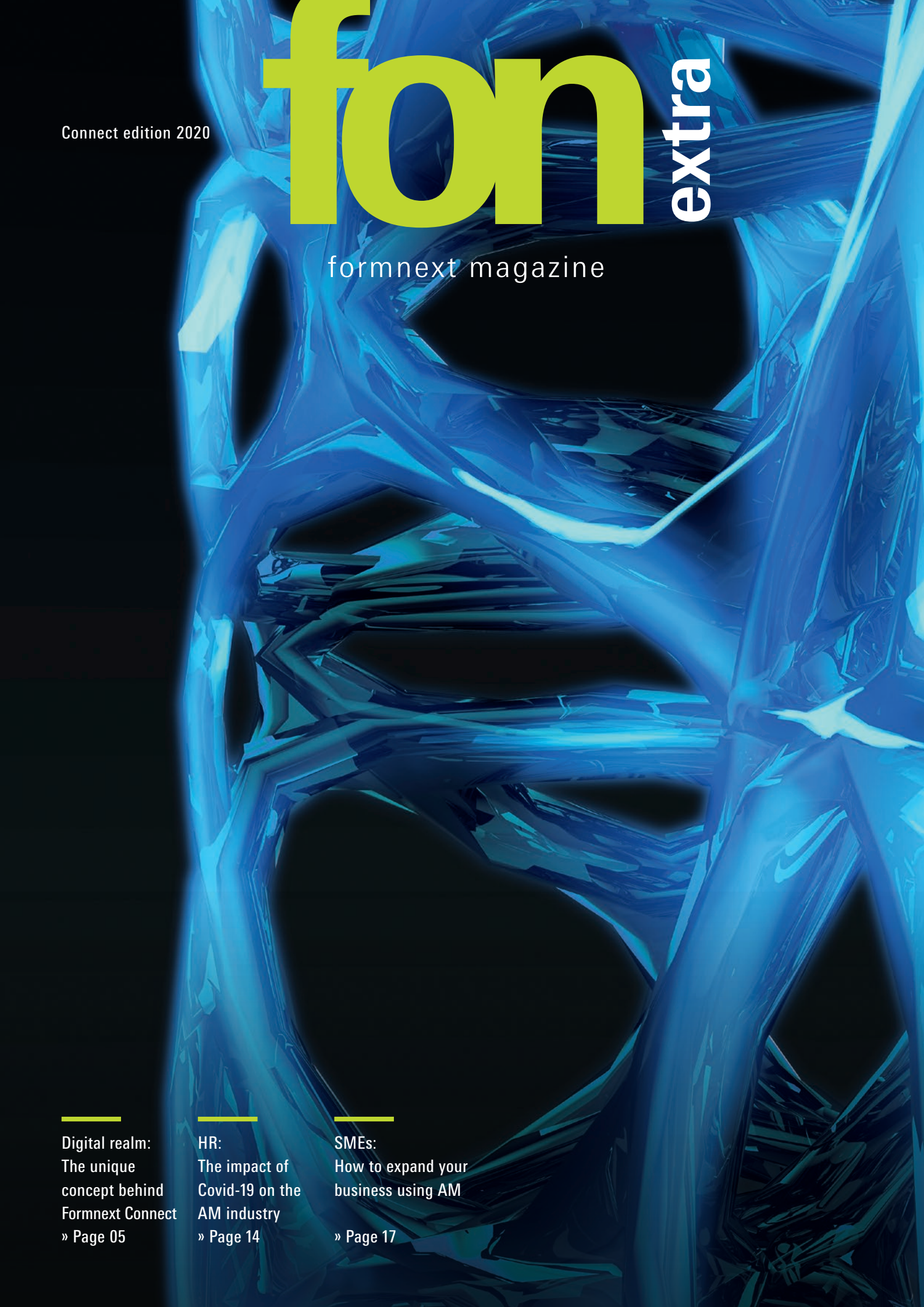
formnext magazine



Cover: B.Right – see also page 21

EDITORIAL

Although having to cancel the hybrid version of Formnext 2020 was a bitter disappointment, we've done our best to refocus and put all our efforts into preparing the all-virtual Formnext Connect. As this new format has taken shape, we've grown more and more confident in working toward and looking forward to this November's event.

For us as trade fair organizers, the coronavirus has been the catalyst for developing and implementing an array of digital offerings. In the Grip platform, we've chosen an excellent tool capable of bringing real people together (if only virtually) through quality matchmaking. Facilitating business contacts has, after all, always been our purpose and objective. This year, we'll be doing our best to achieve precisely that in a virtual setting. I'm also pleased to report that we've put together a solid lineup of content that will help provide for the usual Formnext atmosphere.

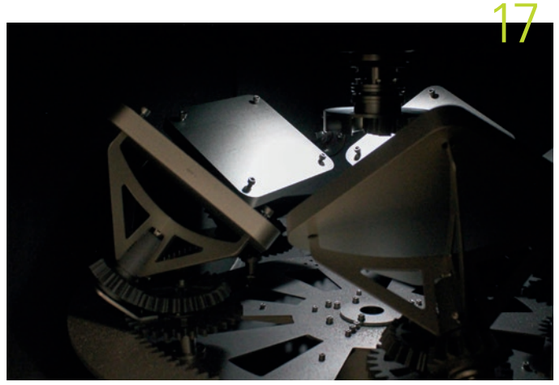
That said, everything is admittedly at a very early stage. Since we had to plan and organize everything in a very short period of time, we may have to ask for a certain amount of tolerance for shortcomings in some respects. On the whole, however, we're in the process of writing a good storyline for Formnext's usual spot on the calendar and creating a platform that gives both providers and users in the AM industry – meaning our exhibitors and attendees – the chance to come together.

In doing everything in our power to establish this platform, we believe we've also laid a foundation on which future trade fairs can be built. Assuming such events will be held entirely on-site at all in the future, that day is definitely still a long way off. In the years ahead, the trade fair of the future will therefore continue to focus on ways for people to meet in person, but combine them with digital possibilities that are sure to see significant advancements going forward.

I for one am glad that enabling people to come together is still the most important aspect of almost any activity. I hope that we'll all be able to do so again face-to-face very soon.

Sincerely, Sascha F. Wenzler
Vice President Formnext

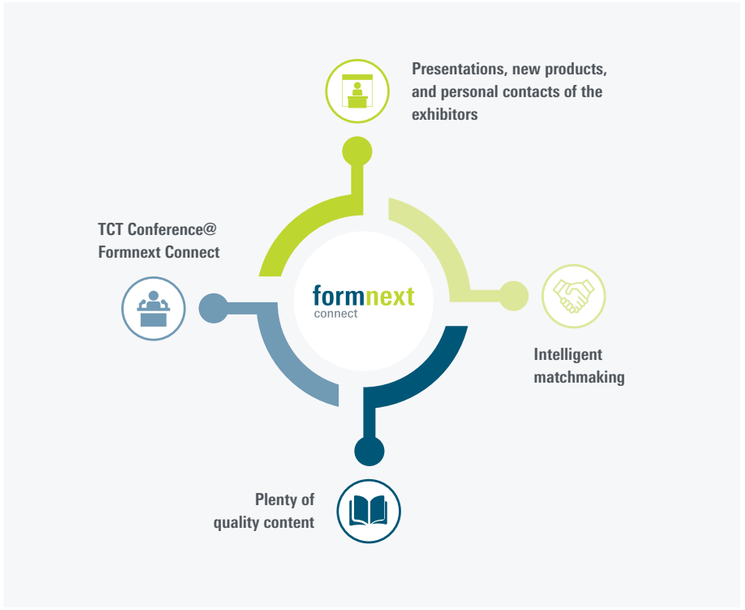
CONTENT



Photos: Alexander Daniels Global, Molyworks, Node Audio Research, Zikomm

Illustration: feedbackmedia.de

FORMNEXT NEWS



FORMNEXT CONNECT HIGHLIGHTS

- AG AM of the VDMA: AM applications in mechanical engineering
- BE-AM Built Environment – Additive Manufacturing
- Discover3Dprinting seminars
- Formnext Start-up Challenge + AM Ventures Impact Award
- Intelligent matchmaking
- Leading AM companies and latest technologies
- purmundus challenge
- TCT Conference@Formnext Connect

» **Further Information & the current program at:** formnext.com/connect

TAKING THE DISCUSSION TO A DIGITAL CONFERENCE ROOM

Thanks to AI-based matchmaking and a diverse array of content, Formnext Connect is set to create that familiar Formnext atmosphere in the digital realm.

Although it will »only« take place in a virtual format this year, Formnext Connect plans to offer a groundbreaking digital program featuring intelligent matchmaking, presentations of exhibitors and their latest innovations, and plenty of other quality content. Participants can also take advantage of the TCT Conference@Formnext Connect, which will be free to attend in this special year.

»These are the four pillars on which Formnext Connect will be building an efficient platform that will enable our industry to showcase its latest offerings, share ideas, and talk business – even in times like these,« says Sascha F. Wenzler, Vice President for Formnext at Mesago Messe Frankfurt GmbH.

Along with intelligent matchmaking, an extensive lineup of content will be an integral part of Formnext Connect. Here, a studio that is currently under construction in Hall 12 in Frankfurt am Main – one of the capital cities of additive manufacturing – will play a central role. Throughout the event, it will offer a wide-ranging program for the world of AM and innovative industrial production with a focus on live elements such as interviews, laid-back discussion rounds, and segments from overseas. One of the highlights will be the executive chat scheduled for the first day of the event. The program will also feature numerous panel discussions on topics like the automotive and aerospace industries (and others you might not expect!).

»

FORMNEXT NEWS

SESSIONS GEARED TOWARD SPECIFIC TARGET GROUPS

Participants interested in more technical details will be able to attend sessions for specific target groups, which will be broadcast alongside the main program. The topics on the agenda include applications from the fields of mechanical engineering (see page 08) and tool- and form-making. Formnext Connect's partner country, China, will also be on hand in certain sessions to present applications, partners, and other aspects of various industries. In addition, exhibitors will have the opportunity to organize and offer their own sessions and roundtable discussions. The latter will be open to up to 50 participants based on advance registrations or invitations.

MATCHMAKING POWERED BY AI

In the digital world of Formnext Connect, exhibitors will introduce their trade fair teams along with their companies, products, and latest innovations. Intelligent matchmaking software will then suggest potential contacts based on the preferences and other information provided by exhibitors and attendees. To make a match, both sides have to accept a given suggestion. »It's a bit like Tinder for business,« Wenzler explains. The software and the AI behind are part of the Grip platform, which has won numerous accolades. »We decided to go with Grip because we wanted to offer our participants the maximum amount of value with a leading technical solution,« Wenzler adds.

While Formnext Connect will not offer a virtual exhibition center for participants to explore, Wenzler doesn't see this as a disadvantage. »A virtual booth is just digital graphics, after all,« he points out. »Visitors don't want nice visuals to look at; they want a company representative they can talk to directly about issues they're having.« Ultimately, in-person events are also about personal contact – between two people who discuss a potential collaboration in a meeting area, for example, even if the space is designed to reflect a company's corporate identity and display its products. »At Formnext Connect, we're skipping virtual booths and using matches to proceed straight to the digital meeting room,« Wenzler says.

THE FOURTH PILLAR: CONTENT

As in the case of past editions of Formnext, this year's virtual event will largely be driven by content. The vibrant program scheduled to run alongside the conversations on the main stage will include much more than sessions on specific subjects, however. International subsidiaries will introduce themselves to those in attendance, and partner organizations like ACAM, BE-AM, VDMA AG AM and VDWF will offer opportunities to gain more in-depth knowledge. The purmundus challenge, meanwhile, will present its finalists before announcing the year's winners (see page 20). Formnext Connect attendees will have the chance to learn about the innovative business ideas submitted in the Start-up Challenge, as well. The entire program can be viewed via the event's calendar, which will also provide a direct means of joining the sessions.

As mentioned, the TCT Conference@ Formnext Connect is part of the Formnext Connect supporting program. No additional registrationen is necessary. The schedule has also been set to accommodate the time zones in the United States on 11 November. The following day will then start early enough in the morning to enable participants from the Asia-Pacific time zone to join in.

In this very special year, we are pleased to be able to bring the fAMily together virtually and invite all visitors to Formnext Connect and the TCT Conference@formnext Connect free of charge.

+ FURTHER INFORMATION:
» formnext.com/connect

FORMNEXT NEWS

PREPARATION IS THE KEY TO SUCCESS

Formnext Connect participants are invited to take an advance look at the platform.

Just like in the case of an in-person event, targeted preparation lays a solid foundation for successful participation in a virtual trade fair. With that in mind, those interested in attending should examine the Formnext Connect platform in advance, along with this year's program and exhibitors. »Those who wait until the first day of the event will have wasted valuable time and possibly missed some very intriguing discussions or presentations,« warns Sascha F. Wenzler, Vice President for Formnext at Mesago Messe Frankfurt GmbH.

On 28 October, participants can already register for free using the designated discount code. Since the exhibitor profiles will be filled out before Formnext Connect kicks off, interested attendees can also take an early look while familiarizing themselves with the platform. Things will then start heating up a week in advance of the event's official opening. On Tuesday, 3 November, as part of the related »Formnext Fusion« event, the matchmaking will be stepped up and participants will be offered a meeting agenda based on their interests. This will enable exhibitors and attendees to gain some initial experience, generate matches, and really get ready for Formnext Connect. That same day, the meeting/video call function will also be activated to enable participants to set up and attend their first preparatory face-to-face encounters.

From 10 to 12 November, the event's attendees will then have access to everything – including discussion rounds, presentations, special sessions, and the exhibitors themselves, as well as the TCT Conference@Formnext Connect. Since the highly concentrated program is sure to feature too many highlights to take in at once, many elements will be made available on-demand until 31 December 2020.

THE FORMNEXT CONNECT SCHEDULE IN 2020

28 October
Start of participant registration
(exhibitor profiles can be filled out earlier)
Free registration with discount code

3 November
»Formnext Fusion« event, including
an hour of AI-based matchmaking

10 November, 10:00 a.m.
Start of Formnext Connect live program

12 November, 2:00 p.m.
End of Formnext Connect live events

31 December
End of Formnext Connect

Register for free!
For free participation enter the discount code at the end of the registration process in the ticket shop:
» formnext.com/tickets

DISCOUNT CODE
FN20ER10

+ FURTHER INFORMATION:
» formnext.com/connect

NEWS

MEDICAL, SOFT MATERIALS AND PP

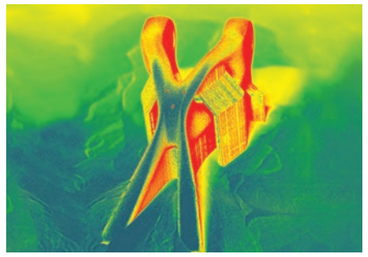
The Arburg Plastic Freeforming (APF) process with the freeformer is predestined for medical technology, the processing of soft materials and PP, and for the additive manufacturing of multi-component parts. High-temperature plastics can also be processed using the open system from Arburg. Arburg is presenting all of these topics at the Formnext Connect.

The freeformer in sizes 200-3X and 300-3X process plastic granulates of the kind also used in injection moulding. This also makes it possible to process bio-compatible, absorbable and sterilisable as well as FDA-approved original materials to be used.

»In medical technology, we can also accomplish very demanding applications with the AKF process that other processes simply cannot handle«, explains Lukas Pawelczyk, Head of Freeformer Sales at Arburg. As well as Resomer Composite LR 706 S ß-TCP, a product similar to human bone that tends to be used as a bone substitute, the freeformer was recently used to process another innovative absorbable material from Evonik: using a polymer from the Resomer-C family employed in the soft tissue sector, individual breast implants have been produced to showcase what can be achieved.

With the additive AKF process, it is possible to produce components from soft materials in virtually all Shore hardnesses. In relation to mechanical load-bearing capacity, recoil characteristics, UV stability and endurance strength, these components share almost the same properties as injection moulded parts, as Arburg reports. With the slicing parameters, various material densities can be achieved within a part. As well as medical technology applications and the processing of soft materials, at the Formnext Connect, Arburg will be presenting an impressive example of additive manufacturing from the multi-component sector, a functional part made of PP and TPE to demonstrate a classic hard/soft combination. The manufacture of parts from a high-temperature plastic rounds off the range.

A THOROUGH CHECKUP OF PROCESS MONITORING



With the benefits of process monitoring (PM) comes also a huge surge of interest in adopting the technology. In response, machine manufacturers are integrating PM systems in their machines. Also, 3rd party companies specialized in monitoring systems have surfaced in the AM scene.

To test independently the existing and future PM systems, the Fraunhofer Research Institution for Additive Manufacturing Technologies IAPT has conducted a detailed study which study highlights the PM systems and their capabilities of detecting part anomalies under different conditions.

»For the widespread industrial adoption of AM parts Quality Assurance is definitely key. Currently post-process QA method are rather time consuming, expensive or both.« says Peter Lindecke the head of Quality Assurance and Certification department at the Fraunhofer IAPT. »Process monitoring not only focuses on increasing the confidence level in part quality, but eventual aims at eliminating post-process quality control methods such as µCT and dimensional measurements.«

SIMULATION FOR METAL BINDER JETTING

Hexagon has introduced metal binder jetting (MBJ) simulation, enabling manufacturers to predict and prevent the distortion that sintering processes will have on parts at the design stage. As the company reports, the new simulation tool within Simufact Additive marks a significant step forward for AM because it helps manufacturers achieve the quality they require while exploiting the benefits MBJ offers for volume production.

With MSC Apex Generative Design, Hexagon also offers a tailored solution for the creation of customized designs for AM. With version 2021, the tools will be further enhanced and extended with additional functions. New geometry tools make model building easier, and clearance regions for tool access or a machine allowance for post-processing are added. In combination with additional functions, this allows component consolidation in the optimization process. With the new API scripting, Hexagon promises to experienced users that they can further accelerate processes and reduce manual activities.

Photos: Arburg, Fraunhofer IAPT, Hexagon

NEWS

A BRIGHTER OUTLOOK

The mood among AM technology companies and users within mechanical and plant engineering has clearly brightened compared to expectations six months ago, says Rainer Gebhardt, project manager with the VDMA's AM working group. »There is a sense of optimism within the industry that we will see a return to the growth of previous years and that orders will once again return to good levels.«

The brighter mood was also reflected in a member survey conducted by the AM working group: In September 2020, 82 percent of the member companies surveyed expected the economic situation within the domestic market to remain the same or improve over the next 12 months. Only 18 percent expected the situation to deteriorate. (see graphic)
Participants of Formnext Connect will be given an opportunity to gain an overview and impression of the current mood on the subject of mechanical engineering. A more detailed look at the AM industry will be provided by a project that is currently underway for the packaging industry. In a master's project at the University of Erlangen-Nuremberg, additive manufacturing has been used to optimize the gripper system of a high-performance Gerhard Schubert packaging machine.

Even more expert knowledge will be available at five sessions on all days of the virtual event, during which users and manufacturers will give insights into the latest possibilities of AM.

How does your company expect the domestic AM market to develop over the next twelve months?

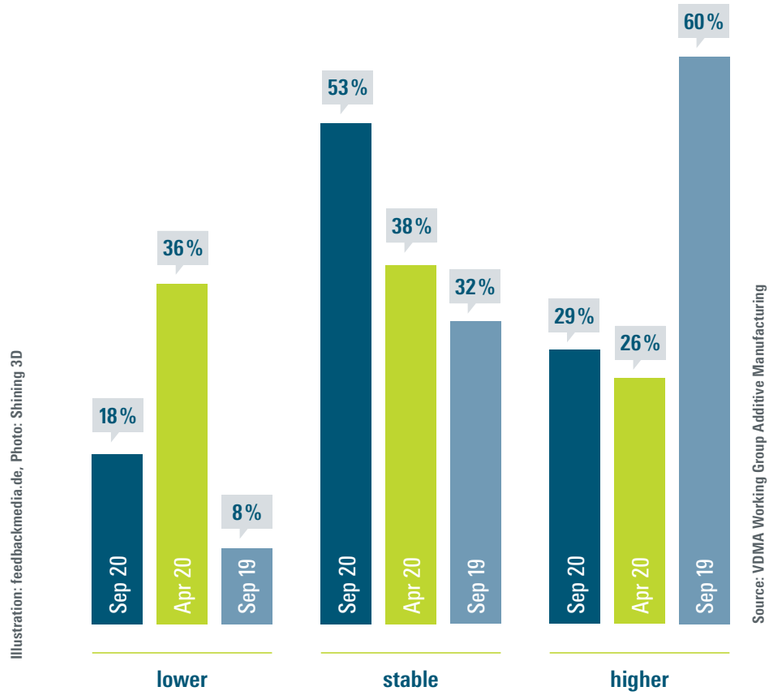


Illustration: feedbackmedia.de, Photo: Shining 3D

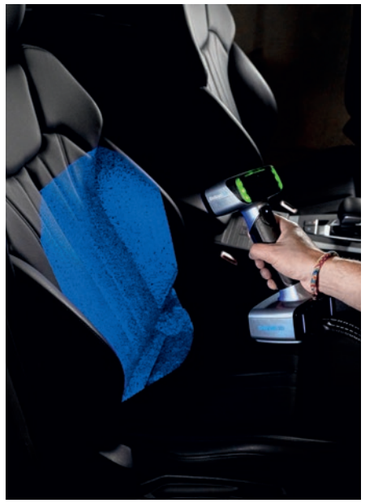
Source: VDMA Working Group Additive Manufacturing

HANDHELD 3D COLOR SCANNING

With Einscan H und Einscan HX Shining 3D is adding a new line of handheld color 3D Scanners to roundup its Einscan series. The new scanners feature hybrid light technology with a second light source predestining the devices for a broader range of challenging ranging from medical to arts to industrial reverse engineering.

Einscan H features two light sources adapting one flexible to specific scanning requirements. Using an infrared invisible light source, 3D data of hair and dark objects can be captured and the built-in color camera delivers authentic color scanning data. This assures a digitization of medium and large sized items such as a full human body, art pieces, furniture, many more.

With dual blue light, Einscan HX combines the advantages of LED and laser, enlarging the adaptability of scanning materials and ambient light, and predestining the device for industrial applications. In rapid scan mode, blue LED structured light is used for capturing object data. 3D data can be obtained quickly without having to apply reference points. The laser scanning mode is equipped with multiple blue laser lines enabling 3D scanning of both reflective metal surfaces and dark surfaces.



NEWS

DEVELOPING AN ELECTRIC MOTORCYCLE WITH THE HELP OF AM

ETHEC city is a Swiss student project that aims to radically change the mobility of tomorrow with the technologies of today. To face the challenges of climate change and sustainability, the team develops an electric motorcycle with an ingenious two-wheel drive that saves energy and improves the range.

»Motorcycles are more efficient than common cars, but we barely see all-electric motorcycles on our streets – that has to change«, says Tobias Oesch, who is studies mechanical engineering at the ETH Zurich and is the technical lead of the ETHEC city project. In a team of nine other ETH students he took up the challenge to develop a prototype of an electric motorcycle in just one year – from the concept to construction, assembly, and testing. The team integrated an electric motor in the front wheel as well, used as a generator to recuperate the whole movement energy back into the system again.

With a small budget and a tight schedule to construct the motorcycle, conventional manufacturing methods soon turned out to be unsuitable »Since it is a prototype, we often only needed single work pieces and not a thousand – in these cases additive technologies are ideal«, as Tobias puts it. The team decided to use SLA, SLS and SLM to 3D print several design parts of the casing but also structural components such as the mounting of the foot pegs. the Swiss based manufacturer of SLS printers Sintratec decided to sponsor several components. Subsequently, parts such as the casing for the display or the fuel filler flap were laser sintered on the Sintratec S2 system using Sintratec PA12 nylon powder.

Constructed to work as end-use parts, the requirements for the 3D printed objects were high: Apart from being lightweight, they also had to be durable and strong.

ELECTRICALLY CONDUCTIVE INKS

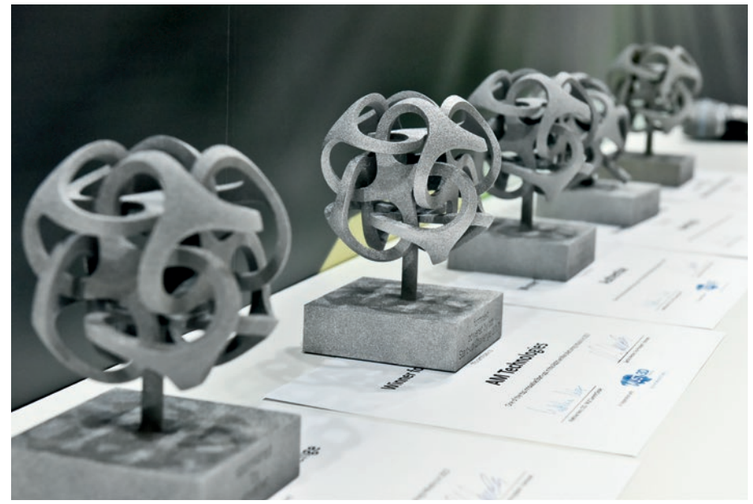
One of the factors driving the growth in the 3D printing industry is the availability of better and more efficient materials. Horizon 2020, the biggest EU Research and Innovation program ever, supports selected research projects in this area. As one of the partners in an international research consortium, cirp GmbH is involved in two EU-funded projects DIMAP and MOAMMM.

The aim of the DIMAP project, which has already been completed, was to open up more application areas and possibilities for 3D printing using multiple materials. The research team succeeded in developing novel nanoparticle-enhanced materials for 3D printing using Polyjet technology, including electrically conductive inks with silver nanoparticles, thermally conductive inks with ceramic nanoparticles, expandable inks for lightweight construction applications, and high-performance polyimide inks. It also implemented a specific printer architecture for printing these materials. After the project was completed, the European Commission's Innovation Radar acknowledged cirp GmbH as a »key innovator« for several of its innovations.

Photo: Sintratec

NEW MATERIALS AND EFFICIENT POST-PROCESSING

Winners of the Formnext Start-up Challenge showcase their impressive innovations.



In 2020, the AM industry has once again seen a swathe of innovative business ideas and new technical developments, as demonstrated by the international Formnext Start-up Challenge 2020 and the products of the five deserving winners. The young companies Addiguru (USA), AM-Flow (Netherlands), MolyWorks (USA), NematX (Switzerland) and ToffeeAM (GB) all impressed the international panel of judges with their outstanding innovations. MolyWorks also won the AM Ventures Impact Award, which was for the first time announced as part of the Formnext Start-up Challenge (see page 13).

The successful technical developments included automated design software, new plastic materials, production monitoring, and a solution for automated post-processing. The low-cost, easy-to-use solutions of some of the award winners highlighted the potential for further expansion of the field of application of additive manufacturing.

The international winners will have an opportunity to present their innovations at Formnext Connect. The winners' versatile developments also demonstrated the need for innovations along the entire process chain in the further development of additive manufacturing: the aim of the intelligent software Toffee, for example, is to optimize the realization of new designs for additive manufacturing, thus enabling the production of new, more efficient components. Addiguru's innovative self-learning process monitoring technology aims to bring significant cost savings and efficiency gains to production in AM. And AM-Flow's end-to-end solution is dedicated to post-processing, which is often still a challenge in the production of larger quantities with AM. NematX has created a new high-performance polymer for even more resilient components. And MolyWorks' mobile combination of smelting furnace and powder atomization is designed for on-site use to turn metal scrap directly into powder for additive manufacturing.

»The high quality and diversity of these impressive developments shows that corona will not halt innovation within the AM industry,« says Sascha F. Wenzler, Vice President of Formnext at event organizer Mesago Messe Frankfurt GmbH.

The Formnext Start-up Challenge 2020 honors companies that are no older than five years. The competition awards novel and viable business ideas. The high-caliber judging panel is comprised of well-known representatives from the industry, science, the media, and the investment sector. »

Photo: Mesago / Thomas Klerx

THE WINNERS OF THE START-UP CHALLENGE 2020

AUTOMATED POST-PROCESSING

Explaining the motivation behind the development of its end-to-end post-processing solution, AM Flow says; »The dark secret of additive manufacturing is that an imbalance of investment (with funding focusing primarily on 3D printers and software) has resulted in a clear bottleneck in the production process downstream of actual 3D printing.« The Dutch start-up offers Industry 4.0 technology for additive manufacturing and is pursuing the specific aim of digitally solving and automating the production process downstream of 3D printing.

Its object is to significantly reduce the typically high labor costs still associated with post-processing. AM Flow's end-to-end solution includes component recognition, handling and sorting, as well as transport and packaging, and utilizes various technologies, such as 3D shape recognition, industrial image processing systems, and AI software for product and process automation.

AUTOMATED DESIGN SOFTWARE

British start-up ToffeeAM has developed automated design software that requires only a design space, fluid/material conditions, and component performance optimization.

ToffeeAM was founded in 2019 as a spin-off of Imperial College London and licensed its AM software Toffee. Not only can the software optimize individual components, it can also be used to optimize entire systems and reduce the total number of components for example. The software is already used in Formula 1, aerospace, and the oil and gas industry.

EXTERNAL REAL-TIME MONITORING

In its own words, US start-up Addiguru provides cost-effective and easy-to-use real-time monitoring for additive manufacturing. The monitoring technology is independent of the manufacturer and can be easily integrated into existing and newly developed AM systems for metal. The camera is positioned at the top of the machine, looks into the powder bed and is connected to an external computer. The company's software automatically recognizes the relevant images and then sends the captured images to a self-learning intelligence for analysis. This then detects anomalies and informs the user.

HIGH-PERFORMANCE POLYMERS

NematX AG is a Swiss start-up founded in 2020 as a spin-off of the Swiss Federal Institute of Technology (ETH Zurich). Nematic 3D Printing technology heralds the next generation of high-performance polymer 3D printing and aims to surpass the current benchmarks in polymer 3D printing of high-performance end-use parts by some margin. Target industries include aerospace, medicine, electronics, and industrial applications where parts are exposed to harsh environmental conditions.

Photos: Addiguru, AM Flow, NematX, ToffeeAM

Closing the Loop of the Metal Part Life Cycle

US Start-up Molyworks also wins AM Ventures Impact Award

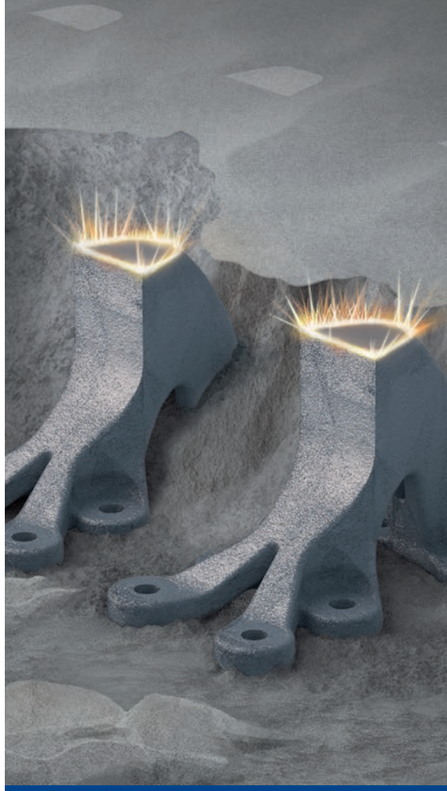
In addition to winning the Start-up Challenge, scrap metal recycling start-up Molyworks has also won the AM Impact Ventures Award for sustainable development. The Californian start-up offers a sustainable and climate friendly solution that converts metal waste from production (such as swarf) into metallic powder for 3D printing, thereby closing the loop of the metal part life cycle. The Greyhound system was first developed by the company founders, essentially in their own backyard, back in 2015. Today, the solution consists of a mobile smelting furnace and innovative powder nozzle.

Molyworks' Greyhound system is used to produce powders for additive manufacturing directly at the customer's premises from used powder, metal waste, and old parts. In total, the young team has already tested the equipment with 21 metals, including titanium, steel, nickel, aluminum, and copper. The ambition is to establish a closed-loop circular economy for the metal production industry.

The fact that Molyworks also won the AM Ventures Impact Award is indicative of the huge resource-saving potential of this technology. After all, according to Molyworks, metal production accounts for 7% of the world's energy consumption. Another major plus is that the recycling also eliminates the transport of hazardous waste.

Overall response to the first AM Ventures Impact Award, which was presented as part of the Formnext Start-up Challenge, was highly positive. Half of all entries for the Startup Challenge also applied for the Impact Award. It would appear that sustainability is something that is becoming increasingly important across the board and to start-ups in particular. »For the success of start-ups, contributing to sustainable development is no longer optional. It is a must for every company and also creates great business opportunities,« comments Arno Held, Managing Director of AM Ventures. »Sustainability also plays a key role in investor decision making, and it won't be long before it is at the forefront of decisions for everyone.«

Photos: Molyworks



AS SOME DOWNSIZE, OTHERS RISE UP

Text: Thomas Masuch

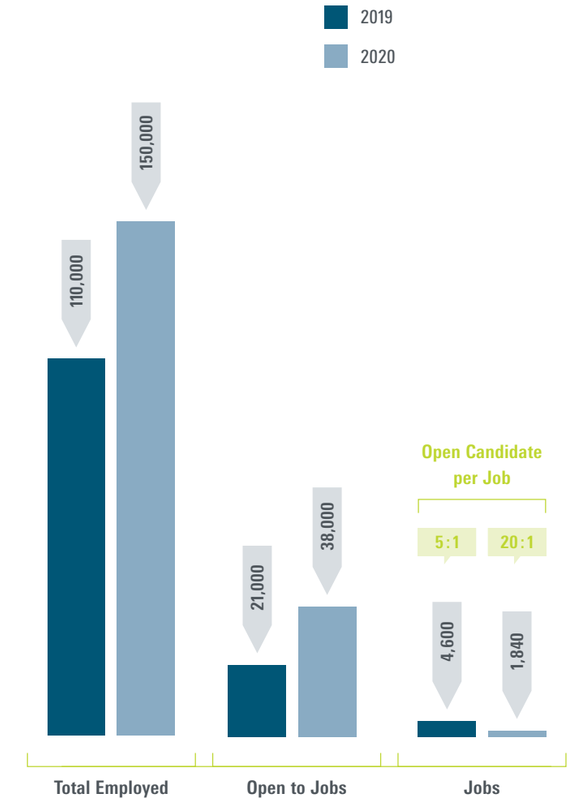
After years of continuous growth, the entire AM industry has been dealt a severe blow by Covid-19. This is reflected in the labor market, which – despite having recovered somewhat – appears to have bid farewell to 100 percent employment for the foreseeable future. Meanwhile, the impact the coronavirus has had on employees varies widely across individual companies, sectors, and regions. In some areas, skilled workers are still in short supply.

In recent years, the conditions the AM world offered employees were practically ideal. Qualified personnel was scarce, and the number of jobs grew along with the booming industry; employers offered good salaries and favorable terms for applicants' contract negotiations. »Since I've been involved in the AM industry, the employment rate has been 100 percent and the unemployment has been close to zero. If you had experience in the industry, you were either employed or between jobs,« says Nick Pearce, founder and director of Alexander Daniels Global, a recruitment company specializing in the AM industry.

Those times are now over. In Europe, the demand for applicants has dropped significantly, and there was a real slump in the US in April 2020. »In March and April, there were experienced AM professionals who were unemployed, particularly in the US,« Pearce says. This quickly became noticeable, especially in sales and marketing. After all, it was impossible to travel and visit customers for weeks – which led to some jobs being put on hold, as Pearce reports. »Since you can hire and fire at will in the US, I think a lot of companies took the view of 'Let's just fire them and get them off the payroll'. Labor laws are more favorable to employers there, which meant that there were significant layoffs of talent within additive manufacturing.«
This is likely connected to the assumption in the US that if companies need these employees back, they can simply rehire them.

AM Job Market, US

Sources: LinkedIn Recruiter, LinkedIn.com, Alexander Daniels Global Talent Market Whitepaper

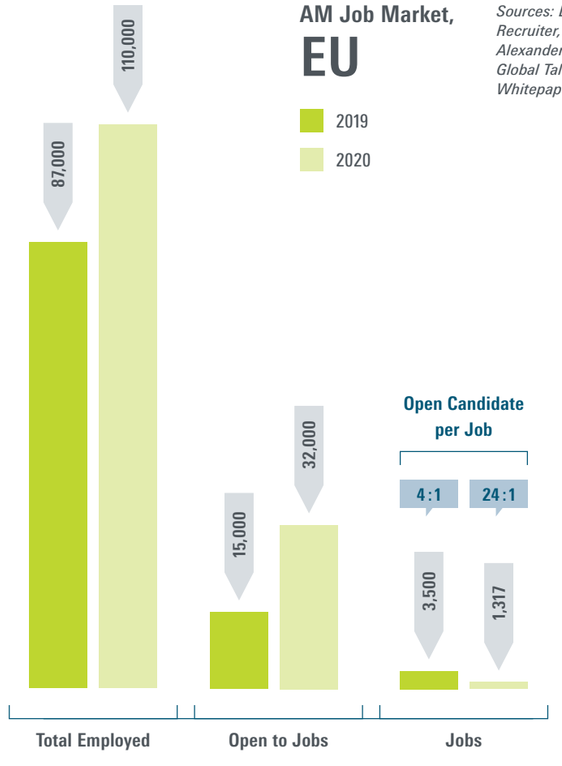


While 3,500 vacancies were advertised in the European AM industry in 2019, by 2020 (up to the end of September) there were only 1,317 – a decline of 62 percent. The fact that this statistic has also fallen by around 60 percent in the US (see graph) is due to the fairly rapid rebound witnessed over the summer. At the same time, the number of people in the AM industry who are open to new job opportunities increased by 81 percent in the US, and by as much as 113 percent in Europe.

Despite the clarity of these figures, Pearce has observed less of a »crisis mode« at companies in Europe. »The labor laws favor employees and their rights, so we didn't see the same thing happen as in the US. Companies in Europe have taken a much longer-term view of the market.«

AM Job Market, EU

Sources: LinkedIn Recruiter, LinkedIn.com, Alexander Daniels Global Talent Market Whitepaper



WORKFORCES CUT BY UP TO 20 PERCENT

The large AM companies listed on the stock exchange, some of which had already considered reorganizing their workforce structure even before the coronavirus, took decisive action amidst the pandemic. In early June, Stratasys announced that it would cut 10 percent of its global workforce, and 3D Systems followed suit in August with its own plans for a 20 percent reduction. While the major players have been looking to get leaner, however, Pearce has seen two different strategies emerging in the rest of the industry. »There are those who are still in a hiring freeze situation. At the other end of the spectrum, we've seen a very different story with start-up businesses that have continued to grow and continued to hire,« he explains. After all, start-ups do not have to have healthy business figures right from the start; they can focus primarily on the development of their technology and their company. »In the start-up and scale-up areas of the market, we've even seen more growth and more job opportunities within the industry,« Pearce adds. »

Illustrations: feedbackmedia.de

Founded six years ago by Nick Pearce, Alexander Daniels Global has established itself internationally as a recruitment agency for the AM industry. The company employs six people in the UK, Spain, Germany, and the US.

alexanderdanielsglobal.com

SUPPLY CHAIN COLLAPSE OFFERS AN OPENING

A look at the individual sectors also reveals a very different picture. For example, Pearce mentions AM contract manufacturers from China and the US, where production continued during the lockdown – thanks in part to digitalized production operations that require almost no human involvement. These companies jumped into the breach when the supply chains collapsed, winning new customers (and entering new business areas) even in the battered automotive and aerospace industries. No wonder that the demand for new personnel also continued. »In particular, these companies have been looking for people with a background in process engineering or quality assurance as it relates to the aerospace industry,« Pearce reports.

As he goes on to note, however, things are less rosy in the AM departments of larger manufacturers and suppliers in the automotive and aerospace industries. Here, production was temporarily switched to TPE and other materials to fight Covid-19. Pearce found that the largest drop in demand for personnel in the AM industry was among manufacturers of large AM equipment (costing €250,000 or more). This is an area where customers often face investment freezes.

A SIGNIFICANT DROP IN PAY

Pearce advises companies (especially those in the US) not to exploit the current situation and continue to push wages down. »There is a problem that this could cause for the companies. At some point – and we don't know when that will be, but I suspect probably 12-18 months from now – the market will have rebounded and hiring will be back at the level it was.« As Pearce predicts, the demand for experienced professionals will then accelerate even faster. »If these companies don't adjust in line with the market as it starts to rebound, in the US in particular, these people will walk into other jobs.«

SPECIAL SKILLS STILL IN DEMAND

On the other hand, it should encourage job applicants that Pearce still sees areas where candidates are scarce and highly sought-after – especially in Europe. »There is still demand for talent,« he affirms. While enterprises are often not aware of this because they tend to look at the overall situation, Pearce believes they »ignore that there are some more microeconomic factors around specific skill shortages that don't align with that thinking.« This applies, for example, to specialists in applicationengineering, additive manufacturing engineering, and design engineering. »These are people who have a holistic view of the technology from the standpoints of processes, materials, and design, so they're able to leverage its full potential. This is still a skillset that is in high demand and difficult to find.«

According to Pearce's experience, there are also other professions that still have promising prospects in Europe right now – engineers capable of optimizing production processes, for example, or even sales and channel managers. »In Germany, I'd have a hard time finding those professionals, whereas in the US, I could immediately give you five because of the different dynamics between the countries.«

Photo: Alexander Daniels Global

+ FURTHER INFORMATION:

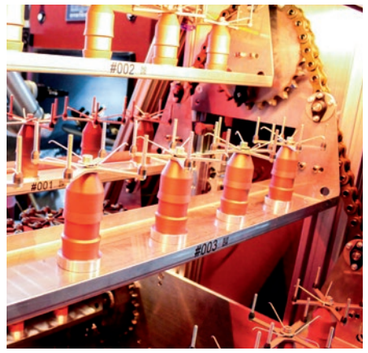
» fon-mag.com

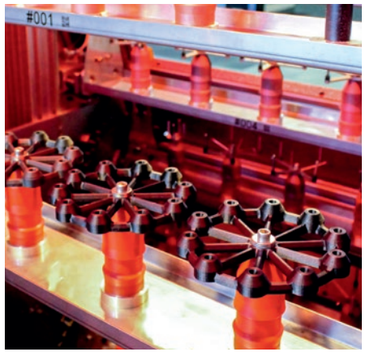
» alexanderdanielsglobal.com

Text: Thomas Masuch

A SMOOTH DEVELOPMENT

For small and midsize companies, industrial 3D printing isn't just an applicable technology – it's a real field of business. For a perfect example, look no further than Bernstein Mechanische Fertigung of Grüna, Germany. While it was purely a contract manufacturer a decade ago (and still makes use of its machining centers), BMF now produces 20 surface-treatment machines each year, which account for half of its annual turnover.





Photos: Zikomm

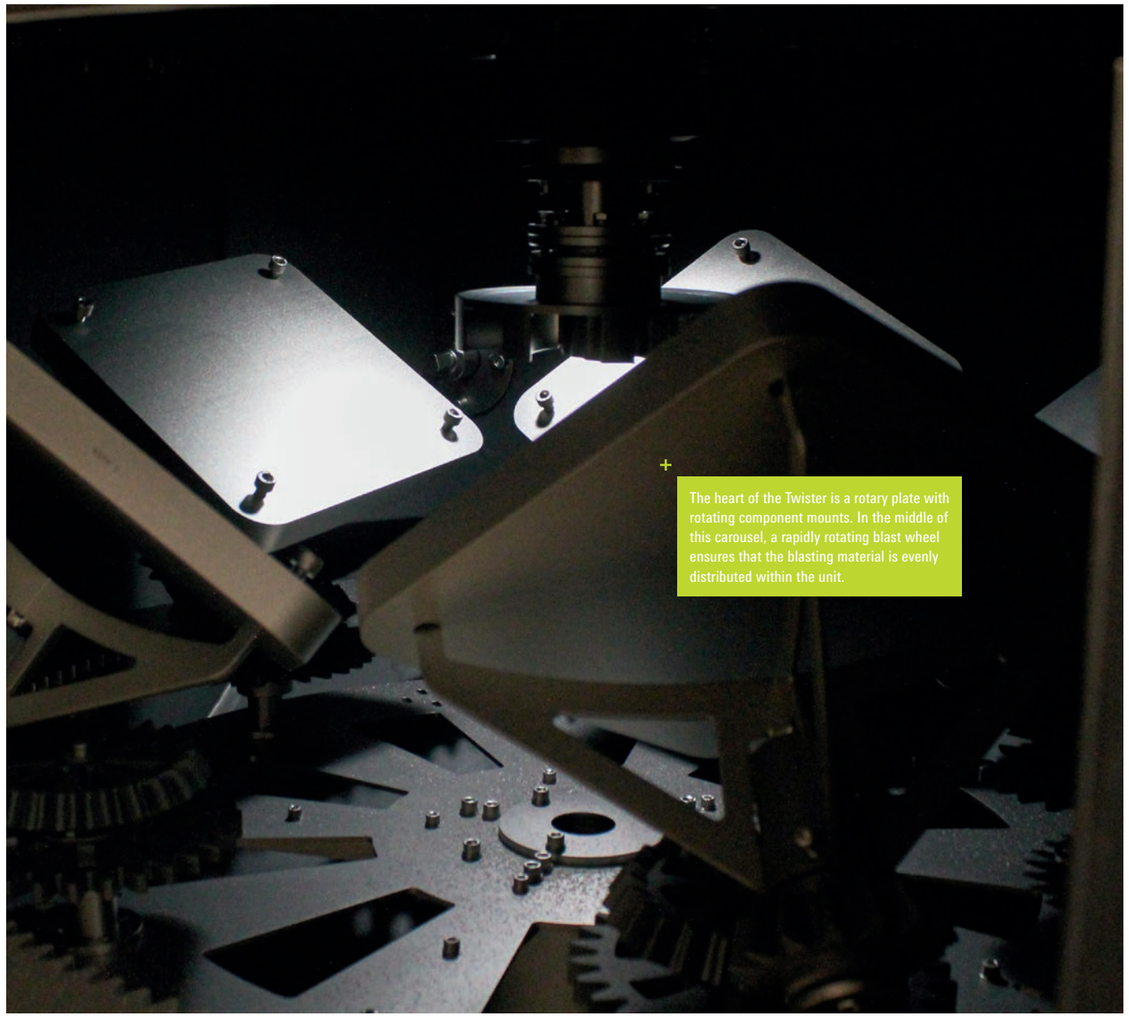
People who visit Grüna might not expect to find a local company with a good bit of sway in the world of additive manufacturing. The village is located along an arterial road to the west of Chemnitz – an eastern German city that, despite its rich industrial heritage, has only just dug itself out of the prolonged hard times that followed the fall of the Iron Curtain. Here, one finds single-family homes with flowery front yards nestled among the rolling hills just to the northwest of the Ore Mountains. Grüna has one bakery, two hotels, and a brick church steeple that is likely the highest point in the town.

BMF's modern facilities are located right next to a garden that features thriving tomatoes and vegetables in the summer. Its main building efficiently combines several machining centers, a training area, and development and assembly departments. Following its foundation 13 years ago, the family-owned company evolved into a specialized contractor in CNC manufacturing. Among other things, it now produces sophisticated parts for luxury items, high-end vehicles, and medical technology.

»We used to have problems all the time with sandblasting because it would leave parts with an inconsistent surface,« recalls Ronny Bernstein, BMF's 41-year-old managing director. He points out that particularly in the luxury segment, this makes components unusable. Ever the entrepreneurial engineer, Bernstein then started looking for a solution of his own along with his team. This led to the development of an installation the company began using to meet its internal needs in 2013. »We eventually had a customer come by who asked what the unit was and ended up wanting one of his own,« Bernstein says.

BMF thus turned the system into a full-fledged product: the Twister blasting installation. At its heart is a rotary plate with rotating component mounts. In the middle of this carousel, a rapidly rotating blast wheel featuring patented blade geometry ensures that the blasting material is evenly distributed within the unit.

After delivering the first of its new systems to machining companies in its region, BMF gradually realized that the Twister had the potential to make a bigger impact. »Post-pro- »



The heart of the Twister is a rotary plate with rotating component mounts. In the middle of this carousel, a rapidly rotating blast wheel ensures that the blasting material is evenly distributed within the unit.

cessing is becoming increasingly important in additive manufacturing, including from a financial perspective,« explains Marc Krause, an employee of BMF Vertriebs GmbH who has been helping the Twister achieve further success by handling sales and process development for the past three years. »With components produced using AM, post-processing now accounts for between 30 and 40 percent of the total manufacturing costs. The printing process has gotten less and less expensive in recent years, but post-processing has stayed about the same because 90 percent of the work involved is done manually.«

Since BMF discovered additive manufacturing through the Twister and began presenting it at exhibitions like Formnext, sales have really started to pick up. So far, 80 of these systems have been installed – not just in numerous European countries, but in India and (since the fall of 2020) the United States, as well.

Krause attributes the success of BMF's blasting systems, 90 percent of which are manufactured in-house at the company, to technical advantages that sound like the Holy Grail of blasting itself. »We've achieved reproducible results in an automated process that can also be incorporated into automated production,« he says with pride. In addition, the blasting material is shot by the aforementioned blasting wheel instead of using pressurized air, which Krause says already saves a great deal of energy. The wheel's rotation speed can be configured to produce different levels of surface quality in terms of Ra (average roughness) and Rz (average roughness depth).

This is how the Twister – and its big brother, the Tornado, which was unveiled in 2016 – ensure that the right type of surface is applied to shifting forks for transmissions, trays for blood plasma centrifuges, dental implants, retrofits for automotive engine components, and many other products. These blasting units continue to be used for machined parts, as well. »Our customers' requirements with regard to surface quality have generally risen over the past several years,« Krause reveals. »More and more often, functional components you normally can't see are also being blasted to improve their appearance and promote sales.« At the same time, the 49-year-old (who already has 25 years of experience in building prototypes) is seeing increased demand from AM service providers, whose expectations have also changed. »Instead of just one part, customers are now ordering 50 or more, and they all need to look the same,« he reports.

The innovative ways in which BMF is taking advantage of additive manufacturing are also apparent in the area of spare parts. The drive wheels of the Twister's rotating component mounts, for example, were created in a 3D printer from Markforged. To make sure that replacements for these wear parts will always be readily available, identical printers have been installed at customer facilities in places like Denmark and India to produce the spares required on-site when ordered. The printers are controlled from Grüna; the customers only have to insert fresh spools and remove the parts when finished. »We don't have to ship anything, and nothing has to go through customs checks,« points out a pleased Ronny Bernstein. For Markforged, this innovation was so compelling that the global manufacturer made the trip all the way from bustling Boston to BMF's peaceful hometown to check out its applications in person before adding them to its international marketing campaign.

Photos: Zikomm

FURTHER INFORMATION:

» fon-mag.com

» bmfgmbh.de

Marc Krause *(left)* and Ronny Bernstein in the Grüna facility.

ROBOTIC ARMS, TITANIUM HIGH HEELS, AND VEGAN SALMON

The international design competition purmundus challenge, an important part of Formnext Connect, provides a unique glimpse into present-day and future applications of 3D and 4D printing.

There's a bright and interesting future ahead for 3D and 4D printing applications, if this year's purmundus challenge is anything to go by. Showcasing an exciting array of inspiring and impressively imaginative ideas and products with which designers, companies and research institutes hope to shape this future, the event is not to be missed. The competition, which is an important part of Formnext Connect, will feature a unique range of innovations, from titanium and plastic high heels to a design-optimized stainless steel robotic arm as well as vegan salmon made from plant proteins and a luminous organism for the living room – all 3D printed, naturally.

For this year, the central theme of the international design competition will be »Geometry and Material in Harmony«. Fortunately, Covid-19, has failed to put a dampener on the challenge: »There have been more submissions than ever before. The quality has also been higher than ever, which has made selecting the finalists an even harder task,« says Corinna Ray, head of the purmundus challenge. »The finalists hail from 13 different countries across 5 continents: China, Germany, the UK, Hong Kong, Israel, Italy, New Zealand, Netherlands, Nigeria, Austria, Switzerland, Spain and the US.«

The fact that this year's purmundus challenge will be held entirely online is no disadvantage either, according to Ray: »Bringing together a wide variety of ideas, creative products and innovative projects from all over the world in one digital place opens up new perspectives.« For instance, it allows participants from every continent to participate equally in the competition. In previous years, not all participants (particularly those from poorer regions) were able to make the journey to Frankfurt. Online, it is not a problem – in 2020, even family members will be able to be there live. »The Formnext Connect virtual platform gives everyone unlimited access to our special digital exhibition,« says Ray. »Our very international purmundus challenge will give us an even wider virtual reach.«

All finalists, including their designs, products, and some videos, will be presented virtually as part of Formnext Connect. The award ceremony on Wednesday, November 11 will also be broadcast live. This year, the Audience Award will be voted on over an external platform.

There will also be some new content this year: For the first time, a prize, sponsored by Addmio, one of the event's partners, will be awarded for the Newcomers category. This, year, therefore, in addition to the top 3 places, the awards bestowed at the purmundus challenge will be as follows: Special Mention, Simulation-Driven Design, Innovation Prize, Newcomer Prize, and the Public Choice Award.

Photo 1: In carafe_hnkl_404 from AdditiveCermamics, the structure provides improved heat insulation and makes handles superfluous.

Photo 2: Hylixa from Node Audio Research embodies elegant innovations in delivering music without the compromises of traditional box-like speakers.

Photo 3: The digital material of a bionically inspired heatpipe from Siemens creates new possibilities for heat transfer.

Photo 4: The 3D-printed Sneaker Zero from Svet Abjo is a fully functional, recyclable, and custom-made sneaker based on foot scans.

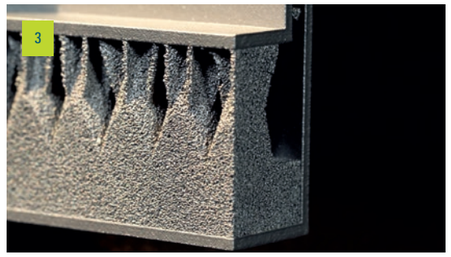
Photo 5: B.right is a lamp structure from Italian designers Danny De Carolis, Matteo Mochi, and Omar El Houdna. The empty section of the object is filled with a liquid containing modified microorganisms that produce both light and oxygen.

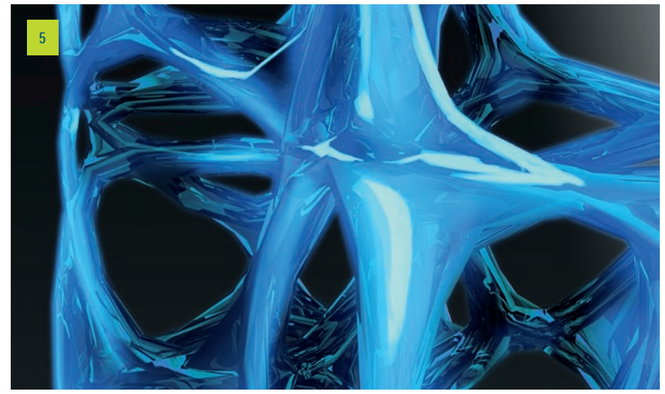
+ FURTHER INFORMATION:

» purmundus-challenge.com

Text: Thomas Masuch

Photos: Additive Cermamics, B.right, Siemens, Node Audio Research, Svet Abjo





»OUTSIDE THE BOX«

The trouble with new strategies

Text: Thomas Masuch

The old saying »Never change a running system« is good advice in many cases. But not always. Otherwise, companies would not be using additive manufacturing technology on such a large scale today. The difficulty of switching to a new technology can also be illustrated on a smaller scale, like for example in our neighbor's yard.

Our neighbor was getting on in years and decided to redesign his garden to minimize upkeep. He was keen to reduce the non-productive time involved in looking after his plants and flowerbeds, as it were. Now, our neighbor was never one to pour his heart and soul into his hydrangeas, so the garden was fairly spartan to begin with. After the redesign, however, every single fruit and flower had disappeared, to be replaced by a uniform expanse of lawn.

As it turned out, the new lawn also required quite a bit of upkeep, especially since it was on a particularly large corner property and had to look pristine at all times to reflect the meticulousness of its owner.

To minimize the effort required, our neighbor decided to buy a robotic lawn mower. But before he could enjoy the increase in efficiency, he first had to bury an underground guide wire that would tell the robot where to stop mowing. A few weeks later, the fine, neatly trimmed green lawn exuded all the flair of Wimbledon in the neighborhood. But one small detail marred the overall picture. The garden fence, which had previously been hidden by flowering shrubs, was now exposed and showing its age with dull and porous paintwork. Back came the workmen, armed with sanding paper and paintbrushes, to fix the corporate identity of house and home.

Finally, the robot could make its way around the garden in peace. Buzzing quietly, it kept the grass trimmed to no more than a couple of centimeters and removed every stray stalk between the wall of the house and the freshly painted garden fence. Aside from the questionable sustainability of the project, the investment in the new garden technology finally seemed to be paying off. Until a few weeks ago, when we spotted our neighbor dusting off his manual lawnmower, pushing it around the garden, and emptying the grass cuttings into bags. The robot had given up the ghost and the garden project would soon need a further injection of cash. So, what can we learn from this story? First, plan any changes with care and foresight. Second, be prepared to face and overcome new challenges on the way to your goals. And finally, be willing to change direction and modify your goals if necessary.

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All information at formnext.com/connect

CONTACT:
» Hotline: +49 711 61946-810
» formnext@mesago.com

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Fax +49 711 61946-91
mesago.com

Responsible for content under German Press Law:
Bernhard Ruess

EDITED BY
ZIKOMM – Thomas Masuch
thomas.masuch@zikomm.de

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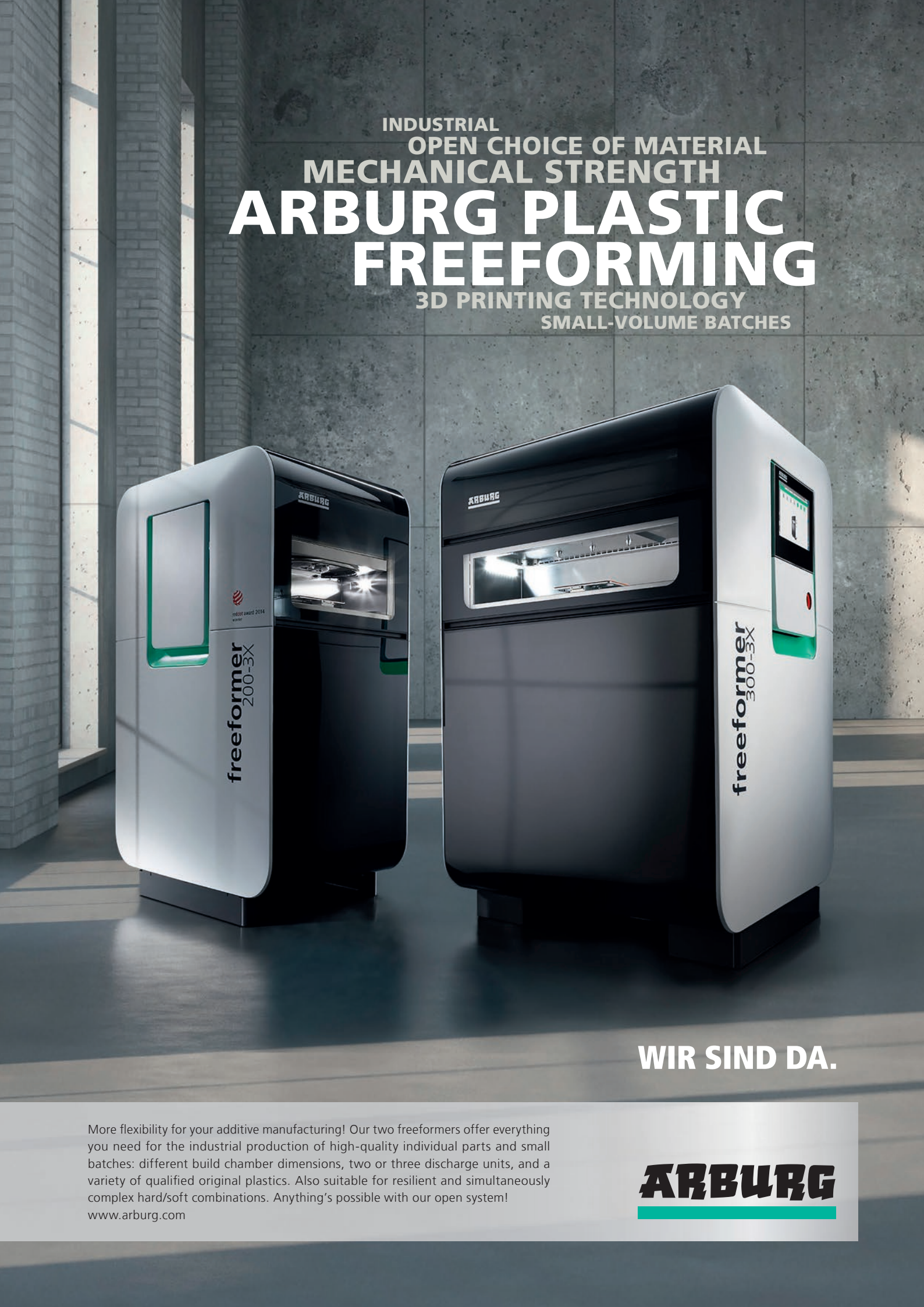
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