

metalligent®

**NOT ACCORDING
TO THE NORM**

IT IS WITH DEEP SORROW
THAT WE ANNOUNCE THE PASSING OF

ROLF ARNOLD

25.12.1934 – 23.04.2017

*He was a fighter, a gifted technician and thinker.
Fearless and full of ideas, he was always in search
of a better solution.*





Uwe Arnold, Arnold CEO | Image: Wolfgang Günzel

OUR STRONG SUIT AT ARNOLD:
THINKING OUTSIDE THE BOX.

Dear readers,

Today I am the bearer of sad news: I regret to announce that my father, Rolf Arnold, passed away on April 23, 2017. He was a spirit of genius, a visionary, a passionate man of action. Treading in his own father's footsteps, he was a key force in the development of our company, and he left his indelible stamp on all of us Arnoldians. Words cannot express how much we are indebted to him; we will cherish his memory forever. Although he would have wanted us to continue producing this magazine as usual, it was important to us to stop the presses during the production of this edition and dedicate the first two-page spread to the memory of this great man. We apologize for the brief delay and thank you for your understanding.

Now, however, the latest edition of **metalligent**® is in your hands. Perhaps you have been waiting impatiently to receive it. This is already the fourth edition, after all. But you might also find it rather bewildering. You might be wondering: Is this really the Arnold magazine? Don't customer magazines generally look a bit different? And what's up with the title? Crazy? What does that have to do with metal?


You're quite right: **metalligent**® definitely breaks the mold. It's a magazine that likes to look at things from all sorts of perspectives, to open up new and unique vistas and discuss all kinds of things that might be of interest to metal aficionados, even if they have nothing to do with metal.

Most importantly, in **metalligent**® we expand our horizons far beyond what is happening at Arnold. Not all the topics covered feature our company, but every contribution is informed by our firm convictions. That is why the current edition's theme of craziness is so important to me. It reflects what it means to be an Arnoldian: the ability to think outside the box, to summon the courage to break out of entrenched modes of thinking, to venture outside the comfort zone defined by standards and routines. That's what makes our work so exciting, and I'm sure many of you are kindred spirits in this respect.

We have dedicated this edition to seeking out some extraordinary people, people who are just a little crazy in the best possible way, and to discovering some intriguing facets of what it means to be crazy. All the way down to crazy ways of moving things.

May you make many wonderfully offbeat discoveries in the pages that follow. Please let me know what you think about this edition at uwe.arnold@arnold.de. I look forward to hearing from you.

Yours,



Uwe Arnold



Crazy goes on at Arnold? Read what the Frankfurter Allgemeine Zeitung has to say. Uwe Arnold was interviewed by editor Thorsten Winter. His article "At our company, everyone has to know the smell of metal" can be found online at www.arnold.de/go/berichte. To open a PDF copy of the article, please scan the QR code.



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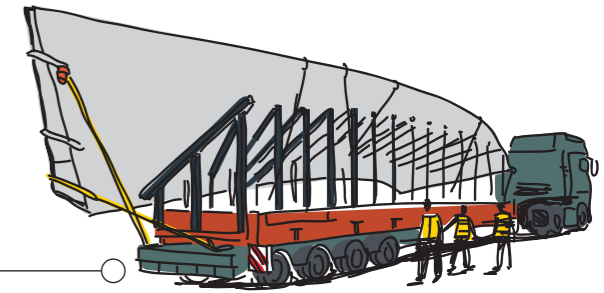
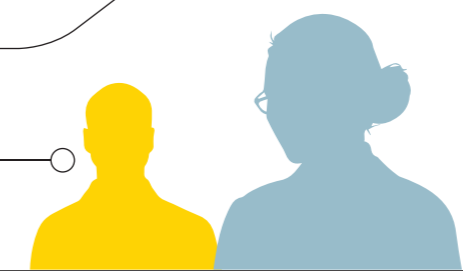
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Image: Siemens



Why to go –
Crazy **eco-packaging**
instead of plastic
insanity



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Crazy? That's a matter of opinion!

The fifth edition of the “psychiatrists’ bible,” the Diagnostic and Statistical Manual of Mental Disorders (DSM), was published on May 18, 2013. Since then, millions of people who were previously considered “normal” have been officially classified as mentally ill (or crazy, as the layperson would say). That includes many people who, unfortunately, genuinely are ill. “Crazy” (or abnormal) is another way of saying that people do not correspond to the norm. But who defines what is normal? Doctors, the government, the culture in which you live, prevailing trends, or your great-aunt Matilda? People who defy the norm can get into trouble, be ostracized, find themselves institutionalized ... or sometimes celebrated as geniuses. A lot seems to depend on your personal viewpoint. So is being crazy just a matter of opinion?



CRAZY TYPES

What makes those successful oddballs tick who choose the less-trodden paths, break out of old paradigms, and persevere with stubborn persistence? One of them who became a mover and shaker at an early stage has a crazy biography. Another woman abandoned her initial career and embarked on a second, crazy one after something “clicked” for her.

An artist tells of the flood of images that “sits everywhere in my whole body”—and that matures in his brain to form concepts which he has been converting into extraordinary art for many years now. He does it because he has no choice, because if he didn't, he might really go crazy.

CRAZY POSITIONS, AND CRAZY MOVERS

A shift in perspective, an attempt to see through someone else's eyes, can be an intriguing experience and may yield new insights. It can shed new light on the hidden champions who often work in the background to produce superb results. It can lead to completely new processes and products. For example, an architect taught a robot to spin—resulting in extraordinary, unusual objects made of entirely ordinary materials.

And what happens when you add instead of subtracting? Rather than wasting 98 percent of valuable material in the machining process, 3D printers work much more economically.

And speaking of the eco mindset: plastic was yesterday. Today, packaging materials made from whey, fungi, seaweed, or fish feed can help to mitigate one of our greatest pollution problems. Does that sound crazy? Let's wait and see. It could just work.

Regardless of how they are packaged, megatons of material, consumer goods, and suitcases are moved every day from A to B in the globalized world. For shipping companies, this is all in a day's work. But what about moving Lang Lang's concert grand? Or a live giraffe? Or a work of art worth 150 million? In these cases, success hinges on the creativity of the haulage contractor.

In our view, people who do things differently, think laterally, test the limits, and transcend frontiers are fascinating. Do you think they are crazy? Let us know!

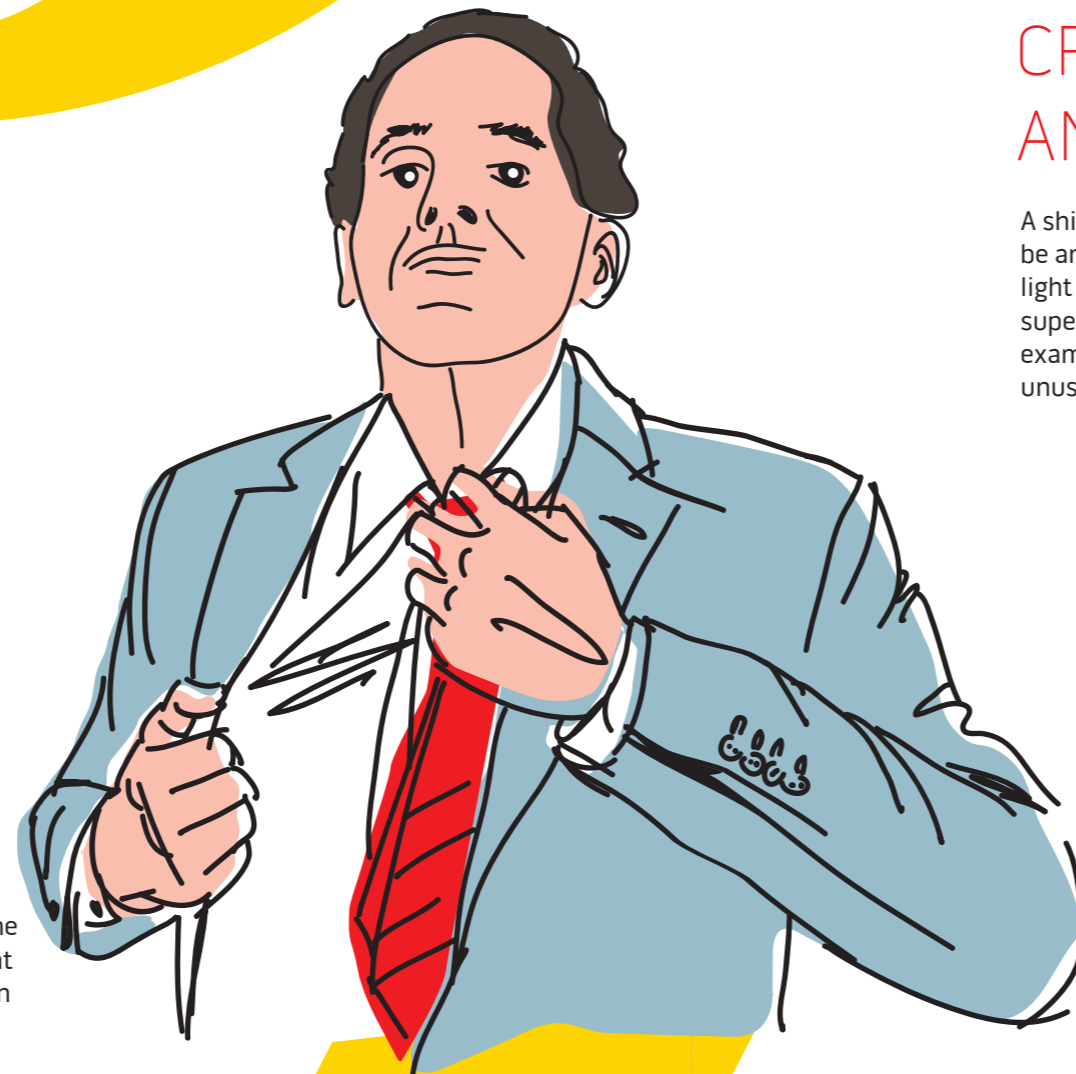
Text: Klaus Altevogt

CRAZY GOES CREATIVE

We find people interesting who deliberately transgress the norms, who strike out off the beaten track, and who are remarkable and successful for precisely this reason. Their “crazy” ideas and projects are what generates variety and brings about change, and progress.

Admittedly, change can disrupt the normal flow of life. During crazy times the demand for nostalgia, vintage items, and back-to-our-roots gurus goes into overdrive. Many young people today think square is cool. Ultimately, it's easier to be normal.

In this edition of metalligent®, we go against the flow and focus on personalities and projects that show that being crazy can be positive—and even profitable.





Doing it differently, doing it better

Karl-Heinz Schröder is the proprietor of Schröder Abgastechnologie in Kamen. Cooperating closely with cutting-edge research, he develops new systems for heat recovery and emissions reduction in industrial plants—and he is usually one step ahead of the competition. Smoke billows from the smokestack. Where does he get his nose for new technologies, his energy, his perseverance?

VERRÜCKTER #1



A BORN ENTREPRENEUR!

At the age of ten he earned extra pocket money and supplemented the family income by delivering bread rolls and sorting bottles after school for the local beverage store. He turned down the opportunity to go to grammar school because he wanted to “do his own thing” as early as possible. After completing an apprenticeship as a decorator he had his own apartment at the age of seventeen: a noisy one, located above a disco, so that he slept in one morning and missed the application deadline for the school of applied arts. Thus he kept working in the business where he had trained, and later, while doing community service, put in night shifts for an interior designer. In lieu of wages, he asked to be paid in designer furniture after a two-year period. By then he was twenty, married, and a father, and just wanted a “nicer” home.

When the hippie and folklore movements were all the rage in the early 1970s, he opened his first store and nationwide dealership for hippie clothing and accessories—at the age of 23. He got around quite a bit, watched carefully how other people did it, and then did it better.

“I can do it better!” was also his thought when he observed the subservient, fake friendliness and the indifferent design of local restaurants. And so, at the age of 32, after half a year of “hard graft,” he opened a live music pub which soon made a name for itself far beyond the region and was a huge success.

ALL IT TAKES IS A PLAN ...

However, his father died in late 1983, just a few weeks after the opening. What was he to do with dad’s little plumbing business? “Take it over, you can do it!” said his family. “Well, all right, what was I supposed to do? I was convinced that I could do anything. Or at least do it better than anyone else.” After selling the pub, it took him and a business partner only a few years to increase the revenue of the little plumber’s shop by a factor of twenty and turn it into a broadly positioned, acclaimed business specializing in exhaust technology for particulate emissions reduction, heat recovery, and smokestack technology. With approximately eighty employees at two locations, it puts solid craftsmanship and state-of-the-art technology to work in producing top quality products.

“There were many times when I made dangerous decisions,” he says. “Because that’s how I tick; I trust people and I look at risk as a challenge. This mindset has often led me to success, but I also often had to pay the price.”

Today he and his son and successor jointly steer the company on a harmonious and circumspect course towards continued expansion. But there is one thing that has never changed. “I still try to infect our employees with the thought: ‘How could we do this better?’”

He does this even with the seemingly hopeless cases that local schools sometimes send him for training. “Everyone deserves a chance, don’t they? Just look at me!” And his laughter bids fair to shake the walls.

Text and images: Klaus Altevogt



Don't be afraid to fall

Sina Trinkwalder is the “mama” of “manomama,” an organic apparel company. She founded the business in 2010, employing primarily people who have poor prospects on the job market—older people, people with special needs, people with migrant backgrounds, single parents, and school dropouts. All her employees are part of the “family,” with permanent employment contracts and fair working conditions. What makes this successful businesswoman tick?

Ms. Trinkwalder, in your “first” life you ran a successful advertising agency. Why—and why did you eventually quit?

Sina Trinkwalder: After graduating from high school I wanted to go into journalism, since language is my thing. I had a choice between tabloid and feature pages, but neither option was for me. So I started writing for clients and founded the agency with my then husband. Over the years, however, I became more and more dissatisfied with my job of artificially stimulating consumerism. And it was during this phase that I had a deeply memorable encounter with a homeless person. Something went “click” and I realized that I didn't want to be successful any more, I wanted to be valuable. Valuable for society. And when I realized that, I quit.

Didn't the people who previously patted you on the shoulder react by saying, “Are you crazy?”

Well, that was their tough luck. I'm pigheaded and persistent, with plenty of staying power. When I'm convinced that something is the right thing to do, I do it. Sure, you might fall flat on your face. But OK, then that's the way it is. I think it's much worse not to do something and years later to sigh: “If only I'd done it.”

You enjoy risk?

Of course. That's what entrepreneurship is about. It's not something you can learn. I'm very sure about that. Either you are an entrepreneur or you aren't. You can learn the tools of the trade, like economics. But if that's all you know, the best you can hope for is becoming a manager. As an entrepreneur, you have to love taking risks

and you can't afford to be afraid of falling. And if you do fall, you get back up, dust yourself off, and keep going. And you'd better not be scared of responsibility, because you're automatically responsible for your employees, who trust you.

And what if something goes really, really badly wrong?

Then I play it straight. I call the customer to explain the situation, and the shipment gets to them with a week's delay. That never killed anybody. Nothing is important enough to give yourself stomach ulcers over. If everyone chills out just a little bit, you generally get the same results, but with much less stress.



CRAZY PERSON #2

“I'm pigheaded and persistent, with plenty of staying power. When I'm convinced that something is the right thing to do, I do it.”



Sina Trinkwalder, founder of manomama

What keeps you going?

Coffee and exercise. Caffeine is the lubricant for my engine, and my engine is my love of people. Even bad people. And I love myself. Especially when I'm playing sports, when I'm totally in the moment, when I can think, when I learn a whole lot about myself. Especially when I'm riding my racing bike. Of course, I enjoy getting recognition and winning prizes. But those don't really mean much except: Well done. But that's about it, it doesn't change anything.

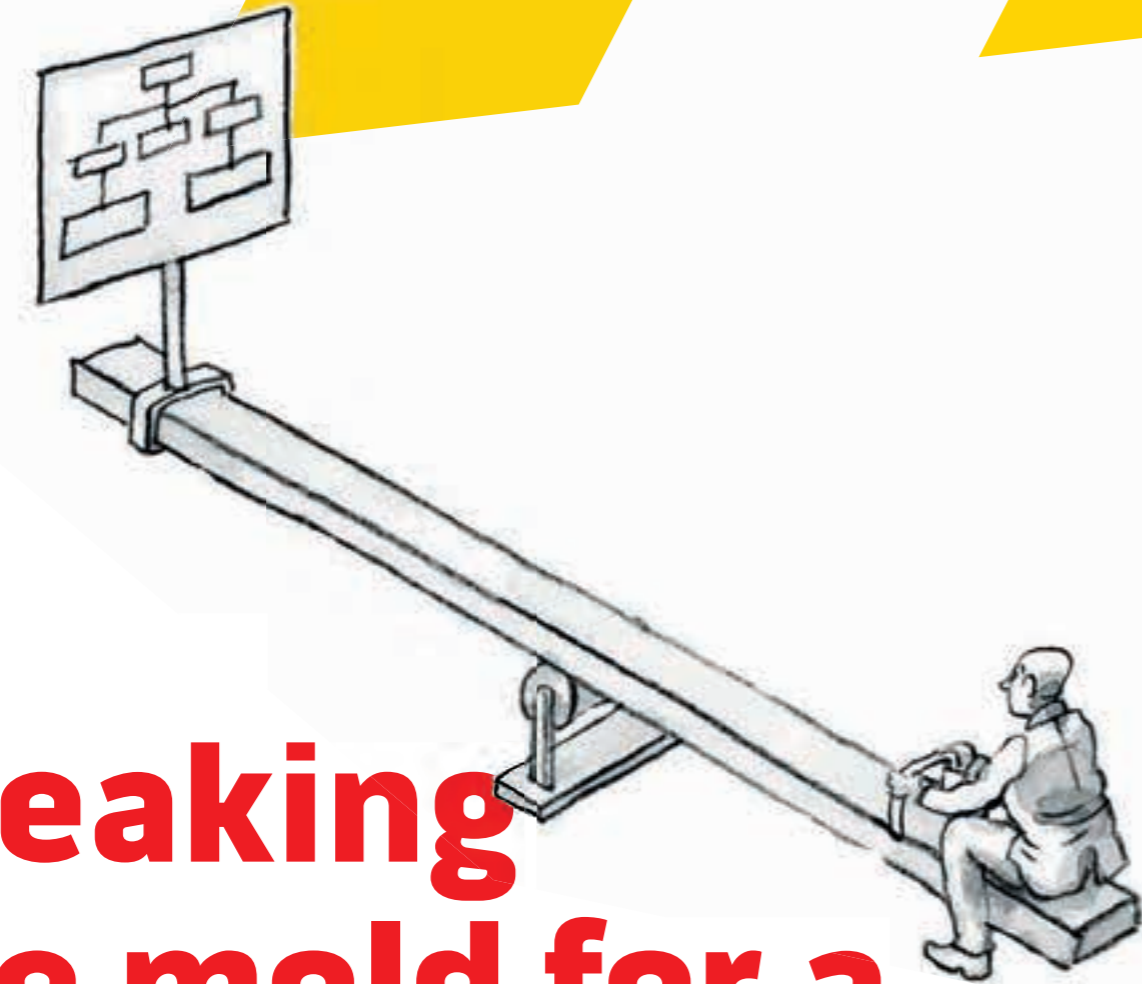
The really important things in life are my son (“Mom's cool!”) and the respect of my ladies and gentlemen in the company. When I screw up, they tell me straight out what they think. And when they screw up, I yell and scream like a mom yelling at her kids. And an hour later we're all laughing about it and everything's OK.

The interview was conducted by Klaus Altevogt

At manomama, people who have poor prospects on the job market produce and sell organic apparel under fair conditions. Images: manomama

Breaking the mold for a different kind of success

Thinking outside the box is all the rage . . . but all too often it's nothing but hot air. Nevertheless, there are companies that march to a different beat and that succeed for this very reason. Management consultants Dr. Stefan Kaduk and Dr. Dirk Osmetz have made a study of these mold breakers. One example is the mechanical engineering firm Allsafe Jungfalk in Engen, with its daredevil manager, Detlef Lohmann.



"We'd rather experiment than avoid things."

Allsafe manager Detlef Lohmann

How crazy do you have to be to quit a secure corporate job, move your family from your own home into a rented one, and buy a share of a company that makes things you know nothing about? And in a market you have no experience with to boot! Viewed from the outside, it's a daring move at best. The more so because we're talking about a man who—as he himself admits—never rose above the position of clerk in his previous career. And Detlef Lohmann is convinced that he would never have risen any higher if he had stayed in the corporation. But then, in the late 1990s, he had this "crazy" idea of buying a share (originally 25 percent) of Allsafe Jungfalk in Engen on Lake Constance. Today he is its CEO.

CRAZY? NO KIDDING!

He himself takes a different view. "I never thought it was a crazy step to take." As an engineer, he simply did the math. The option of a corporate career was closed, and employment in the mid-tier sector struck him as being slightly risky. So he bought into a company, because "it's kind of hard to fire an owner." Kudos to him. It takes guts to come up with that idea.

Finding himself suddenly the boss, Lohmann did everything differently from how Allsafe—and other companies—had done it before. He really had no clue about either leadership principles or even his own company's business model. Allsafe Jungfalk produces cargo mounting systems like tensioning and lashing straps. So he started by going into a normal office as a normal employee and learning the ropes. Consultants call this a management buy-in. For Lohmann and his logical engineer's brain, it was simply the only way of getting by: "There wasn't a thing I could do operatively, so I thought about strategic issues."

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EVERYONE'S A BIT OF A BOSS

As a result, he gained insights and made decisions with which he turned the company's organization on its head. Since then, all employees work in self-organized teams. There are no divisions and time clocks are nowhere in sight. Production employees don't even have to punch out to play table soccer—after all, there's no time clock to punch. If you run late on your lunch break, you make up for the time later. Hallways, walls, production halls, and offices are plastered with colorful tables, charts, and infographics. The teams alone decide who puts up what information where and for what purpose. For a company that produces in a high-wage country like Germany, where efficiency and waste avoidance are not exactly trivial issues, all of this sounds pretty offbeat. Oh, and innovative too.



The mission of Musterbrecher: making people laugh at work | Image: allsafe



Illustrations: Florian Mitgutsch / Musterbrecher

ALL FOR ALL

But let's not forget that we aren't in Silicon Valley—we're in rural Baden, just a stone's throw from Lake Constance. Life is relaxed here, but the people are hardworking and enterprising. Nevertheless, Allsafe Jungfalk marches to a different drummer. For example, right now all the production teams are working out who wants to work with whom on their shifts in future and whom they would rather not share a shift with. Ever since the third stage of employee participation was achieved in 2016, all the teams decide with complete autonomy how to distribute this portion of their pay. And we aren't talking peanuts, but five-figure sums that must be divided up fairly among teams of ten people.

Does it work? Colleagues determining their colleagues' bonuses and even deciding whom they want to work with? "Yes," says Lohmann, "it does." Though he admits that even he is surprised at how well it works and at the ideas his employees come up with. For example, one of the teams used part of the bonus to arrange a party for all their colleagues in production as a gesture of thanks for the good working atmosphere. "We couldn't have predicted all the ways this could go," Lohmann says, still surprised at the things he set in motion. "And we most certainly couldn't have ordered it from the top down."



NOTHING VENTURED, NOTHING WON

Lohmann firmly believes that you need to trust people and empower them to take responsibility for making decisions. "Then they achieve much more than we expect them to." In his view, all this is far from crazy, but merely logical, provided that you deal fairly and openly with one another and allow people to experiment. "We'd rather experiment than avoid things," is another of the ways in which Lohmann describes how he does things differently.

To date, the company's continual growth and healthy earnings have vindicated these policies. In financial terms, the bottom

line is favorable. What about in human terms? One of the effects of team spirit and transparency is an increase in social control. Is everyone able to deal with this? "We have a very special atmosphere in which we challenge ourselves to peak performance," says the boss, adding that newcomers do need a little time to get their bearings. "We do march to the beat of a different drummer," he concedes. "But we assume that anyone can assume a position of responsibility as long as they want to do so." The low employee fluctuation rate in Engen suggests that it really does work.

Text: Annette Mühlberger

More than the latest hype

Dr. Stefan Kaduk and Dr. Dirk Osmetz are management consultants who help companies that want to break with the mold to be experimental. We asked them about the advantages of defying convention—and what happens when being different becomes the new normal.

Industry 4.0 is about automatization and digitalization. Is it even still possible to break free in a networked economy?

Kaduk: It's important to differentiate between factual constraints and seemingly fixed models and approaches. So it would be crazy in a negative sense to want to sidestep certification if your business depends on it. But with all the buzzwords that are trying to map the new world, it's important to take a closer look. When it comes to management, we believe that as business models, processes, and working environments become increasingly digitalized, management needs to become more analog. Breaking free begins with asking counterintuitive questions. For example: How many unintended special cases will result from standardization? To what extent does networking lead to a lack of commitment? It's all about paradoxical connections.

What is the advantage of breaking free of conventional models?

Osmetz: There's no "golden formula" to doing things differently. It starts with a process of reflection about the side effects of professionalism. This can come at a high price—monetarily, but also in terms of phenomena like demotivation and a lack of individual responsibility. If a performance system leads to the creation of anxiety-filled spaces and people start point-scoring, it can be dangerous. The important thing is to follow through on the reflection process by experimenting with other models. For example, leaving it up to the team to decide who to recruit.

Thinking outside the box seems to be the new management standard. Can planned craziness work?

Kaduk: That's a great question, because it touches on something that we have identified as a negative trend. A few years ago now, being different started to become the new normal. It is cool to break away from the norm. But unfortunately this divergence is often just superficial yet vaunted all the more ostentatiously for being so. We differentiate between creative thinkers and convention breakers: the first are happy to just think and talk while the latter actually experiment. But obviously the idea of planned craziness is an absurd contradiction.



Dr. Stefan Kaduk and Dr. Dirk Osmetz | Image: Musterbrecher

Does innovation require nonconformism and think tanks?

Osmetz: We talk about nonjustification spaces – spaces which make it easier for new things to happen. If an idea can escape immediate judgment and go on with impunity to be refined in dialogue, that's a good thing. But it can be risky if it leads to the formation of biotopes that are completely disconnected with the company. Then you lose the feedback and end up with value judgments like "boring old organization versus crazy young thinkers." Everyone in management needs to have the skills to work against their own organization to some extent, if innovation is to happen.

Putting yourself in someone else's shoes helps you to see things from a different perspective—do we need more job rotation?

Kaduk: Definitely. Trading roles is very useful for eliminating blind spots. But we're not talking about a perfectly planned exchange. It's much better to create a space where tandems can take place on a voluntary basis. We often accompany experiments where executives trade tasks with other executives for a period of time. This triggers something unfamiliar: It does away with professional leadership. And you are left with leadership in the real sense of the word. The greatest value of seeing the world through new eyes is being able to experience things that you have always understood intellectually in a "live," emotional way as well.

The interview was conducted by Annette Mühlberger



The air artist from Amsterdam

He blocked out the light with a series of small and large objects; he drilled perfect cylinders from vast, unhewn blocks of granite; he exploded huge marble spheres. He spent weeks painstakingly polishing a perfect cube of marble—only to topple it headlong over the face of a cliff. Today he is sucking the air out of ten-ton steel forms . . . Who is Ewerdt Hilgemann and what is his mission?

"Hu, da!" (Look at that!)—these, rather than "mama" and "dada" were his first words. "If you want to understand Ewerdt Hilgemann you must know that his attitude to the things of the world has always been one of curiosity and wonder—and it still is today. He has a need to communicate what he's seeing to everyone, all the time," writes Antoinette de Stigter, his wife, in the book *Ewerdt Hilgemann* (Art Affairs, Amsterdam 2015). "I just have to," Hilgemann says.

A MAN FULL OF IMAGES

When I visited the two of them in Amsterdam, I was given a warm welcome—and entered a cosmos full of stories, which, as Hilgemann says, "mature into concepts in my head, are converted into processes, and lead to results. Which I then have to accept." And, he says: "I am full of them, they sit everywhere in my whole body."

Born in 1938, he gathered his first images and impressions as a war baby in the Ruhrgebiet: Nazi fanfare, air raids, rubble, cripples, dead bodies. And he tried to make the incomprehensible comprehensible and to put it in some sort of order, through drawing. He collected fragments of shrapnel, fascinated by its shapes and colors—and fatal effects.

When things became too dangerous for his family, Ewerdt Hilgemann was sent to the farm of his beloved grandparents in Lengerich, where he was plunged into a world of unspoiled nature and its careful cultivation. He saw the perfect parallel lines of the plough's furrows in the fields and stared at the passage of the clouds across the blue sky for hours on end.

His other grandfather, a laboratory director in a cement factory, led him by the hand through the screeching and crashing of the machine hall. The experiments he conducted, testing the breaking point of different materials, left a deep impression on his grandson. But destruction also struck here, when a shell hit his grandparents' house, leaving only half of it standing. An explosive device disguised as a fountain pen fell from the sky on a parachute and lacerated the "sowing hand" of his best friend, a farmer's son.

After the war the "perpetrators," his father, his teachers, locked the door to the past by glorifying ancient history and German classicism. They played down all questions about the Holocaust and its causes and prescribed the classics, piano and violin lessons, and the importance of studying something "proper." "But how was I supposed to listen to the people who had triggered the catastrophe?"

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A LIFE FULL OF RUPTURES

Hilgemann decided he had to work things out for himself and in 1959, distanced himself from his parents. After visiting various art museums he realized that he didn't want to become a landscape architect as he had originally planned (the love of nature!) but an artist instead. So he enrolled in the Werkkunstschule in Saarbrücken, which in those days was like a different country. It was here that his first and one of his most important teachers, Oskar Holweck, taught him skilled craftsmanship and how to develop independent ideas. As well as to regard life and art as an inseparable unit to be aspired to.

In an early phase of his career Hilgemann started working with strictly logically conceived small- and large-format serial structures and the play of light and shadow. Soon he wanted to make the artistic process visible—by this time he had moved to the Netherlands—creating a series of different squares and cubes by adding to or removing sections from them. Now he was on the right track.

From 1975 to 1984 Antoinette and Ewerdt Hilgemann rented a studio in Carrara in Italy where the artist began working with growing intensity with the power of the elements and physics, and with the relationship between construction and destruction. He began grinding and polishing a hunk of marble 1.5 meters long for hours and hours every day in the sweltering heat until it was a perfect cube. "Stone stays stone, and I was just a little person who wanted to do something he could be proud of. And then the day came when we let it roll 330 meters down the face of a cliff. I hoped that it would merrily bounce down the mountain where it came from. But a chunk of stone that weighs upwards of nine tons does not bounce, it crashes and thunders. Boom! Boom! Boom! Eventually his "bella ruina," the innermost, untouched core of the cube, landed at the bottom, not broken, not shattered, but worked on by nature and gravity. E.H. had found his subject.

He then turned his attentions to explosions, but remained on the lookout "for a way of deforming a perfect shape without hammering away at it." He hit on the concept of implosion and later found his ideas confirmed by the philosopher Marshall McLuhan—known for his work "The Medium is the Message"—who described implosion as the symbol of a changing world, as a way to the center of things, and as the antithesis of expansion. And so it was that Hilgemann found a method with which he could achieve "transformation from the perfect to the incomprehensible."

Antoinette de Stigter and Ewerdt Hilgemann | Image: Klaus Altevogt



AN OEUVRE FULL OF IMPRESSIONS

He continued to experiment and developed a process that resulted in highly unusual and impressively monumental artworks, which in the meantime have made him famous all over the world. First of all he gets his "boys" in Hardinxveld/NL and at Arnold in Steinbach-Hallenberg to weld him perfect cubes, pyramids, and cuboids two, three, or six meters high, out of stainless steel, which are fitted with a valve. Then he attaches these giants to a vacuum pump and lets them slowly implode. It is overwhelming to watch the first wrinkles form, or the ten-ton colossus gracefully lifting a corner as if it were a leg, or the top half bending sideways like a flower. In the interplay of precise calculation and tamed arbitrariness of physical forces, the cool metal forms transform serenely into "three graces," an angry

„Freeze Frame“, Magnan Metz Gallery, New York 2014 | Image: Arnold



"Cerberus," a flowering "cactus". It is the perfect collaboration between an artist's intention and his "collaborator," the air.

When the Park Avenue Sculpture Committee invited E.H. to New York, he felt extremely honored. For his Park Avenue Project 2014 he created seven sculptures whose shiny surfaces reflect Park Avenue's brick "façade sculptures" and astound passers-by. Antoinette and Ewerdt Hilgemann are currently preparing new projects in Amsterdam, Constance, Los Angeles, and for the sculpture biennial in Bad Homburg. A strong team, a fantastic artist, wonderful, modest people. "I was always an outsider," he says. Thank heavens for that.

Text: Klaus Altevogt

Image: Rolf Giesen



**Antoinette and Ewerdt: A strong team,
a fantastic artist, wonderful, modest people.**



BURNING FOR GLASS: NEON- ARTIST BY CONVICTION



The last masters of their trade

Neon glass bending is becoming a dying art. But the passion of “neon artists” like Vladimir Milicic and Francisco José Navarro Melendo for their craft glows on undimmed. Where did they get their obsession with the colorful fluorescent tubes and how will they survive in the age of LED?

“I was always fascinated by the millions of neon signs in the United States and was determined to be able to make them myself,” enthuses Yugoslavian born Vladimir Milicic, who has been neon glass bending at the Hessian sign- and neon sign-maker Nordlicht since 2000. He learned the trade on the job at a small company in Alberta, Canada. But he was so obsessed by glass blowing that, although he had only been hired as a production assistant, he was determined to learn the art from a professional. It required a huge amount of persistence and patience, Milicic recalls. “In the first six months I wasn’t allowed to do anything but watch. Then it was just practice, practice, practice. A lot of people can’t take it.” He, however, was sold from the start.

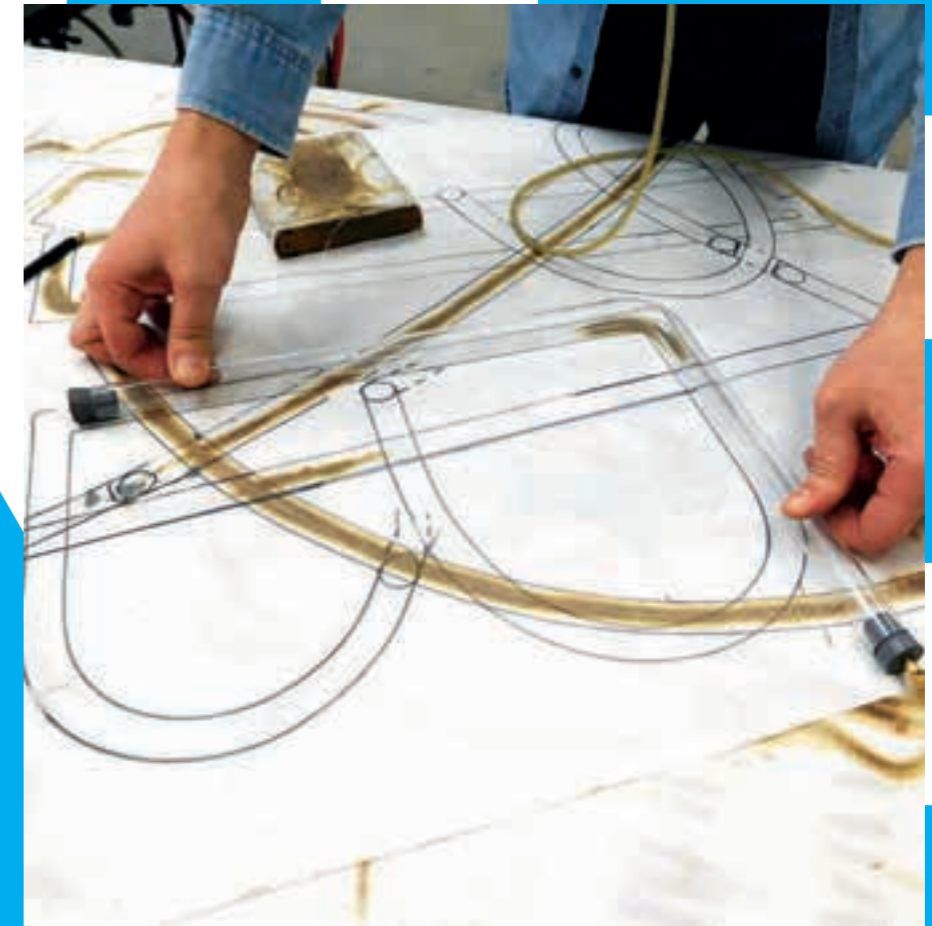
His colleague at Nordlicht, Francisco José Navarro Melendo, born in 1954, from Saragossa in Spain, decided at the age of 14 that he wanted to become a radio and TV technician. A distant uncle, however, advised him against it. “There are millions of those already! Why not become a neon glass bender instead, you will earn more and be more in demand.” The young man was eventually convinced. During the course of his three-year apprenticeship he developed a passion for the difficult craft. After successfully completing his apprenticeship he managed to overcome the endless bureaucratic hurdles and follow his family to Frankfurt am Main. He immediately found work in a family business, which offered a number of perks on the side. For example, he was allowed to use the workshop and materials outside business hours to make his own artworks. These later found their way to Opel in Rüsselsheim where he was able to exhibit and sell his work. In 2005 he moved to Nordlicht GmbH, where he still works today.

Making sand glow

What does he find so fascinating about this line of work? “What I love is that it involves making glowing fluorescent tubes out of sand, the most basic of materials,” Navarro Melendo says, his eyes shining.



Francisco José Navarro Melendo



Art from light: The man between the walls was made by Francisco José Navarro Melendo in his free time.

Image: F. J. Navarro Melendo

“What I love is that it involves making glowing fluorescent tubes out of sand, the most basic of materials.”

Francisco José Navarro Melendo



Nordlicht has been owned by Arnold since 2015. The neon sign specialist combines traditional glass and metal products with cutting-edge lighting processes and technologies. Visit Nordlicht.de via the QR code

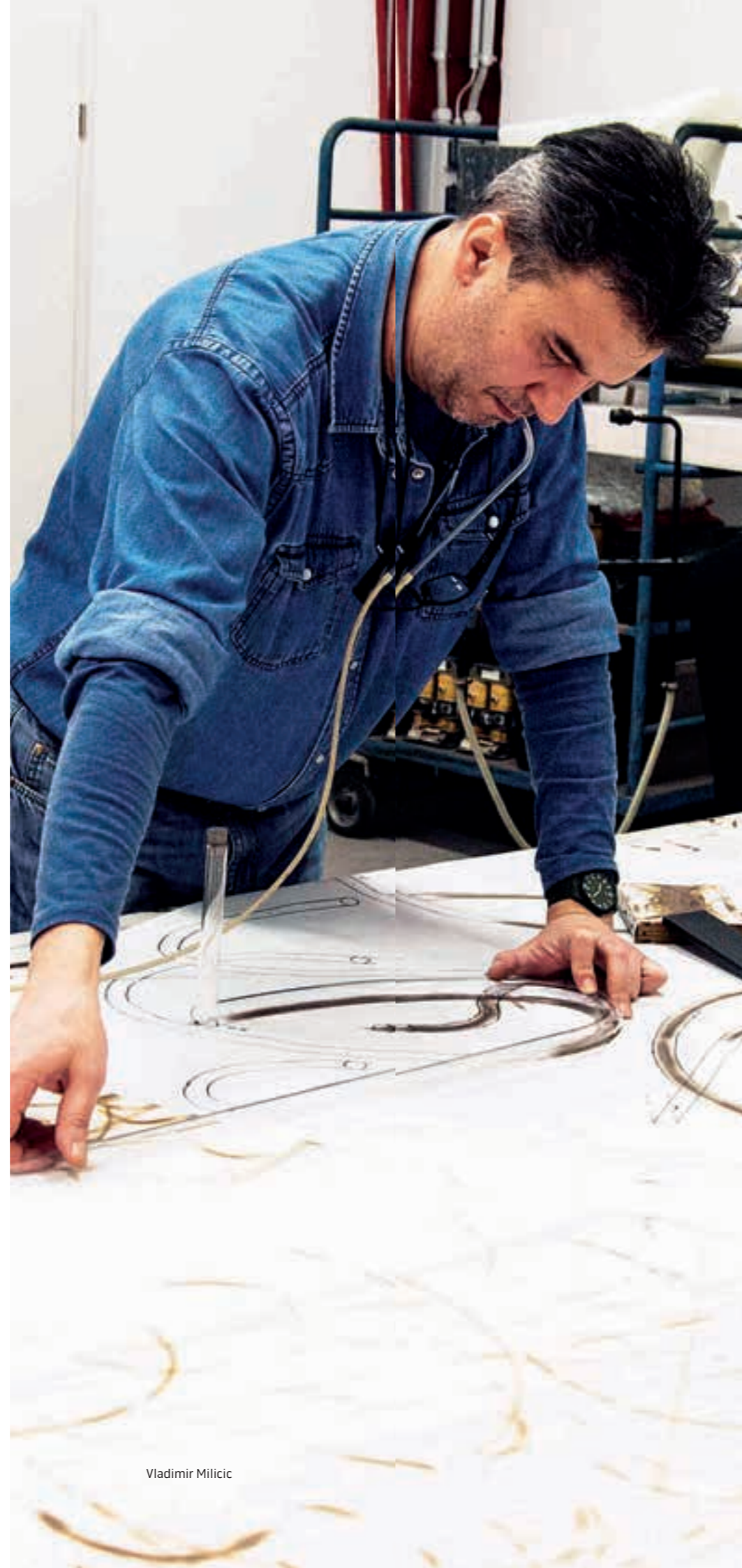
It all comes down to the quality of the glass tubes and technical knowledge. His evening classes in drawing at the art college in Saragossa have also served him well. In their raw state the glass tubes are about 1.5 meters long. First he cuts them to size and marks the places where they need bending—forming each letter beforehand in his mind. The type of glass, special fluorescent powder, and filling them with a noble gas like neon, argon or xenon determines the color of the light. The choice of which electrodes and transformer to use is decided by the total length of the installation. And this can be pretty large: longer and wider signs can need up to 10,000 volts to light the gas—but that's the legal limit.

The most difficult part, however, is the bending itself. The glass tube has to be heated to exactly the right temperature. "Just a few seconds too many or too few can ruin the entire thing," Vladimir Milicic speaks from painful experience. Holding an air tube in his mouth, the 47-year-old ensures that the soft glass is bent evenly, without dents or creases. With his bare hands he then swiftly bends the tubes into a U-shape, a 90° angle, or a curve—according to the technical drawing. The more complicated the lettering, the more handling and work steps are necessary. "I was told that if I wanted to apply for a job, I had to be able to make an 'E.'" It contains everything that a glass bender has to be able to do," Milicic informs me with a wink, holding one proudly in the air.

Quality beats quantity

Like so many products, neon signs are now being mass-produced in low-income countries. In China, for example, where hundreds of glass benders in huge halls produce the "OPEN" signs that glare out of virtually every shop front in the USA. These products have little in common with high-quality craftsmanship, but they make neon signs available for the common man. Apropos savings: if neon sign-making is already in mass production, does that mean that a machine could eventually take over? "No, that won't work," grins Milicic but after thinking about it for a moment, adds: "Theoretically it might even be possible, but the bending is a problem. As soon as a customer decides that they want the letter just ten centimeters bigger, the machine would have to be set up all over again. It would involve far too much work and be very expensive."

But mass production abroad is not even the biggest competitor for businesses selling neon signs: LEDs have been putting the squeeze on neon tubes for several years now because they



Vladimir Milicic



are significantly cheaper and easier to produce. But they lack the charm of the mouth-blown neon tube. Which is why neon glass blowing, which still exists as a licensed profession in its own right, has developed into an independent art form. In Germany there could even be a renaissance for neon tubes.

"In the USA the name of our profession is 'neon artist.' That describes it a lot better than the neutral term 'neon glass bender,'" comments Nordlicht employee Milicic. But what would he do if the age of colorful neon tubes really did come to an end in Germany. "I'd move back to Canada or America, they won't go out of fashion so quickly there," he laughs. His colleague Navarro Melendo, who is coming up for a well-earned retirement, is returning home to Spain: "I will buy a little house and open my own workshop and continue making my neon artworks. I'll never stop wanting to perfect the art." Such passionate glass artists make one hope that the good old neon tubes will shine in a new light, and continue to make many places in this world a little bit brighter and more cheerful.

Text: Stephanie Werner | Photos: Arnold

Crazy ways to a new building culture

Professor Achim Menges is developing the architecture
of the future based on natural principles

HOW DOES NATURE DO IT?

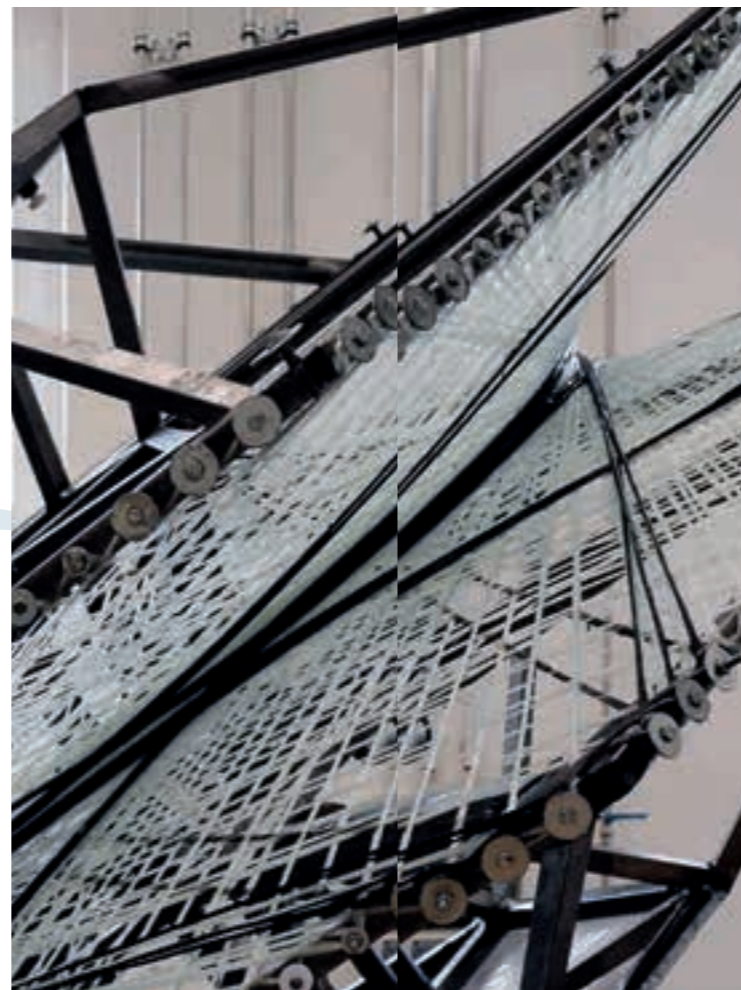
This is the first question to which Professor Achim Menges, founder and director of the Institute for Computational Design and Construction (ICD), always returns. He translates mechanisms at work in the natural world into architecture. The highly specialized abilities of pine cones, spiders, and lobsters are a source of inspiration for his interdisciplinary projects with biologists and engineers. With the aid of state-of-the-art robotic technology at the ICD in Stuttgart, pioneering architectural designs are born.

Most people associate pine cones with the fresh and aromatic scent of pine forests. A spider, on the other hand, is a source of disgust or even fear for some. The lobster is known as a luxury food, but also for the incredible strength of its claws. For Achim Menges, these organisms are a challenge and a source of inspiration.

Peter Cachola Schmal, director of the Deutsches Architekturmuseum in Frankfurt, calls Menges "a unique case in German architecture." "His experimental pavilions combine innovative material developments with new manufacturing technologies and artistic creativity," according to the statement explaining why Achim Menges won the Baukunstpreis (for architecture) at the Berlin Academy of Arts in 2015.

Menges—a unique case? Let's take a look at the example of his installation HygroScope—Meteorosensitive Morphology, a Centre Pompidou commission that made its debut in the Creative Multiversities in 2012. Huge honeycomb forms hang from the glass ceiling of a room-sized vitrine. They move, they open, they close, but without motorization. They are simply reacting to the humidity of the environment. "They are following the approach of self-regulating, 'weather-sensitive' architectural systems," Menges explains. Just like wood and pine cones, which react without any fancy technology to changes in the climate (dry/moist), adjusting their form accordingly. Owing to the anatomy of its cells, wood grows or shrinks in response to humidity levels in the atmosphere. Pine cones open in arid conditions to release their seeds, which disperse much better in dry weather.

Menges used these natural response mechanisms as the inspiration to design a simple connecting veneer element to function as a sensor, motor, and butterfly valve. But this "simple connecting veneer element" is actually the product of years of interdisciplinary research. Robots have played an indispensable role in the process, as without them the serial manufacture essential to the process would not be possible.



Photos: © V&A London

The Elytra Filament Pavilion, which the ICD designed and built in cooperation with the Stuttgart Institut für Leichtbau Entwerfen und Konstruieren (ILEK) in the courtyard of the Victoria and Albert Museum, reacts to its environment. The term "elytra" comes from the Greek "elytron," which means covering and describes the forewing-coverings of certain orders of insect, which are extremely hard without being stiff or brittle. The roof construction of carbon and glass fiber reacts to visitors' behavior, climatic values, and tension shifts

in the supporting structure. "The carbon fiber structure has built-in sensor systems. They provide information which feed into a growth algorithm as the basis for a future reconfiguration of the structure. The system informs local robots about challenges for the construction parts that they will be producing as the building develops," Moritz Dörstelmann, a research associate working for Menges, explains. Visitors have a live experience of the creation of this fascinating lightweight system as a dynamic process. The construction components are fitted to the roof so that over the duration of the exhibition, the roof adapts its form to its use on site. "This ongoing connection between use and generation of space gives rise to an evolving microclimatic, structural, and spatial system which could serve as a model for public green spaces in the future," Dörstelmann says.

The spider *Argyroneta aquatica* is a further source of inspiration for Menges from the natural world. It lives underwater in a form of diving bell in which it spins its web. Biological construction processes for fiber-reinforced structures are highly efficient in terms of material use and function, and none more so than the net-building process of this water spider. To translate this into architectural applications Menges and his team developed a process in which an industrial robot is placed into an airborne casing of ETFE foil, an extremely lightweight and translucent plastic foil. This initially soft casing, which is borne exclusively by the air pressure, is then reinforced from inside by the robot using a form of spider web.

Menges' methods are still considered somewhat crazy in the architectural world. But the 41-year-old is confident that transformation processes of mechanisms from the natural world combined with innovative technology will result in architecture that is viable for the future.

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HELLO, ROBOT. DESIGN BETWEEN HUMAN AND MACHINE

Anyone interested in experiencing Achim Menges' architectural structures that were inspired by nature and built with the help of robots has until the middle of May. The Elytra Filament Pavilion is part of the exhibition "Hello, Robot. Design between Human and Machine" at Vitra Campus in Weil am Rhein (www.design-museum.de).



Digital Nature—New thinking turns everything on its head.

The Mannheim-born architect Achim Menges, born 1975, became a professor at the age of 32 and has a string of prestigious prizes under his belt: the International Design Award, the Mies-van-der-Rohe-Preis, the Kunstpreis of the Berlin Academy of Arts. Menges taught at the Architectural Association School of Architecture in London and at the University of Art and Design in Offenbach am Main. He is now director and founder of the Institute for Computational Design and Construction in Stuttgart.

Professor Menges, at your institute you deploy computer-based processes for architectural design. What advantages do these have over traditional design processes?

Achim Menges: The main improvement is a significantly higher level of integration. When computer-based planning and robot manufacture are integrated into the design process from the outset, this results in new, constructive possibilities which produce both efficient structures and innovative architecture.

As I see it, computer-based planning and production processes should not primarily be about automatization or replacing the planner or worker with computers or robots. Our research is much more focused on developing new synergies between humans and machines. In this way we want to create possibilities that do not exist when these working worlds are separate.

Lobsters, beetles, spiders—these are all creatures with highly specialized characteristics which have been a source of inspiration for you. What is the role of biomimetic research in architecture 4.0?

In order to explore the innovative possibilities of an integrative approach to digital planning and production, it is often incredibly interesting to look to biology. Nature constructs things differently from how we have been taught to do things in architecture. For example, in nature material is “expensive” and form is “cheap,” whereas until now the opposite has been the case with technology. Conversely, this means that we can learn from biology how to achieve higher levels of efficiency and performance using more complex structures. For architects and engineers these are often counterintuitive solutions.

You make frequent use of fiber-reinforced composites. Is this the magic material of the future?

Fiber-reinforced composites correspond with the possibilities of digital technologies because they enable a high level of differentiation and adaptation. It is only by using digital planning, simulation, and production that I can exploit the advantages of being able to lay each fiber according to its function and load. This is how nature constructs too. Almost all weight-bearing structures in nature are fiber-reinforced composites, built from cellulose, collagen, or chitin fibers.

What has to shift in the mindset of industry and society for computational design to establish itself long-term as the architecture of the future?

I am optimistic that it will happen all by itself. If you want to design the process in our favor and to accelerate it, then particularly in industry you have to think about how to use digitalization beyond the mere automation of existing production processes. These are just “pre-digital” products and systems. It is much more important to develop innovative architectural technologies in response to the new digital possibilities, because these will be the game changers.

Text and interview: Corinna Willführ

“When computer-based planning and robot manufacture are integrated into the design process from the outset, it results in new, constructive possibilities which produce both efficient structures and innovative architecture.”

Achim Menges

Image: ©Achim Menges



Creating something **from nothing**

PRINTED METAL REVOLUTIONIZES
MANUFACTURING

The principle is over thirty years old—and it's ingenious. In 1984 Chuck Hull developed the process known as stereolithography, the virtual mother of 3D printing. Hull used light to create just about any possible form from a kind of plastic primordial soup. Today the same can be done with metals. 3D printing is set to conquer the shop floor.

"Really?" asks the seasoned manufacturing engineer. It wouldn't be the first time they were disappointed by such lofty promises. But this time it would seem the omens agree that we are looking at a real step forwards. Large industrial concerns such as General Electric, Siemens, and Airbus and their suppliers are setting up the first production halls for serial 3D printing.

Renault Trucks wants to use the technology to produce lighter and more compact motors. The first tests have already proved successful. More than a third of General Electric Aviation's new ATP turboprop engines are produced using 3D printers. And what's impressive is that only twelve printed individual components replace 385 parts produced using conventional techniques, as Mohammad Ehteshami, Vice President for Additive Integration, explains.

To realize their plans, these concerns are entering into close partnerships with the manufacturers or else purchasing the equipment outright. Take Concept Laser, for example, a developer and manufacturer of 3D metal-printing systems: seventeen years ago Frank Herzog and his wife went into business for themselves after completing their studies. Today the systems that leave the production line in Lichtenfels are the size and shape of large machine tools.

Production processes are parallel instead of sequential in order to minimize downtime and increase output. Herzog is the recipient of numerous prizes. Then in the fall of 2016 Handelsblatt reported: "GE acquires majority stake in 3D printing system manufacturer." The American conglomerate was prepared to pay €549 million to purchase a 75 percent share of the family enterprise with 200 employees.



Frank Herzog, CEO of Concept Laser | Image: Concept Laser

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3D printing reaches new heights: following nature's example along the lines of force, the cabin bracket for the Airbus A350 XWB | Image: Concept Laser



Image: Concept Laser



3D-printed turbine components | Image: Siemens

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3D PRINTERS FOR EVERYONE

But let us take a step back. Everyone is talking about 3D printers, but it's all just nonsense. Nevertheless, the term has already found acceptance and ensured that Sally Housecoat can even contemplate owning such a device. She can pick one up in the hobby shop around the corner for only a couple of hundred euros and print her own knick-knacks at home.

One thing is true, however: we're talking about additive or generative processes. There are processes for plastics, metals, and even ceramics, generally in powdered or liquid form or in the guise of fed filament. Light or lasers are used to harden or melt the materials. The fragile stereolithography models of the past now serve merely as illustrative objects, as tangible construction drawings, so to speak. Later came the first functional components of series-like plastics and the first tools, such as the one used in plastics injection molding. Once engineers succeeded in producing ever finer metal powders, the road to serial production was wide open.

It's already an everyday technology in the field of medical technology. Entire factories produce millions of crowns and dental bridges around the clock. Patients now profit from custom-manufactured prosthetics. Surgeons use drill and saw templates that allow them to operate more quickly. One hour less at the operating table means one day less in the hospital for patients. This makes the procedure easier on the patient and saves the insurance companies money as well.

NEW HORIZONS FOR DESIGNERS

Things are moving ahead quickly in the spare parts market. For example, Siemens' additive torch tips are used to manufacture spare parts for gas turbines. This results in a 90 percent decrease in repair times. The jewelry industry and its designers have also discovered the new design possibilities for themselves, especially since it is now possible to "print" in gold and silver.

The aerospace industry is the true trailblazer in the field. One thing is clear: metallic 3D printing is an expensive habit. But it's important to remember that everything subject to the laws of gravity can profit from lighter weights. This is where 3D printing truly shines. No longer do designers have to worry whether the component can be cut, bent, or welded, for now they can allow their parts to grow along the lines of force as if they were natural objects.

Another advantage: many components for aircraft fuselages and turbines are made of light but extremely expensive and tough titanium. It's crazy if you think about it: oftentimes much more than 90 percent of the valuable material is simply cut in order to achieve a delicate but stable frame or turbine blade. Additive manufacturing instead of cutting is certainly the better alternative.



Four lasers in simultaneous action ensure rapid production: the EOS M 400-4 system is currently one of the most highly efficient 3D metal printers on the market | Image: EOS



How far have we come in the world of 3D metal printing? Kai Weigel inspecting test samples | Image: M. Pyper

COLORFUL THEORY, MONOTONE PRACTICE

A revolution in metals processing? This certainly causes us at Arnold to prick up our ears, for the very idea of printing metal certainly does sound "metalligent." Arnold's engineers have been experimenting with plastic printing since 2012 to produce individual patterns, assembly aids, painting templates, and spare parts. A new, larger facility is currently in the planning phase.

Kai Weigel, machine tool technician at Arnold, is keeping an eye on developments. Fascinated by the possibilities, he is quick to bring the overly euphoric back down to earth. Arnold, too, has individual metal components, primarily artworks, laser cut by other firms. The process is fine for smaller pieces, but it starts running into problems as the pieces get bigger. One of these is costs. As Weigel says, "A kilogram of metal powder costs between fifty and eighty euros; the bigger the system, the more material I need to fill it." In addition to the equipment costs starting at a quarter of a million you're quickly faced with another six-figure sum.

Weigel pours more cold water on the fire: "The construction room can be heated to a temperature of up to 500 or 600 degrees Celsius, but in order to melt metal I need much higher temperatures. The temperature difference leads to structural changes, and therefore changes in the material properties at the edges." Another problem is the larger the component size, the more uncontrollable the shrinkage. There are even limits when it comes to freedom of form. Angles of less than thirty degrees require support structures. This causes waste and extra work, the horror of every manufacturer.

THE BEST OF BOTH WORLDS

Machine manufacturers such as DMG Mori combine the best of both worlds: the flexibility of generative component manufacturing with the precision of cutting processes. The machine tool producer integrated a laser head into a general-purpose cutting machine. This allows the company to manufacture complete components in machined quality using generative techniques. The fill rates for the metal powder jet are up to ten times higher than in the powder bed, and manufacturing the entire component using a single machine saves time and money.

Many metal components made using additive manufacturing techniques require surface treatment. In the case of a machine tool with a laser head, the part can remain in the chuck. The final surface is created traditionally in the familiar quality of a machining center.

A lot of research still remains to be done, however. Arnold is hard at work exploring the possibilities posed by various generative manufacturing techniques.

Text: Michael Pyper

Whey to go – Crazy **eco-packaging** instead of plastic **insanity**

Plastic packaging is totally out, at least in ethical and theoretical terms, but unfortunately, things look different in real life. Even the smallest of products comes in a blister pack that cannot be opened without a tool—a type of packaging guaranteed to end up in the garbage. And let's not even mention the veritable tsunami of plastic bags. When it comes to logistics, plastic is just too cheap and too practical. There is a cause for hope, however. Scientists around the world are developing alternative, natural materials. This leads to unusual metamorphoses: whey, mushrooms, or fish food are being transformed into containers. Is this the right way to save the environment?

Eco-tattoo "Natural Branding" on a sweet potato | Image: natureandmore

Yummy, there's a six-pack ring floating in the water, the shiny dolphinfish in the Pacific thinks to himself. The edible six-pack rings manufactured by Florida's Salt-water Brewery taste great to the ocean's inhabitants. Instead of plastic, the rings are made of wheat and barley waste left over from the brewing process. Brewery director Chris Gove sums it up nicely: "Instead of killing animals, we're feeding them." After only two hours in the water, the rings begin to disintegrate. It disappears entirely after two to three weeks—unless the dolphinfish gets to it first, of course. If they end up on the beach, the rings break down after a similar period of time. Marine watch groups view the rings as a step forward, but they are certainly not overjoyed. It remains to be seen what effects such new materials and additional nutrients might have on the oceans. With a price tag of twenty-five cents per ring, the eco-rings are around ten cents more expensive than the plastic variety. Future production levels of 400,000 per month would help bring costs down.

TOTALLY CHEESY? IT SURE IS HERE!

Leftover whey from the cheese-making process can be used to produce paper and cardboard packaging for solid and liquid foods. Researchers at the University of Pisa have experimented with the recipe for this organic plastic, which includes potato starch, bio-degradable polymer, and whey protein. The resulting plastic film can replace plastic packaging layers (polymers) in multi-layer packaging materials of plastic film, cardboard, and aluminum. During the recycling process, the protein barrier level can be dissolved and the remaining levels reused. The long-term EU project, known as BioBoard, at the same time offers evidence of just how difficult it can be to make the leap from the research phase to the commercial mass market.

THE ULTIMATE FIVE-MINUTE TERRINE

Unharmful to animals and even drinkable and ecologically safe to burn: the bag produced by the Indonesian company Avani Eco is made of a natural material obtained from high-starch manioc or cassava. The organic bags are intended to help Indonesia solve its garbage problem and take pressure off of a polluted sea. Kevin Kuala of Avani describes a fitting example that helps explain the scale of the problem: "If every Indonesian uses just one 20-cm drinking straw each day, that adds up to around 5,000 kilometers of plastic thrown away each day. That is the distance from Jakarta in Indonesia to Sydney in Australia." Bags of cassava are bio-degradable and break down in just a few months. They are nearly twice as expensive as conventional plastic bags, but they do have an additional use. They can be dissolved in hot water (80 degrees Celsius) and drunk. It's a question of taste of course.

SWEET PACKAGING

It's not just the material that's important; what's also needed is the creative spark. Sugarcane fiber meets the optimal requirements as a material for fruit packaging, explains Paul Hendriks, packaging expert at Nature & More: "Sugarcane fiber is a waste material left over from the production of sugar from sugarcane. Our sugarcane comes from Columbia, where thanks to favorable growth conditions it can be harvested several times a year." Hendriks adds: "It's a renewable resource requiring no additional land that might otherwise be used to grow food." The compostable packaging of sugarcane fiber is no more susceptible to moisture than conventional cardboard. At 295 g/m², the rather thin organic substrate is stabilized by the packaging's special form. With its dark color and fiber structure, it is the perfect fit for organic produce.



Image: natureandmore

PACKAGING-FREE THANKS TO THE ECO-TATTOO

"The most sustainable form of packaging is no packaging. I've been preaching this for years, but it was difficult to convince the supermarkets," explains Paul Hendriks. With their eco-tattoo "Natural Branding," however, Nature & More appears to have finally achieved this goal. A concentrated beam of light removes the pigments in the outer layers of the skin of the fruit, thus allowing it to be labeled as organic produce. This means plastic shells and nets or adhesive labels are no longer necessary. The Swedish supermarket chain ICA calculates that this would mean 725,000 fewer plastic shells and films per year for avocado sales alone. And consumers can bite into their tattooed apples without hesitation, for the labeled area is edible.



Production made easy:
Fibers as the basis for packaging
Image: istockphoto | ajball18



Image: Saltwaterbrewery

Sugarcane fibers are waste, but also the perfect raw material for packaging

INDUSTRY AT THE FOREFRONT

Delivering goods to consumers easily yet sustainably is actually the second step. First the goods have to be produced, and the more complex and differentiated logistics concepts become, the more packaging is used during transport between companies. But now there is an established alternative to ubiquitous foam materials, and this includes chips made of corn starch and fungus mycelium. But just how practical are such alternatives?

As so often the answer is "It depends." For example, people at Arnold have been looking at organic packaging materials for a more sustainable logistics chain for some time now. According to logistics director Uwe Schäfer, "Many alternatives, including organic chips, are something that we as a producer of made-to-order pieces simply cannot employ. The organic materials are formed in a particular fashion, and this is only feasible for mass production." But in made-to-order manufacturing, too, there are better alternatives than petroleum-based disposable packaging. Around 70 percent of the packaging materials used by Arnold are manufactured using sustainable raw materials, and this is a share that is set to rise.

At present, only 10 percent of the materials cannot be replaced by sustainable substrates or because of customer wishes.

There is, however, another alternative that has proven optimal for such a range of goods. "In reusable packaging we've discovered the best solution for Arnold—one that is ideal for our individual products," explains Schäfer. Returnable packaging systems can be used for up to ten years. After the goods have been delivered to the customer, the empty crates are picked up on the way back and returned to Arnold. It's a constant cycle in which the customer sets the packaging standards. The list of acceptable materials—increasing numbers of clients explicitly forbid the use of Styrofoam!—is just as regulated as product labeling. It's not unusual for companies such as Siemens, but also mid-sized companies as well, to offer special crates or transport aids such as EUR-pallets and wire mesh boxes, for these are designed to fit specific goods in terms of their shape, weight, and features (special adapters) and to ensure secure transport. This helps save resources and hopefully reduce the mountains of packaging waste.

Text: Ingo Wölk

Will trade office for manufacturing

Things keep moving beyond the desk

How does it feel to switch jobs for a day? Arnold's personnel manager Stephanie Werner dives into the workaday world of production manager Wolfgang Diller and takes a curious look at the world beyond the edge of her desk.

It's 7 am on the nose, and I'm standing rather excitedly in my hardly worn safety shoes in the office of Wolfgang Diller, director of manufacturing sector PRF 2 at Arnold's Thuringia branch. He's taking his first look at the current workload in his manufacturing groups—laser cutting and punching, prefabrication, lead coating, and final assembly—on his computer monitor. Luckily his five workplace schedulers are taking care of personnel planning for their teams—but the tension makes me just as nervous as if I found myself faced with an exploding amount of overtime in the time-tracking system. "We're able to shift orders and balance excessive loads by temporarily reassigning employees," a relaxed Diller explains.

I notice the buzz of activity among the early shift during our subsequent tour through the large production hall. Christian Storch is operating a hydraulic press. He makes his way to us. "Would you like to record a video while I switch out the tool on the Hymag press?" After seeing my questioning look, I am told that such video recordings are used in process analysis. When the three of us watch the video on the computer some time later, it quickly becomes clear that the use of a cordless screwdriver can help save time when changing tools. And mounting supports for the press unit on the front instead of the back of the machine can also help ensure things move more smoothly. Another video, recorded at the bending machine, shows how an inappropriate tooling plan leads to a mistake when applying the bending matrices. I'm excited by this simple yet ingenious method that is now used regularly at Arnold.

Production times are a popular topic, of course. This is something I also sense when I find myself in front of an Excel table showing the planned and actual assembly times for the products for a particular customer. Diller and his staff look into every significant deviation, including by videoing final product assembly.

Before I know it, I find myself at a workbench assembling housing parts. Putting in the tiny screws is a lot harder than it looks. I'm all the more impressed by the injecting going on in Daniela Loyola's department or the blind rivets being inserted by Denis Danke during final assembly. I'm amazed at just how much concentration these tasks require. I wonder how it feels for employees to perform them for entire workdays and even longer.

But I don't have all that much time for such ponderings, for it's time for me to make my way to the "First Article Inspection" (or FAI) of a converter housing, which is already well

under way. While the client's experts discuss a welding seam with quality manager Thomas Dornheim and project leader Gerardo Arcuri, design engineer Carsten Ellenberger crawls into the housing armed with a CAD drawing in order to take a measurement. Hardly have I had a chance to understand what happens during an FAI before I'm called back to Wolfgang Diller, who now finds himself confronted with a wrongful delivery of sheet metal at the MiniBend Center.

The longer this day becomes, the clearer it is to me that production management does not take place at a desk but in the production hall. Numbers and processes might be a part of it, but the main task is to be able to respond quickly to any sudden difficulties and come up with pragmatic solutions. This means managers not only need to know their tools and work processes inside and out, they also need to have a sympathetic ear for their personnel. As I find myself standing in front of the time clock in the late afternoon, I realize I am exhausted—but all the richer for the experience. The things I've learned will certainly help me in my daily work as a personnel manager. That much is sure.

Text: Stephanie Werner | Photos: Arnold



Up, up and away: Logistics experts find a so- lution for everything—even by helicopter if need be!

Logistics experts are the “shiftest” of types. You read that right! It’s crazy what they sometimes find themselves moving back and forth—and how they do it, too. But those tasked with making these decisions are far from unstable. They are professionals who let nothing unnerve them.

Normal belongs someplace else, at least when it comes to Hasenkamp in Cologne. This is something CEO Hans-Ewald Schneider clears up right away: "First of all, artists do not work according to norms. Second, art is not replaceable. 'Once it's gone, it's gone.'" The man knows what he's talking about. Three years ago, he personally carried the death mask of Tutankhamun—a unique work of humanity's cultural heritage—on its journey around the world.

The family business, founded in 1903, has made a name for itself as a shipper of special goods, particularly in artistic circles. But Hasenkamp transports everything else as well, including the things that cannot be categorized as "normal," like entire ministries, laboratories, computer centers, and even satellite components from CERN near Geneva to Cape Canaveral in Florida.

The climate travels too

Whatever it is that is to be transported from A to B, there are four important points to be considered: the route, the goods, the packaging, and, of course, the cost. "We start from the beginning every time and carefully consider what exactly is to be transported and how. And this is what influences the packaging." It's just not the same thing if you're transporting an

antique painting on a wooden panel in January at 50 percent humidity a couple of hundred meters around the corner or if it is to spend many hours in a plane and then land in Singapore where the humidity is 99 percent. Which brings us to the topic of climate. What Hasenkamp developed decades ago has now become the global standard. When they travel with Hasenkamp, works of art truly can be said to take their native climate with them.

For decades, transporting art has been Sven Lubinus's purpose in life. The goods transport manager is the assistant director of exhibitions services at Frankfurt's Städel Museum and the Liebieghaus. The seven-person team regularly invites, awards, and supervises tenders for art transports. "We're the interface for logistics both in and outside of the museum."

Lubinus has his work cut out. The Städel, one of the world's leading museums, always attracts a great deal of attention with its special exhibitions, the preparations for which can take two to three, sometimes even four years. Once the lender has given his consent, the exhibition services department gets down to work. A contract stipulates all of the rights and obligations for both sides; transport, exhibition conditions, and security measures are always renegotiated for each loan. Things don't get really hectic until about a week before the exhibition opens when the artworks arrive. The pieces are handled with velvet gloves as they are hung and arranged.

Old masters on tour

Lubinus remembers the events of 2011. While the Städel was undergoing renovations, two important works of art were sent off on a journey around the world. The Städel Museum showed nineteenth- and twentieth-century masterpieces in Lausanne, Melbourne, Wellington, and Rome on two exhibition tours. At the same time, distinguished works of

seventeenth-century Dutch and Flemish painting were being shown in Bilbao, Tokyo, and in Aichi, Japan. Japan? 2011? Exactly. It was during this time that the nuclear disaster at Fukushima happened. "The situation was certainly hairy," Lubinus remembers.

Despite working with pieces worth millions, Lubinus has no trouble sleeping at night. "It's important not to think about what it's all worth, though." Every day and every project brings with it new surprises as well as new challenges. But that is precisely what Lubinus finds so fascinating about his job. He's also enthusiastic about getting to meet so many people from so many different countries as a part of his work.

...



Image: Liebieghaus/Alex Kraus



Photos: Städel

...

Nothing terrible has ever happened, by the way. Such a catastrophe is hardly to be expected—a point upon which the museum specialist Lubinus and shipper Hans-Ewald Schneider agree: “Robberies of art transports make absolutely no sense.” And there is nothing about the vehicles to indicate which valuable items they are transporting. Furthermore, any piece of stolen art would immediately be listed within minutes in the Art Loss Register on the internet, making it for all intents and purposes unsellable.

That means the only people prepared to commission an art robbery are shady collectors, but of course art transports are not left unprotected. “Particularly Italian museums are keen to insist that the transports are accompanied by the police all the way to the border.” Once they cross the Brenner Pass, a private security company takes over.

When the bridge is just too low

The transports organized by Arnold’s Uwe Schäfer often do not follow the norm. Mostly it’s the measurements that are most likely to challenge logistics directors. This is why Schäfer has a seat at the table when it comes to design, for whether the object is 2.5

or 3.6 meters high decides, for example, if it will fit under bridges along its route.

Most of the time things work out, but not always. Around twenty years ago “a helicopter was the only option.” A nearly twelve-meter-high work of art was flown from Steinbach-Hallenberg to Chemnitz hanging on steel cables. “It was still a lot easier than trying to move a bridge,” Schäfer points out. It truly was an exception, even for Arnold.

It wasn’t all that long ago that Schäfer found himself confronted with another XXL transport. An aluminum sculpture of giant arches had to be moved to Frankfurt, where it was to be erected between office buildings known as “The Wave.” Thirty-eight-meter-long semi-trailer trucks were used to move the prefabricated components to the building site, where they were erected using a lifting frame and welded together—with millimeter accuracy.

Schäfer now has another such project on his desk. A giant stainless steel ring for Seoul in South Korea should if at all possible only be cut in half. It would still measure almost five meters in width and eleven in length. Schäfer says, “For air transport we will need the freight version of a Jumbo or an Antonov An-225, the world’s largest transport plane. That would cost €700,000.” Maybe transport by ship is a better option at €40,000, but that’s a decision the customer will have to make.

Text: Michael Pyper



In the line of duty for art and culture all around the world: Hasenkamp employees recovering a sculpture from the ca. 2,300-year-old ruin Naga in modern Sudan in order to transport it to Europe for an exhibition of Sudanese antiquities | Image: Hasenkamp



That was real precision work: semitrailer trucks transporting giant arches for an aluminum sculpture for the Frankfurt office complex “The Wave,” where they were welded together, erected, and assembled | Image: M. Pyper

1 x
World Champion

12 x
European Champion

26
European
Champion Medals

12.000
High dives a year

2
Olympic Medals

Living for the somersault

The indoor swimming and diving pool in Berlin's Europasportpark is a megastructure that was built for the city's Olympic candidacy in 2000. The games never took place in Berlin, but this is the hall where high diver Patrick Hausding's career shot through the roof. Now he trains here almost every day.

A brief flashback to 2016 for all you couch potatoes. It was the time of the Olympic Games in Rio, where Hausding won bronze diving from the three-meter board. It was the result of great talent, training, and the joy of sports. All of these traits were already there when the scouts noticed seven-year-old Patrick in an elementary school in Berlin's Lichtenberg district.

What is it that motivates the world-class diver Hausding to push himself to the limits? Was he always so crazy for sports that he had no problems throwing himself somersaulting off the ten-meter board? Is training every day a form of torture or quality of life? The answers came from a top athlete who has always known how to set himself new and realistic goals.

You were noticed by recruiters looking for young athletes. Are you a natural athletic talent?

Patrick Hausding: I was a very active child, enthusiastic about the water, brave, and I liked to burn off all my energy. So I guess diving was certainly better than turning our apartment upside down. That's why my parents were happy that I had found an extracurricular activity. What one can aspire to in sports and the goals one can achieve is something you find out much later.

Anyone listening to Hausding's convincing and calm words can sense the determination. A highly technical sport, high divers are known for their mental strength when competing. Hard training is not the sole reason for victory, Hausding knows: he's hitting the water six times a week for five to six hours. A few less on Saturdays.

It seems as if the joy of diving and training is something you'll never lose.

That's true. When I think to myself the training today is really going well and the dives are working, then I don't want to stop. But at the same time, experience tells me that I should conserve my energy.

And on bad training days? Do you just pack up and head home?

No, certainly not. When you sense things just aren't working—maybe you're just not fit enough on that day—then you have to accept it. You have to remember that there have always been bad days. I'm always a bit grumpy and mad at myself in such situations, but you can't let it get to you too much.

What's your approach to a new dive?

When I think about the four-and-a-half forward somersault: the first time I attempted it was in 2010/2011, and the first time at competition was in 2013. Afterwards we kept on working on it. A couple of years ago I would never have thought that I could perform a four-and-a-half somersault of such quality.

High-performance sport also has an effect on the body: the shoulders, knees, and hands of a diver can wear out. Adrenaline levels are so high during competition that athletes feel no pain, but the training structure has to be more moderate. To gauge this, Hausding, who's certainly capable of self-irony, consults his physiotherapist ("I'm a constant patient there.") and doctor. After all, only a physically strong Patrick Hausding can conquer the world. During the FINA World Series, Hausding takes part in competitions in China, the Mecca for divers. Hausding's 2013 world champion title which he shares with his Synchro partner Sascha Klein sparked continuing admiration in the Chinese world of sports.



Image: ©Deutsche Sporthilfe

Now it's the Chinese who are the perfect divers. Does that fire you up or frustrate you?

Sometimes I find it a motivation, and sometimes I think I'll never make it. I arrive at the competition in high spirits and think today might be a good day. Then the Chinese athletes arrive and perform one perfect dive after the other. The stability of their dives is beyond all measure.

But you still have a chance?

Of course. You can be the world champion in training, but you have to show your stuff in competition. Even Olympic champions can falter. In Rio we saw how the world's top people had to close ranks. In one competition a Chinese diver won "only" third place (Hausding laughs).

At the FINA World Series it's possible to earn a bit of money. This is not a given for a career diver. Sponsored by the foundation Deutsche Sporthilfe since 2003, today Hausding is a student in business administration as well as a Bundeswehr-sponsored athlete.

Did you find you had the financial freedom to develop your talent?

In my younger years, up until I joined the army, the Deutsche Sporthilfe was my only supporter. That's what happens when you make it to the C-squad, to the nation's top. I think I was getting fifty euros a month. I have to say as a thirteen-year-old I was really happy about it. By the age of fourteen I was getting seventy-five to a hundred euros a month thanks to my good athletic performance. That was a source of motivation, of course. The Deutsche Sporthilfe also supported me in school and helped me purchase sports equipment and training outfits. They also helped with training supervision and travel expenses.

In 2016, Hausding, who can look back on twenty years of competitive sport and great successes, was elected "Champion of the Year" by numerous top German athletes. This outstanding athletic title—conferred by the Deutsche Sporthilfe—is awarded to only very few. "It really makes you proud when you're recognized by your own peers," Hausding explains. He sees a number of great dives still to come.

Do your motivation levels sink after a sporting success or do they take off again?

A bit of both. The Olympic medal was very motivating, but also very exhausting. At the same time you look forward to what comes after the medal. I knew of course that I would switch trainers after a season full of injuries. I was really itching to start with the new season. Now I really want to realize my potential—as often as possible and as long as it's fun.

Interview: Ingo Woelk



Diving his way to the top with skill and Sporthilfe sponsoring: Patrick Hausding (28) is today Germany's most successful diver, twelve-time European Champion, with an established place among the world's best. After winning an Olympic medal in Beijing in 2008, he was awarded his second in Rio in 2016. His bronze medal was the first individual medal awarded to a German athlete for the three-meter board in 104 years.

Sports audiences love medals, but how do athletes finance their careers if they're not one of the world's top soccer players? This is where the Deutsche Sporthilfe comes in. Hausding struggled his way through every stage from the youth league C-squad to the young elite sponsoring and, finally, elite sponsoring. Its constant sponsoring of Patrick Hausding is proof of what the Deutsche Sporthilfe understands by value-based sponsoring: accompanying athletes over many years as opposed to viewing them from the perspective of media and marketing opportunities. When his diving career comes to an end, Hausding will also be able to rely on Deutsche Sporthilfe to help him make the transition to a professional career.

Uwe Arnold is a curator at the Deutsche Sporthilfe. Arnold AG has helped support athletes since 2004.

NEWS IN BRIEF – CRAZINESS ALL THE WAY DOWN THE LINE

Communication by Ann Reder

Future smartphones will be bendable or even foldable. Friedrichsdorf already has them. The two post-office-yellow, ca. 2.7-meter-high concave aluminum bodies by the Frankfurt artist and Städel Museum lecturer Ann Reder grace one of the town's main traffic circles. Reder's work is titled Communication and is reminiscent of two smartphones dancing around each other. As viewers make their way around the circle they are rewarded with ever-new perspectives, which helps reinforce the illusion of two communicating objects. The artwork is the most recent addition to Friedrichsdorf's sculpture trail, which also includes the works Im Gleichgewicht (Balanced) by Claus Bury and Zwieback by Eckhard Gehrmann. What all these works have in common is that they were financed and built by Arnold.

Brilliant: a Friedrichsdorf discovery that changed the world

It fits in your jacket or your coat pocket, even though it spends most of its time pressed to your ear. The cell phone. Its predecessor, the telephone, comes from Friedrichsdorf, where Arnold AG's headquarters are located. It was invented by physics teacher and visionary Philipp Reis, born in 1834.

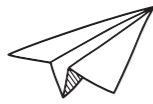
The sentence "The horse doesn't eat cucumber salad" is as crazy as it sounds. But it wasn't without meaning, for it served Reis as the text he used to present his device to the public—as well as proof that "sounds from various instruments, yes, even the human voice to a certain degree, can be transmitted."

That was in 1861. The new device did not go down particularly well with the audience of assembled professionals at Frankfurt's Physikalischer Verein, however. The "bowler and tinkerer," as the teacher described himself, was obviously not a marketing expert. He was happier inventing things than selling them: roller skates, for example, an early form of today's in-line skates. Or the velocipede, an early bicycle that was propelled forwards by hand.

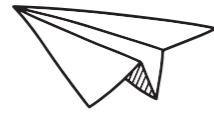
He did not live to see his greatest invention achieve success, for he died of tuberculosis in 1874 at the young age of forty. He had had a number of pieces built and sent all over the world. One of these examples was seen by Alexander Graham Bell, who immediately recognized its significance. Bell himself patented the telephone, developed it, and made it into a commercial success. What do they say about innovation? A good product is not enough. You also have to get it to the market.

Both inventors are worthy of respect, however, for together they revolutionized communication. "I called it the telephone," Reis is purported to have said. On January 9, 2007, Steve Jobs, cofounder of Apple, presented to an audience of millions a device that would once again revolutionize the way we communicate. His words were: "We call it the iPhone." What we at Arnold like to remember, however, is that for an open discussion from person to person, the most important thing is to keep an open ear.

Text: Corinna Willführ



NEWS IN BRIEF – CRAZINESS ALL THE WAY DOWN THE LINE



Not Nobel, but wonderfully quirky

On September 23, 2016, a badly stricken German automobile manufacturer (keyword: "Dieselgate") still managed to receive an honor: it was awarded the chemistry "Nobel Prize" "for solving the problem of excessive automobile pollution emissions by automatically, electromechanically producing fewer emissions whenever the cars are being tested."

It wasn't a real Nobel Prize with all of the royalty, splendor, and glory, of course. But it was enough for an "Ig Nobel Prize"—a play on words referring to the nature of the winner's pursuits.

This satirical award was endowed in 1991 and is awarded annually at Harvard University (until 2011 at the Massachusetts Institute of Technology) in order to "honor achievements that first make people laugh, and then make them think." And which "cannot—or should not—be repeated." See the above.

A jury of real Nobel and Ig Nobel Prize winners together with a random member of the public select the most bizarre achievements. Among them is even a winner who would later go on to win a "real" Nobel Prize. Yep, genius and insanity...

The enthusiastic audiences—the event always sells out months in advance—frenetically celebrate the award winners and pelt them with paper airplanes. Roy Glauber is the one who sweeps up all of these paper planes with a broom. But in 2005 he couldn't fulfill his duties, for he was called to Stockholm to receive the Nobel Prize for Physics. The real one, that is.

Two Germans were also honored with the prize last year. Christoph Helmchen of the University of Lübeck was awarded the dubious prize in the category of medicine for his discovery that itches on the left side of the body can be quelled by scratching the right side of the body while looking in a mirror and vice versa. The Ig Nobel Prize for Psychology went to Kristina Suchotzki, among other recipients, at the University of Würzburg. The research team interviewed 1000 liars to determine how often they lie...

The prize itself is a potted flower. By the way, the above-mentioned auto manufacturer did not attend the awards ceremony. Car trouble perhaps?

If one studies the long list of prizewinners, it's impossible to stop laughing. At first—then comes the thinking part. That's what the Ig Nobel Prize is all about.

Text: Klaus Altevoigt

Sensational: anthems on Tinder as far back as 1968

Berlin, a pop music festival in 1968: dressed in a short skirt and equipped with well-nigh clairvoyant powers, the young French singer France Gall belted out her hit "Der Computer Nr. 3" (Computer No. 3) with all her heart. The eponymous computer was supposed to fulfill the dreams of well-to-do love-hungry souls by acting as a matchmaker. Fifty years later there's an app that does the same for free: Tinder, the dating application in which rutting calls in the form of selfies are "matched" with others on the smartphone. Disagreeable potential mating partners are simply swiped away.

A brief analysis of the lyrics: instead of Kartei, or "file," nowadays we would use the word "database." But otherwise Georg Buschor's lyrics are nothing less than visionary! Clever how he gets around the coupling laws with the anonymous computer ("No. 3"). If such a computer really did exist, Tinder might have to watch out. Whereas the passionate woman in the song certainly wasn't left out in the cold, she was on the make for a wealthy companion who could introduce her to the high life—a much sought-after manly attribute in this day and age as well.

Text: Ingo Wölk



„Der Computer Nr. 3“

*Computer No. 3 is looking for the right boy for me,
love is guaranteed for both of us indeed.*

*The computer knows the right woman for every man,
happiness falls from the file immediately, for one of
many millions is waiting somewhere for me.*

*(computer voice: one eighty-two, collar 39,
shoe size 46, stop!)*

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