ECO

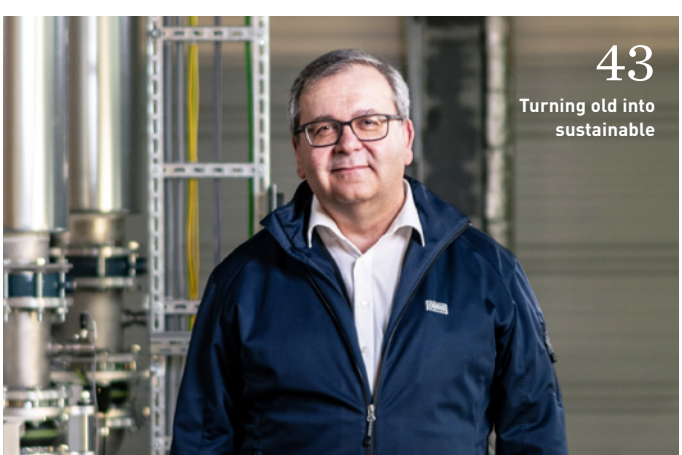
THE DÜRR GROUP MAGAZINE 2022

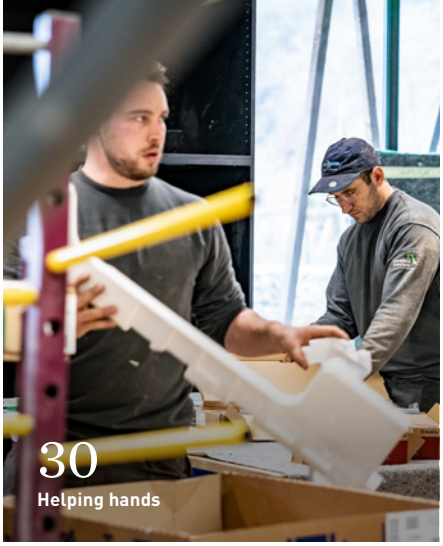
PREPARED FOR TOMORROW

CONTENT

PREPARED FOR TOMORROW

Digitalization, electromobility, sustainability: We are living in a time of transformation. The Dürr Group sees this transformation as an opportunity. We are tapping into new fields of business and offering our customers solutions for the business of tomorrow. Our brands, Dürr, Schenck, and HOMAG, feature intelligent and low-consumption technologies that enable users to make the switch to sustainable production processes. Bring on the future!





Our cover feature
What will the world look like in the future? This is the question we asked our employees. Our magazine introduces you to three personal visions for tomorrow. The imaginary time travel creates a fresh impetus and opens up exciting prospects.

ECO MAGAZINE ON THE WEB
You can find the web version here:
www.durr-group.com/en/duerrmore/prepared-for-tomorrow

DR. JOCHEN WEYRAUCH

An electrifying job: Jochen Weyrauch, who holds a PhD in industrial engineering, has been CEO of the Dürr Group since January 2022 and is constantly on the move. To travel as sustainably as possible, he has chosen an electrically powered company car.

“When it comes to sustainability, there is huge potential to be leveraged in industry”

ON THE ROAD WITH DR. JOCHEN WEYRAUCH

Sustainability, digitalization, and a shift in the work environment are some of the big future tasks for the Dürr Group. During a one-and-a-half-hour car journey, the new CEO, Dr. Jochen Weyrauch, explains how he plans to push these topics — from behind the steering wheel of an electrically powered vehicle.

THE INTERVIEW WAS CONDUCTED BY: **HEIMO FISCHER** — PHOTOS: **SASCHA FEUSTER**

LIGHTS, CAMERA, ACTION! During the car journey, we switched on the video camera and asked Jochen Weyrauch a few personal questions. Watch our video to find out whether the CEO misses the engine sound in his electric car and how sustainable his lifestyle is in general.

We are about to leave the Group's subsidiary HOMAG in Schopfloch and drive back to the Bietigheim-Bissingen headquarters in your electric car. Yours will be one of the few electric vehicles on the freeway. When is this likely to change?

JW The breakthrough of electromobility is already in the cards today. In Germany, we are seeing record levels of new registrations for electric vehicles every year. I expect that by 2030, around a third of all new vehicles will have an electric drive. And this shift is not just happening in Germany, but worldwide. Including China, where development is much further along that road than it is here.

How will this affect Dürr's products and services?

JW E-mobility is driving our business because numerous start-ups from Europe, Asia, and the United States are surging into this market. We are providing machines and systems for their factories. Furthermore, we are supporting established OEMs who are converting their production facilities. Electric cars are heavier, which means conventional manufacturing systems are often not suitable for them. But e-mobility also offers us the opportunity to enter new markets. To give you an example: We provide coating systems for electrodes, which are installed in battery cells. In addition, the Dürr Group, through Teamtechnik, leads the market in the testing of electric drives.

Weyrauch glances at the cockpit, starts the car, and touches the large touchscreen in the central console. We can hear the voice of the soul singer Alicia Keys. He likes her music, enjoys listening to her while driving, and wants to go to one of her concerts as soon as possible. Depending on his mood, he will sometimes switch to rap or classical music. The right music enhances the driving experience. He does turn down the volume for our conversation, though.

The esthetics of a vehicle are underlined by the right paint finish. Is this the same for electric cars?

JW We have seen that the paint finish is becoming more important due to the success of electromobility. Since electric drives shape the character of a car less than the various internal combustion engines, manufacturers are trying to differentiate their vehicles through the type of color by offering, for example, cars with a two-tone design. This places higher demands on the painting technology, which has a positive impact on our business.

In automotive manufacturing, paint shops were long considered energy guzzlers. To what extent are manufacturers prepared to make their production more sustainable?

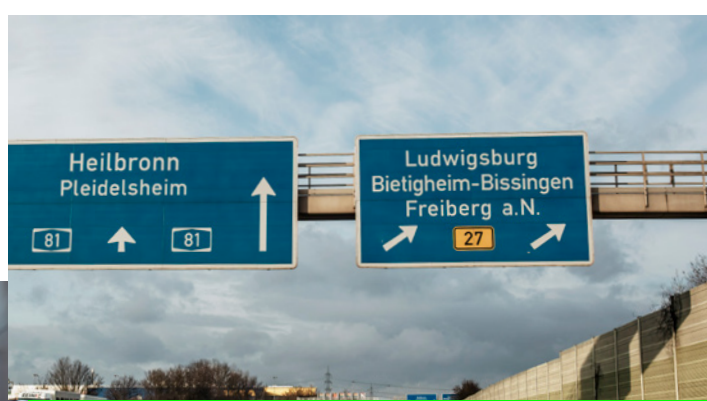
JW When it comes to sustainability, there is still huge potential to be leveraged in industry. Around 200 automotive factories in Europe are still removing overspray in the paint booth using the conventional wet process, which consumes a lot of energy and water. And yet it is possible to reduce the CO_2 emissions of a medium-sized painting line by around 8,000 tons per year using our modern dry separation system. For ovens or exhaust-air purification systems, we also offer alternatives that are significantly more economical and eco-friendlier. How much these innovations continue to take hold depends on how far the automotive industry drives its sustainability-related investments.

The car in which we are sitting still needs to be steered manually. When will automated driving become the norm?

JW We're looking at a good ten years before that happens. The development effort for the automotive industry is extremely high, plus the legally required certification processes also take a lot of time and effort. But we are already seeing some promising approaches.

With a smile, the CEO pulls a lever and shortly afterwards he is only lightly touching the steering wheel. The autopilot keeps the car in the lane. This is only permitted when the driver can intervene at any time. It is a precursor to automated driving — something that even a motor sport enthusiast like Weyrauch appears to enjoy.

Jochen Weyrauch outside the HOMAG Group headquarters in Schopfloch



Taking the right exit: The destination of the journey is Bietigheim-Bissingen.

Schopfloch >>>

The CEO knows the way, but he still likes to use his sat nav.

Jochen Weyrauch (right) talks to Heimo Fischer.

>> Bietigheim-Bissingen

The Dürr Group itself drives technological progress in a number of areas. What are the most important innovations right now?

JW We are breaking with the rigid structure of painting systems and are making the processes of carmakers more flexible with the help of modular systems. A painting line where car bodies move along one after the other could soon become a thing of the past. In the field of timber construction, our subsidiary HOMAG is a great innovator. This is where we are developing systems to push industrialized timber house construction — not only for single-family houses. Multi-story buildings or even high-rise buildings can also be erected in this way.

We are on the A 81 freeway, just outside Böblingen. Suddenly, we can hear a beeping sound and the car breaks automatically. The electronic system has intervened. The distance to the car ahead was too short — at least according to the software.

Digital tools are increasingly shaping cooperation within the workforce. How does everyone cope with this?

JW We will see a transformation in this regard within the next few years. Nobody should be left behind on this journey. We are therefore offering training programs, which help employees to familiarize themselves with new and useful digital tools. They will make mobile or hybrid working easier. These modern ways of working are especially popular with the younger generation. That's an important point given the demographic shift. We are already competing for the best talent in many areas — and so far we have been successful.

Automotive industry, woodworking, medical technology — the Dürr Group is positioning itself more and more broadly. Why?

JW Aside from the highly cyclical automotive business, we are developing further mainstays that give us stability. By adopting this approach, we have already made great strides. Last year, for the first time, our sales were higher in the non-automotive sector than in our traditional business. We have noticed that the capital market values this step.

Supply shortages are currently impacting numerous companies. How is your company preparing for this?

JW Over the past few years, the business world has paid too little attention to supply chain security. Now this topic is at the forefront every day, not least because of Russia's devastating attacks on Ukraine. Supply shortages no longer affect only semi-conductors but also steel and other materials that nobody ever thought could be subject to shortages. Having coped relatively well at first, we are now also feeling the effects of the ongoing bottlenecks. Our purchasing department, for which we developed a more strategic approach last year, is working closely with our engineers to find solutions together if any parts are missing.

After more than 90 kilometers, we have reached our destination. There is a charging station outside the Bietigheim-Bissingen headquarters. This is where Weyrauch parks his car — so when he leaves work, he can carry on driving with a fully charged battery.

"E-mobility offers us the oppportunity to enter new markets."

THE FAST ROUTE TO CLIMATE PROTECTION

- EU milestones
- Dürr Group milestones

December 2019
The European Green Deal is introduced. It shows Europe's route to becoming the first climate-neutral continent.

January 2020
Collection of Group-wide energy consumption data for 2019

March 2020
The Commission proposes a European Climate Law. Target: to write the 2050 climate neutrality target into legislation.

March 2020
The Dürr Group from now on combines and coordinates its sustainability activities in the Corporate Sustainability department.

September 2020
Additional target: to cut net emissions by at least 55% by 2030 (previously 40%); to be laid down in the European Climate Law.

September 2020
The first Sustainability Council convenes. This new council holds regular meetings, determines the strategy and targets relating to sustainability, and monitors their implementation.

December 2020
The European heads of state and government endorse this target.

January 2021
Collection of Group-wide energy consumption data for 2020

April 2021
The European Parliament and the member states reach an agreement on the European Climate Law.

May 2021
The first sustainability report based on the GRI Standard is published.

Climate strategy

The Dürr Group is committed to the European Green Deal and therefore adopted a comprehensive climate strategy in 2021.

MAKING EUROPE CLIMATE-NEUTRAL BY 2050

The European Green Deal is designed to strengthen Europe and support a fair, competitive, and ecological transformation. It comprises eight fields of action:


Climate protection


Clean energy


A healthy food system


A crisis-proof & circular economy


Protection of the environment & oceans


Green & intelligent mobility


Sustainable investments


New technologies & disruptive innovations

THE "FIT FOR 55" PACKAGE

The EU wants to make its laws fit for the new climate targets through new and reformed directives and regulations.

BY 2030

55%

lower emissions compared to the base year of 1990

1 TRILLION EUROS FOR CLIMATE PROTECTION

A third of the investments from the NextGenerationEU recovery package and from the EU's seven-year budget will go toward the Green Deal. Added to that are resources from other funds. In total, the economy has funding worth just over one trillion euros available for climate protection.

€503 billion
EU budget for climate protection and the environment

€279 billion
Private & public investments

€100 billion
Just Transition Mechanism

€25 billion
EU Emissions Trading System

€114 billion
Member state structural funds

June 2021
The European Climate Law comes into force.

July 2021
Package of proposals on the climate-friendly restructuring of the European economy. The EU Parliament and the member states agree on a legislative package.

by 2030
The EU is to reduce its emissions by at least 55% compared to 1990.

by 2050
Climate neutrality

from June 2021
The consumption data already available forms the basis for further data collections, analyses, and calculations in accordance with the Greenhouse Gas Protocol.

November 2021
Dürr presents the Group-wide 2030 climate strategy, sets ambitious, science-based targets, and takes comprehensive measures to reduce greenhouse gas emissions.

January 2022
The Dürr Group's climate targets are validated and approved by the Science Based Targets initiative (SBTi).

by 2023
Global switch to green energy

by 2030
A zero-emission vehicle fleet is to be in use at the German sites.

Scope 3 emissions are to be cut by 15%, and Scope 1 and Scope 2 emissions by 70%.

by 2050
Climate neutrality

OUR 2030 CLIMATE STRATEGY

The Dürr Group has used sound, standardized approaches for developing its climate strategy. We have thus created transparency, defined targets and had them scientifically validated. This has allowed us to derive the necessary measures. Our credo: invest rather than compensate.

FIVE PILLARS FOR CLIMATE PROTECTION

The Dürr Group is fully committed to its responsibility for climate protection.

1
We are committed to the decisions of the **Paris Climate Agreement.**

2
Application of the **Greenhouse Gas Protocol** as a standardized approach for calculating emissions

3
Validation of targets by the **Science Based Targets initiative** (SBTi)

4
Science-based climate strategy in line with the **1.5°C target**

5
Invest rather than **compensate**: As things stand today, climate certificates are no option.

OUR MEASURES FOR DECARBONIZATION

There are six levers for a significant reduction of emissions from our own business activities (Scope 1 and 2) as well as from the upstream and downstream value chain (suppliers, logistics, and products, Scope 3).

6 Products

Sustainable products
Increase of resource and energy efficiency of our customers

Green sources
Switch from fossil to green energy sources

Green portfolio
Enabler for e-mobility and solid wood construction

5 Logistics

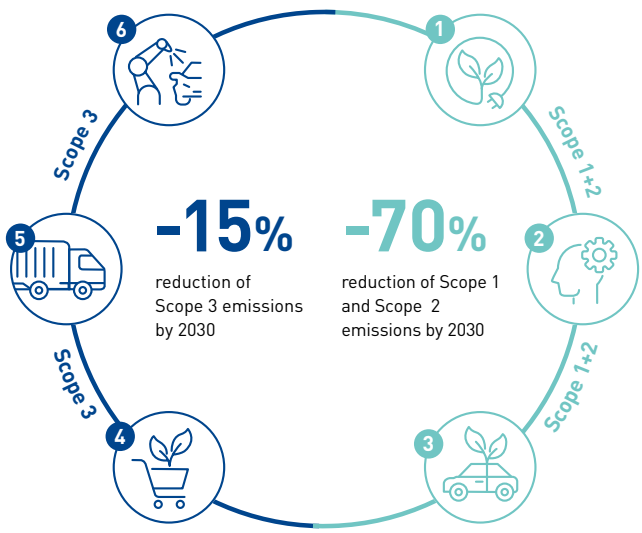
Transport modes
Shift toward green modes of transport

Order placement
CO_2-footprint as basis for order placements

4 Procurement

Supplier training
Supplier training on environmental goals

Supply chain finance program
Financial incentives for green suppliers



1 Energy

Green electricity
100% at all locations worldwide by 2023

Energy efficiency
1%–2% p.a. increase of energy efficiency

Self-generation of electricity
Investments in photovoltaic systems and in-house ORC systems for waste heat utilization

2 Awareness

Idea collection
Employee involvement and rewards

Communication
Internal and external stakeholder dialoge

3 Mobility

Company fleet
CO_2-neutral fleet in Germany by 2030

Staff commuting
Offers to incentivize emission reductions

ALL-ELECTRIC *through the skies*

Take a clean, quiet, and safe short-haul flight in an electric propulsion aircraft. This vision could become a reality for the first passengers as early as this decade. Prototypes for this new generation of aircraft already exist. Until these are ready to go into production, manufacturers still have a lot of development work to do. Dürr's subsidiary Schenck in the United States is supporting these pioneers of climate-neutral air travel on their journey.

PHOTO: **EVIATION**

Pioneering WORK

Dürr's subsidiary Schenck USA tests electric propulsion components for aircraft using spin test systems. The data and the insights gained from these systems provide manufacturers with important information on the strength and durability of the material and their part designs.

TEXT: **HEIMO FISCHER** — PHOTOS: **CAMERON DEWALLACE**

How has the rotor changed in the spin test system? Together with a colleague, Hiro Endo (right) takes a look at the test results.

Electric motors have charm. They hum instead of howl — and recently, they have become increasingly capable of generating substantial thrust. Powered by sustainable clean energy sources, they will be an important technology for combating climate change. However, while there are already millions of electric cars on the road, electric propulsion for aircraft is virtually unheard of. "Electric air travel is still in its infancy," says Lars Künne, Head of Schenck USA. But this is set to change.

In the Center of Excellence in testing located in Hudson, Massachusetts, Dürr's subsidiary Schenck is supporting the development of electric propulsion aircraft. Both established manufacturers and start-ups come to the test facility to push the components for their prototypes to their limits by using state of the art spin test systems.

Here, the e-pioneers are in expert hands. Schenck has been a partner for customers in the aerospace industry for decades. "We regularly test components for jet and rocket engines", says Hiro Endo, Chief Technology Officer at Test Devices, a business unit of Schenck USA. The company also leads the innovation in cutting-edge spin testing for components of electric motors in the automotive industry.

It's about safety

At the heart of the tests for the e-aircraft manufacturers is the rotor — the centerpiece of the electric propulsion system. Using its magnetic fields, it converts electric energy into kinetic energy that propels the aircraft. The rotor in the electric motor could rotate up to 20,000 times per minute. Enormous centrifugal forces act on the component — like a swing carousel where the chairs are pulled outward by the rotation of the carousel. Failure of such a part can pose a serious risk for aircraft, and spin testing is one of the key steps in checking its integrity. The development teams of the e-aircraft manufacturers receive critical information to validate the manufacturing quality of the rotor and reveal any weaknesses in design before they release the parts into production.

The team in Hudson meticulously prepares the tests for its customers. It is crucial that nothing goes wrong, especially when the prototype components are pushed to their limits at extremely high rotational speed.

"Electric air travel is still in its infancy. But this is set to change."

LARS KÜNNE,
HEAD OF SCHENCK USA

When the rotor is placed into the spin test system's test chamber it is either subjected to a very high rotational speed, over its intended operational limit, or put under a cyclic load — accelerated and braked tens of thousands of times. Digital data acquisition and control systems monitor and record how the material changes over the course of the test. Experts carefully observe the key parameters of the rotor under test, for example, where the magnets are mounted — a potentially sensitive location where the structure of the material is interrupted, thus causing higher stress.

One of the most nerve-racking tests that Endo and his team perform for many customers is the burst test. "We only have one chance to do it right. If something goes wrong with the measurements and recordings, we have to ask our customers for another expensive component." During the burst test, the spin test system pushes the rotor to its breaking point. Schenck has equipment capable of reaching 200,000 revolutions per minute. High-speed video images of the burst test capture intricate details of how the rotor deforms and breaks apart. The results give the customer a full picture to understand where the load limit is, and how the part fails.

Taxis are taking to the air

Right now, Schenck is mainly seeing customers who are planning to construct small e-aircraft and eVTOLs (electric Vertical Take-Off & Landing). These are designed to be used as air taxis, carrying passengers above the congested roads of large cities, and connecting cities in the years to come.

"I expect the first small all-electric regional passenger aircraft and air taxis to be technically mature and certified for their services as early as this decade," says Künne. For larger passenger aircraft, he estimates that it will take considerably longer than 10 years. For medium- and long-haul aircraft, all-electric propulsion will not be viable in the near future. This is due to the rigorous certification requirements as well as the technical challenges related to the weight of the batteries, which are significantly heavier than jet fuel with the same energy content.

As electric flying is a new technological territory, it is mainly the manufacturers' development departments that have individual rotors tested in the spin test system, many working toward FAA type certification requirements. When the first electric aircraft go into mass production, fundamental work with spin test systems will decrease. "Instead, we anticipate a growing request in balancing," says Lars Künne. After all, the electric motors of future aircraft generations are to run smoothly. When exactly this time will come is still uncertain. "But when it does, we will be ready."

Up and AWAY

The dream of flying is firmly embedded in the history of humanity, and it is certainly not over yet.

TEXT: **CLAIRE BUSCHE**

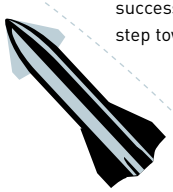
2040

2021
The company Eviation develops an electric aircraft model called "Alice". This passenger aircraft, which can accommodate nine people, is set to attain certification and go into operation in 2024.

2035
Airbus wants to bring the first emission-free aircraft to market by 2035.

2020

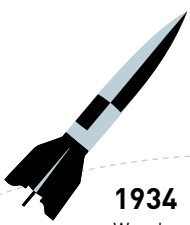
2021
The US company SpaceX, founded in 2002, assembles the world's largest rocket (120 meters). The rocket consists of the "Super Heavy" booster and the "Starship" spacecraft. On May 5, the spacecraft, dubbed SN15, completes its first successful test flight. It's a first step toward space tourism.



2000

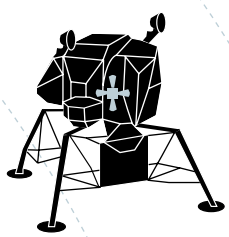
1980

1961
The Soviet cosmonaut Yuri Gagarin is the first human to journey into outer space. He orbits the Earth in 108 minutes.



1960

1969
The Apollo 11 mission: Americans Neil Armstrong and Edwin "Buzz" Aldrin are the first humans to step onto the Moon. Often overlooked fact: Pilot Michael Collins had to continue to orbit the Moon on board the command module.



1934
Wernher von Braun starts the first rocket tests and is regarded as the father of space travel. Having developed the A4 rocket under the Nazi regime, he then goes to the United States as an engineer after the war, where he later leads the development of the launch vehicle for the Apollo spacecraft.

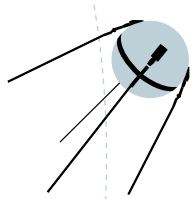
1940

1920

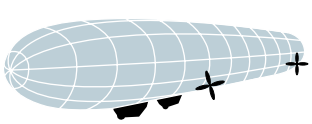
1957
The Soviet Union launches the first satellite, Sputnik I. This is an important milestone for the Soviets in the so-called space race. Sputnik II is launched soon after, carrying a dog called Laika, the first mammal to reach the Earth's orbit.

1909
Foundation of the world's first airline, DELAG (German Airship Travel Corporation). The first passenger-carrying aircraft come to be known as zeppelins. These airships had their heyday from 1928 onward, until it ended abruptly with the Hindenburg disaster in 1937, when the airship caught fire while landing in Lakehurst near New York.

1919
The world's first modern transport aircraft takes off with seven passengers on board. The "Junkers F 13" reaches a record height of 6,750 meters. The start of a success story — the aircraft comes to dominate worldwide air travel.



1900



1903
With Orville Wright at the controls, the "Wright Flyer" airplane flies for a whole 12 seconds and covers a distance of 37 meters.

1891
Otto von Lilienthal is the first person to take to the air in his "Derwitzer Glider".

“Rather than being linked to a specific location,
the workplace of the future is more about a feeling.”

Working where we feel comfortable and are best able to carry out our daily work: This is how **Mona Daub** imagines mobile working will evolve further. Meet Mona Daub again here in the magazine on page 34.

TACKLING THE HOUSING SHORTAGE WITH TIMBER CONSTRUCTION

Affordable living space in a large city? There's no such thing! This is the experience of people who are looking there for somewhere to live. The B&O Group is not prepared to accept this. Bringing fresh ideas, it constructs new apartment buildings within a very short time frame. In doing so, it relies on the sustainable raw material timber — and systems offered by HOMAG's subsidiary Weinmann.

TEXT: **HEIMO FISCHER** — PHOTOS: **B&O GROUP, PETER JÜLICH**

Hiding behind a row of trees, the facade has a plain elegance about it — and yet, this four-story building next to Munich's Dantebad swimming pool is the flagship of the B&O Group. The building, comprising 111 apartments, firstly consists for the most part of timber; secondly, it rests on stilts above a car park; and thirdly, it was erected within just six months. For Uwe Dohrn, Managing Director of B&O's timber construction segment, this is an ideal combination. "This way we have created sustainable and affordable living spaces in Munich's metropolitan area within a very short time frame."

The company from the Bavarian town of Bad Aibling, which was once a roofing firm, over time developed into a service provider to the housing industry, with sales of half a billion euros. The objective of B&O is to radically reinvent the culture of house construction. "Today, buildings are still erected using a high proportion of manual labor," says Dohrn. This is slow and expensive. B&O therefore relies on prefabricating solid-wood walls and ceilings in factories in a standardized way, and assembling them on site.

The building next to Dantebad is a result of this method. However, producing high-quality walls and ceilings in series requires first-class technology. B&O relies on systems made by world market leader Weinmann. The HOMAG Group's subsidiary has been providing equipment to carpentry businesses and factories for timber construction for years, and is expanding this business that continues to grow.

Positive eco-balance

Prefabricated houses made of timber are on trend. The market for systems used to produce timber construction elements is growing by more than six percent a year. Around every fifth new house in Germany is being manufactured using this sustainable raw material. Every cubic meter of timber used in buildings binds one ton of CO_2, which is thus removed from the carbon cycle for a long time. And more wood is growing back than is required today or will be required in the future. Sustainable forestry ensures that every felled tree is replaced by planting a new one. The eco-balance for conventional concrete and brick construction, by contrast, is considerably worse.

A LOOK INTO THE FUTURE Uwe Dohrn heads up the timber construction segment of the B&O Group. The company, which was once a roofing firm, has developed into a technical real estate service provider. Today, B&O is driving the development of timber construction for multi-story buildings.

LIVING NEXT TO DANTEBAD The four-story building rests on stilts above an existing car park. This means no natural ground had to be sealed.

"Going forward, we want to build in a more and more standardized way."

UWE DOHRN,
MANAGING DIRECTOR OF B&O'S
TIMBER CONSTRUCTION SEGMENT

The B&O Group went into timber construction when it first extended houses by building another story to create additional living space. "This lends itself mainly to metropolitan areas, where real estate is at a premium," explains Dohrn. Conventional structures made of brick or concrete are not suitable for this due to their heavy weight. Timber, on the other hand, is so light that the structure of the house can cope with an additional story.

Adding density to existing built-up areas in this way is a popular method, especially in large cities such as Munich. More living space is thereby created without the need for any additional building land. Experts have been pointing out for years that undeveloped land is a natural resource which must be protected. According to estimates, an area the size of 122 soccer fields is being built on every day in Germany. This restricts the habitat of plants, animals, and microorganisms.

Whereas so far, mainly one- and two-family houses have been built of wood, an increasing number of multi-story buildings are now being constructed with this natural material. B&O is one of the pioneers in this field. "Around ten years ago, we built our first four-story timber house," says Dohrn. It was part of a building project on the land of a former army barracks in Bad Aibling, where all buildings were constructed using timber. The experience gained back then has since been used in other projects.

A house on stilts

Lack of space was an important incentive for building the 115-meter-long house next to Dantebad for the city of Munich. The existing car park there had to be preserved for legal reasons. Erecting the building on stilts was therefore an obvious idea. This left enough space under the house for parking for use by the residents or the visitors to the neighboring swimming pool. Another advantage: The

parking area was already sealed. Not one square meter of natural ground had to be turned into building land. The building owners could also dispense with an underground car park.

The architect in charge was familiar with timber house construction and had planned all rooms in a way that allowed for the facades and ceilings to be machine-made without any problems. As he decided against any unnecessary frills and many parts looked the same, production using the Weinmann systems of a B&O partner company proceeded quickly.

A novel building method also helped to keep the construction time short. To make sure the workers didn't step on each other's feet, the planning was based on a staggered approach. The various different tradespeople worked their way from one side to the other. While on the right-hand side the shell of the building was already finished, work at the left end was still going on to complete the concrete platform that would support the timber structure.

The interior work progressed in an equally systematic way. Windowsills, roller shutters, and conduits for electricity and water already came prefitted in the timber elements. Even fully fitted bathrooms, complete with wash basin, shower, and tiles, were lifted into place within a matter of minutes using a crane. The result: All interior rooms were finished five weeks after the building shell had been completed.

A preference for solid wood

The common practice in timber construction is to use so-called timber frame construction elements. To this end, the frames for the wall are assembled in the factory using different-sized timbers and enclosed with panels of wood or other sustainable materials. Multi-function bridges subsequently cut out the recesses for doors, windows, and ducts. The remaining cavities are then filled with insulating material and are also enclosed with recyclable panels.

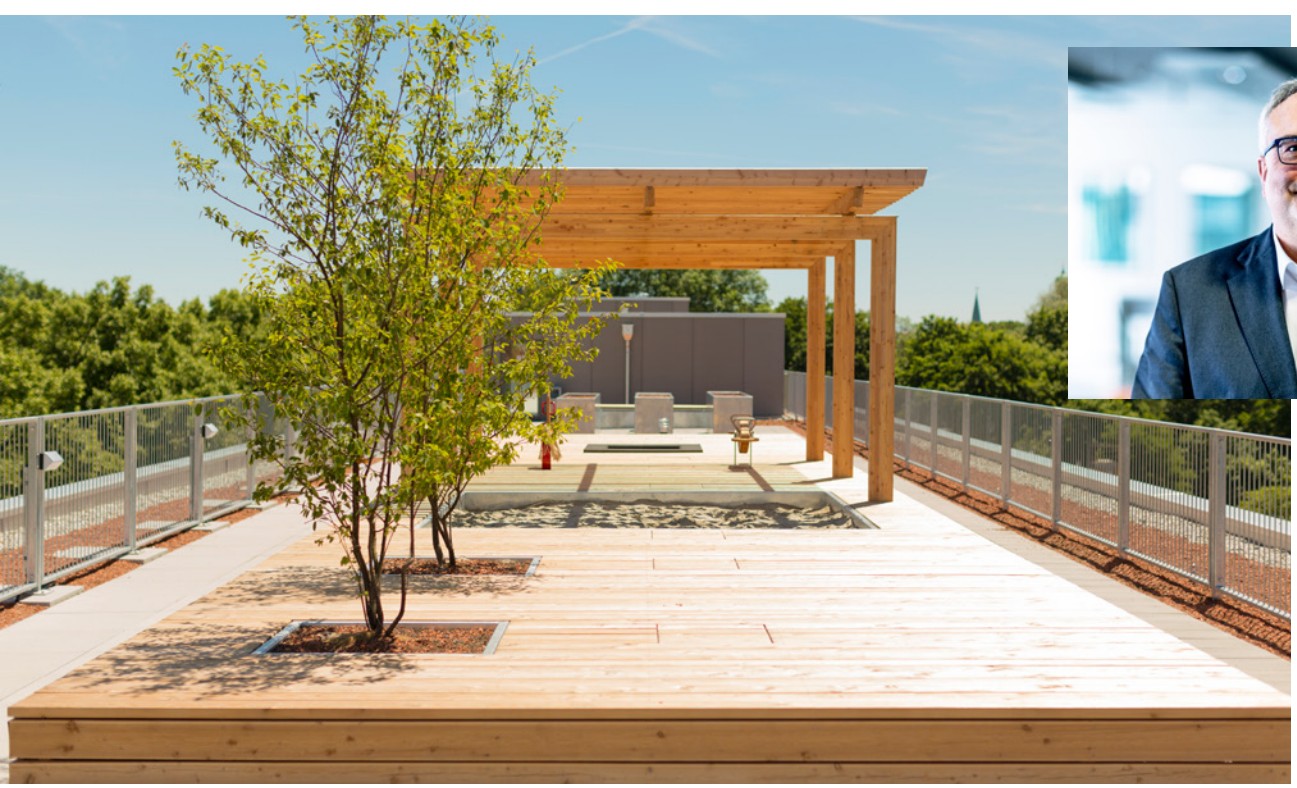
B&O, by contrast, prefers prefabricated solid-wood elements. This means the walls are made up of thin wooden strips, also known as studs. In factories, these are placed side by side until a continuous wooden structure is created – and thus a load-bearing solid-wood core. This method has a significant advantage: The lengths of the individual studs are chosen to ensure that the intended openings remain free. "Windows,

1 ton of CO_2

IS BOUND BY EACH CUBIC METER OF WOOD USED FOR BUILDING

111

APARTMENTS WERE CREATED IN THE BUILDING NEXT TO DANTEBAD



A PLACE OF CALM
The roof terrace of the residential building next to Munich's Dantebad is a welcoming place to unwind. Weinmann, a company belonging to the Dürr Group, delivered the modern machines that were used to manufacture the timber components for the building. Managing Director Josef Zerle (above) supported the project.

doors, and ducts therefore don't need to be cut out at a later stage, which would usually be the case," says Dohrn. This saves around 20 percent of the material used.

Weinmann has adapted its systems for this type of manufacturing. "We all brainstormed together to find the best way," says Josef Zerle, Managing Director at Weinmann. The careful use of resources was also at the forefront of these discussions. Timber construction elements can be reused when the building has reached its end of life. And this can take a long time, according to Zerle. "If we use wood in the right way structurally, its durability is extremely high. Evidence of this can be seen in timber buildings that are still standing after several hundred years."

"If we use wood in the right way structurally, its durability is extremely high."

JOSEF ZERLE,
MANAGING DIRECTOR AT WEINMANN

Modular building systems

Creating living space that is both durable and affordable is one of B&O's primary goals. "Going forward, we want to build in a more and more standardized way," says Dohrn. This starts as early as the planning. "What happens today is that architects design buildings and only later think about how they can put their ideas into practice structurally." This is followed by a planning process, which costs time and money. "It makes more sense if all the data required to build the necessary parts in the factory is available right from the design phase." The digitalization of the entire process plays a vital role in this.

Does that mean all houses will look the same because of the use of standard elements? According to Dohrn, this won't be the case. Arranging the elements creatively will still provide for variety and individuality. He sees automakers as an example. They use a modular system to build very different models using identical platforms.

B&O firmly believes in the potential of timber construction and is investing in its own factory in Frankfurt/Oder. There, the company is planning to manufacture patented solid-wood elements using automated series production. The HOMAG Group is also on board: Its subsidiary Schuler Consulting has supported B&O in the factory planning, while Weinmann is delivering the production systems.

In prefabricated timber construction, cranes lift the assembled components into place within minutes. Even complete bathrooms can thus be installed into the building.

PLAIN ELEGANCE The walls and facades of the building consist of timber. Only the platform on which the building rests is still made of concrete.

What the construction industry is lacking

Hannes Schwarzwälder, Professor of Building Process Digitalization at the University of Biberach, talks about the slow pace of digitalization in construction.

Imagine trying to pay with a debit card from one bank, but in the shop they tell you that, unfortunately, the cash registers can only read debit cards from a different bank. Unthinkable? And yet we face a similar situation in the construction industry.

Designs coming from architecture studios must almost always be rewritten by the contractors so they can use the plans for their own machines. While other sectors enthuse about networked production, in the building industry there are no uniform standards to transmit data electronically. Due to the slow pace of digitalization, the productivity of the sector has been stagnating for decades. This has an impact in particular on multi-story buildings, which take a long time and are thus expensive to construct — this is one of the reasons for the lack of affordable living space in large cities.

However, standardized data flow would allow for industrial production of individually designed components in large quantities. This would make it feasible for ceilings and walls that are prefabricated in the factory to be assembled on site in a short space of time. Timber construction shows what is possible; here, individual companies have already digitalized the process right from the design through to completion of the house. Linking planning and production information is a first step toward constructing potentially all residential and office buildings in a faster, more sustainable, and cost-efficient way in the future.

CLOSING THE GAP *in the battery market*

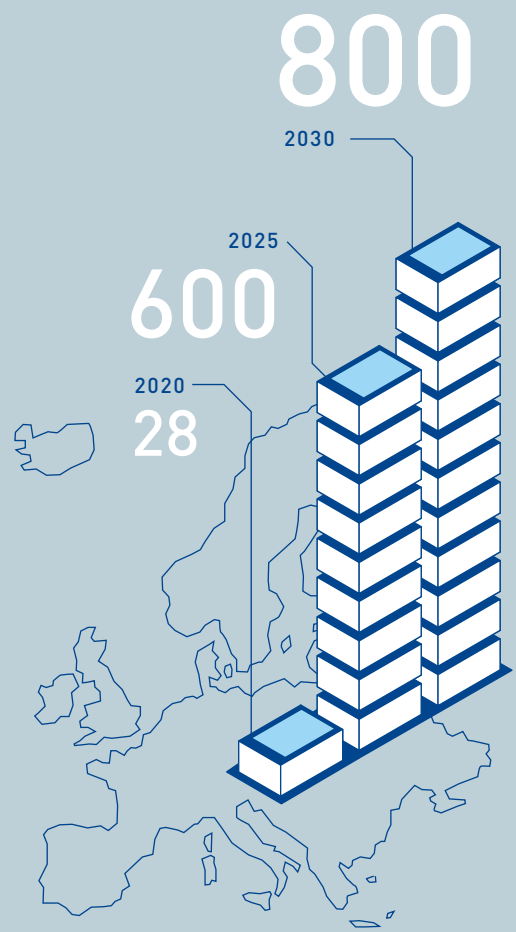
In Europe, the market for electric cars is growing particularly fast. Now is the time to quickly build local production capacities for battery cells and systems. The Dürr Group is benefiting from the multi-billion-euro investments in new plants.

TEXT: **JOHANNES WINTERHAGEN**

The automotive market is all charged up. In 2021, nearly one fifth of all car buyers in the European Union opted for a passenger car with an electric drive. Experts predict that sales, particularly of vehicles powered exclusively by batteries, will continue to see strong growth. By 2030, the market for all-electric cars is set to rise to 8 million vehicles per year in Europe.

Until now, the batteries for Europe's electric cars have come primarily from Asia. However, transporting lithium-ion batteries over long distances is time-consuming and costly. Many producers would like local and reliable supply chains, and the EU is offering financial assistance for building production sites. This is why automotive manufacturers and their suppliers want to create huge production capacities in Europe. The storage capacity of all the batteries produced in 2030 is expected to reach a total of 800 gigawatt hours — this also includes plug-in hybrids.

The core technology in battery production is the coating of electrodes: Graphite is mostly used at the anode end, while the cathode end is usually coated with a precisely blended mix of nickel, manganese, cobalt, and lithium. These materials make energy storage possible in the first place. Through its own solutions and its partnership with the Japanese plant engineering firm Techno Smart, Dürr is offering all relevant technologies for the coating of electrodes.



PRODUCTION CAPACITY FOR BATTERY CELLS IN EUROPE
(IN GIGAWATT HOURS)

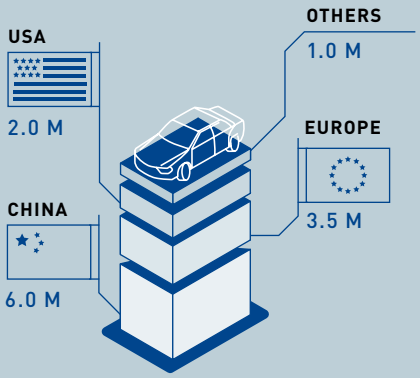
Battery production: a market with potential

- By 2030, investments in European battery production plants are expected to exceed €75 billion.
- Of this, 15% to 20% will be spent on equipment for which the Dürr Group has a solution in its portfolio.

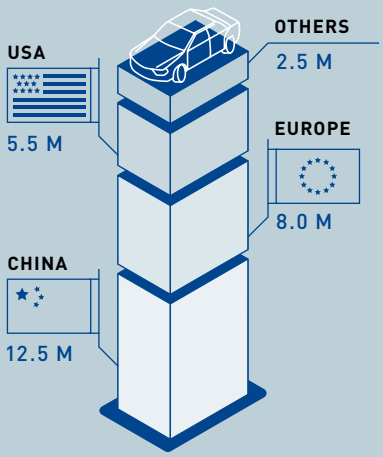
SALES BOOM

In 2030, in terms of sales, Europe will be the world's second largest market for electric vehicles after China.

2.3
MILLION VEHICLES
2020



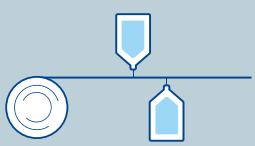
12.5
MILLION VEHICLES
2025



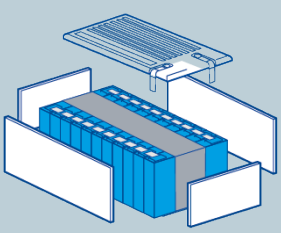
28.5
MILLION VEHICLES
2030

FROM A SINGLE SOURCE

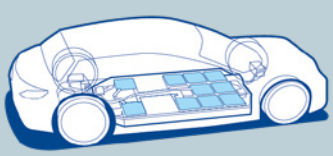
From the cell through to integration into the vehicle: The Dürr Group offers a wide range of technologies and know-how around the battery.



CELL MANUFACTURE
End-to-end solutions for electrode coating, including drying and solvent recovery



MODULE ASSEMBLY
Modular system for the application of glues, sealants, and fillers as well as assembly and testing technology for battery modules



BATTERY SYSTEMS
Assembly and testing technology for battery packs and installation of the finished battery into the vehicle

CONSULTING
Expertise for the economical building and operation of new factories

ORDER FOR GERMAN BATTERY PLANT

Dürr's coating technology will soon be used by the German battery producer Cellforce. This company, in which Porsche has a 50% stake, is currently building a battery production facility in the Swabian city of Reutlingen. This is where electrodes will be coated using system technology developed and patented by Dürr. The new process enables both sides of the electrode foil to be coated simultaneously, thus achieving a particularly high level of quality.

Pace setters

Since February 2021, Teamtechnik has been part of the Dürr Group. Among other things, the company builds highly automated machines and systems that can be used for the safe and fast manufacturing of large quantities of medical products. This allows Teamtechnik to benefit from the global growth of the medical technology sector. A visit to an up-and-coming subsidiary.

TEXT: **HEIMO FISCHER** — PHOTOS: **SASCHA FEUSTER, RALF GRÖMMINGER**

There is a slight humming sound in the workshop. Technicians kneel at the semi-finished machines made of sparkling stainless steel. They concentrate on checking cables, assembling components, or typing into their notebooks. Carsten Köhler stops at a circular installation. “This is a ring transfer system. It is one of our best-selling systems,” explains the Head

Medical products are assembled and tested quickly and reliably on fully automated ring transfer systems made by Teamtechnik.

of Sales of Teamtechnik's medical technology business area in Freiberg am Neckar. The typical characteristic of this setup is a transport system that moves each workpiece in a circle from one workstation to the next — a proven method that enables high-quality mass production in a short time frame.

Fast and safe production — this is crucial for Teamtechnik's customers, since they manufacture medical products, such as syringes, injectors, test kits, or disposable contact lenses. "Although safety always comes first, our customers need to be able to produce large quantities very quickly and to the highest quality," says Köhler.

“Although safety always comes first, our customers need to be able to produce large quantities very quickly and to the highest quality.”

CARSTEN KÖHLER,
HEAD OF SALES MEDICAL TECHNOLOGY,
TEAMTECHNIK

Machines for life-saving products

The semi-finished ring transfer system is to be installed at a Teamtechnik customer’s site in just a few months and will produce triggers for auto-injectors. Auto-injectors are instruments that look like thick ballpoint pens. Inside, there is an injection system with a needle and a precisely dosed drug. In case of an emergency, such as anaphylactic shock, the patient presses the auto-injector onto his or her body, the needle shoots out and injects the active substance.

Every minute, the machine will produce 80 of the triggers, which are composed of many small parts — quite a lot, considering the accuracy with which the production of the auto-injectors has to be performed. After all, each work step is followed by a test step that uses sensors or small cameras to check the result of the previous station and automatically removes defective parts from the production process.

Most of the fully automatic machines that Teamtechnik manufactures are designed for cleanrooms. They work independently and with a degree of precision that human hands can never achieve. Tiny stainless-steel grippers grasp parts only a few millimeters in size and load the workstations so quickly that the eye can no longer follow. Thus, hundreds of delicate plastic parts can be produced within a short period of time.

Köhler leads the way to another machine under construction a few meters away. It can be used to produce winged infusion sets. The butterfly needle is placed in the patient’s arm before general anesthesia, for example. Its manufacture, however, poses some challenges. Since the plastic parts are flexible and smooth, they can easily slip away. Only specially designed grippers are able to grasp them. “Many of these machines are one-of-a-kind,” Köhler summarizes. They are constructed on standardized platforms according to the wishes of individual customers.

Prosperity is a growth driver

Teamtechnik has grown large with machines and test stands for the automotive industry, which is still an important pillar of the company. Medical technology was added around 15 years ago. Today, Teamtechnik has almost 50 customers in this sector — a market with potential. “We expect growth rates of between six and twelve percent per year in this business area, and that is a conservative estimate,” says Managing Director Stefan Roßkopf, whose father co-founded Teamtechnik 46 years ago.

TEAMTECHNIK
Business areas and figures

E-MOBILITY
Whether drives for electric vehicles or sensors and control units for autonomous and connected driving: Assembly and testing systems for these new technologies come from Teamtechnik.

MEDTECH
Medical products such as insulin pens, syringes, and contact lenses are assembled and tested on fully automated Teamtechnik systems to the highest quality standards.

NEW ENERGY
Be it the generation, transmission, storage, or usage of energy: Teamtechnik provides the production technology for any required components such as solar modules, plug connectors, and battery systems.

840
EMPLOYEES WORLDWIDE

5
PRODUCTION SITES

13
SERVICE SITES

Carsten Köhler explains what is important in the manufacture of life-saving medical products such as injection pens.

6%–12%

ANNUAL GROWTH EXPECTED BY TEAMTECHNIK IN THE MEDTECH BUSINESS AREA

This development is being driven by population growth, but also by increasing prosperity in regions of the world such as Asia. The people there want to be treated according to modern medical standards. For hygienic reasons, disposable plastic products are in particular demand. The quantities are considerable. After all, countries like China and India each have around 1.4 billion inhabitants. A huge potential — for syringes and cannulas as well as for disposable contact lenses.

Growth in medical technology is also being driven by the rising number of chronically ill patients. One example is diabetes: Worldwide, approximately 425 million people are affected by this condition. And the tendency is rising. Many of them inject themselves regularly with insulin — increasing the need for manually adjustable injection pens or automatic pumps worn on the body. Teamtechnik also offers fully automated production systems for these devices.

Expansion under the Dürr umbrella

By acquiring a majority interest, the Dürr Group has entered the growing medical technology business. The new subsidiary, in turn, will have the opportunity to expand with a global partner. “We wouldn’t have had the financial resources to do it on our own,” Roßkopf says.

The short distance between the two companies facilitates collaboration. After all, Freiberg am Neckar is less than ten kilometers from Dürr’s headquarters. In addition to Germany, the new subsidiary also has locations in China and the USA.

A center of competence for medical technology is now to be established under the Dürr umbrella. To that end, further acquisitions are at the top of the to-do list. “A first joint project has already become a success,” says Roßkopf. In the summer of 2021, Teamtechnik purchased the automation expert Hekuma.

120

WORK STEPS PER MINUTE
ARE PERFORMED BY THE FASTEST
TEAMTECHNIK SYSTEMS

The Munich-based company specializes in an exceptional field. It manufactures systems for taking out plastic parts from injection molding machines. Lightning-fast grippers extract the freshly molded parts from their molds, which requires less time than if they were simply dropped onto a belt. Thanks to this approach, daily production volume can be doubled in many cases.

A passion for automation

Teamtechnik and Dürr are also expanding their collaboration in project management and software development. For sales, on the other hand, Dürr's contacts to the automotive industry are of interest. After all, Teamtechnik has so far derived the bulk of its sales from test stands for transmissions and drives in electric cars. "This is an area that also promises high growth," according to Roßkopf.

The expansion of its medical technology business area proves that Teamtechnik is focused on future-oriented topics. "Our passion for automation will continue to play a central role," says Roßkopf. Technologically speaking, the company is to offer its customers the entire range of the manufacturing process in the future: from the removal of injection-molded plastic parts through assembly and testing to packaging. All this in a clean, safe and fully automated manner.

Megatrend **HEALTH**

Three questions for trend researcher and futurologist Corinna Mühlhausen. For more than 20 years, she has been concentrating on the topics of health, pharmaceuticals, and medicine of the future.

How has the understanding of health changed over the past decades?

CM The health megatrend has entered into all areas of our everyday lives and is shaping our lifestyle. One important reason for this is that people feel more personally responsible for their health than before. They have realized that living a health-conscious life can also be fun. This has multi-layered implications: Food preferences today are linked, for example, to lifestyle, moral values, or the behavior of people close to us. The topic of preventive health care is also moving more into focus.

To what extent has the pandemic influenced health awareness?

CM Health was the most important value for people even before the coronavirus crisis. But the pandemic brought back an aspect to health that had increasingly faded into the background in recent years: the awareness that health means first and foremost not being sick. Since the collective experience of the crisis, people have become much more aware of the importance of physical integrity. Scientists are also gaining greater appreciation, since the interest in factual information on the topic of health is growing. At the same time, the pandemic has made us aware that health in a globalized world is not just the responsibility of the individual, but is a complex set of interactions. As a consequence, health issues are shifting from an individual to a societal level as well, and in some cases can only be solved globally.

How will the topic of health develop in the future?

CM The experience of the past two years has shown that patients with typical diseases of affluence have a higher risk of becoming seriously ill. This development may lead to people having more valid reasons, apart from wellness and self-improvement, as to why they should lead a healthier life. At the same time, medical standards continue to rise. More and more people will expect to be provided with high-quality medical products when they are ill and especially when they are old. This drives automation in the production of such products.

"It is service, not the means of transport, **that is central to the mobility of the future."**

Using instead of owning: For **Hiro Endo**, individual mobility means having the flexible choice of different modes of transport without being dependent on having a car of one's own. Meet Hiro Endo again here in the magazine on page 12.

HELPING HANDS

In the night from July 14 to 15, 2021, the flood in the West German Ahr Valley destroys Maik Rönnefarth's business. Like many other businesses in the region, the master carpenter and his employees are left with nothing. But shortly afterwards, the willingness of friends and strangers to help is so great that fast reconstruction becomes possible. It is a story about cohesion and optimism.

TEXT: **HEIMO FISCHER** — PHOTOS: **PETER JÜLICH**

One day before the disaster, Maik Rönnefarth has his business in Dernau polished to perfection. A camera team has been ordered to shoot a commercial. The master carpenter is as yet unaware that these will be the last images of this workshop, with its state-of-the-art machine park. Then it starts to rain — and won't stop for a long time.

When the tranquil little river Ahr swells into a raging torrent, the carpenter and his employees at first try to keep the water out. "We used sandbags and chipboard to seal the building," Rönnefarth says. Today, the 45-year-old has to laugh about it. "We actually thought that might be enough."

Shortly thereafter, a 1.40-meter-high column of water presses against the outer walls of the company building. At around 9 p.m., there are several thunderclaps. The gates can no longer withstand the pressure, and burst. Water rushes into the building, flooding the workshop and offices.

The murky brew also makes its way into the machines. They are the pride of the workshop — the carpentry workshop has regularly invested in new models. Its preferred supplier is the Dürr subsidiary HOMAG. Only recently, a digitally controlled machining center has been added, which saws, drills, and mills fully automatically. It is the showpiece of the company, which was founded in 2003 in a garage and has 30 employees today. Its cost: 270,000 euros. Now the machine is only worth its scrap value.

ALL HANDS ON DECK Now that the aftermath of the flood has been cleared, there is plenty to do in the carpentry workshop again. Customers have been waiting patiently — now all orders are being completed.

Pictures of the flood night

Where there was rubble and debris in July 2021, six months later it smells of fresh paint. The first new machines are humming in the clean halls that cover a total of 2,200 square meters; employees are bent over their workbenches. Wearing a hoodie with the company logo, Rönnefarth sits in a meeting room and shows photos of the flood night over coffee and cookies. The total damage amounted to more than 4 million euros. The 18 destroyed machines alone accounted for 1.5 million euros.

Damage of this magnitude threatens the very existence of a craftsman's business. Months may pass before the insurance company pays out, but many costs continue unabated. However, quitting was not an option for the master carpenter, who only makes important decisions together with his staff. "We never lost confidence in ourselves," he says, describing the mood. And as strange as it may sound, he says, the positive experiences from that time are more important to him than the images of the disaster. They helped him a lot in the reconstruction.

Reminder of a dramatic night: Maik Rönnefarth shows pictures of the flooded workshop.

€200,000

In addition to loan machines and discounts for affected HOMAG customers, the Dürr Group's aid package following the flood disaster also included a cash donation.

Rushing to the rescue of data

One reason is the enormous willingness to help that became apparent in the weeks after the flood, but also the commitment of his own employees. He tells of his workshop manager, who, thinking quickly, runs into the IT room when the water enters and brings the server to a dry place, thus saving the valuable data. Others secure the computers installed in some machines.

Together with 13 of his employees who have rushed back to the workshop on the evening of the flood, he spends the night on the top floor of the building. There, they wait without electricity or drinking water until the flood level drops again after several hours, encouraging each other.

The next day, the extent of the devastation becomes apparent. The workshop is gone, numerous finished orders, including entire kitchens and dressing rooms, have been carried away by the water. Wooden boards, tools, small equipment — all gone. "We didn't even have any brooms or shovels left to clean up mud and debris," Rönnefarth says.

But soon after, a farmer with his tractor appears at the carpentry workshop. A neighbor has got hold of an excavator and offers to help. Together, they clear away the largest debris. They remove the swollen chipboard from the rack storage, salvage machine parts, and remove the remains of destroyed furniture that was to be delivered before the summer break.

Store manager donates food

Later, a customer who runs a swimming school comes forward. He mobilizes 35 athletes who sweep, clean, and shovel. On the way to the carpentry workshop, he buys mineral water, food, and cleaning equipment. When the store manager learns that the goods are destined for the flood zone, he refuses payment. "It was really incredible," Rönnefarth says.

Damage removed: Thanks to the great help, the carpentry workshop can now work again as before.

Guardians of the workshop: Maik Rönnefarth with dog Thaya in front of a new machining center

“Obviously, we have been loyal to the right people over the years.”

MAIK RÖNNEFARTH,
MASTER CARPENTER

It is stories like these that the master carpenter keeps coming back to. The photos he produces show thoughtful faces, but also helpers laughing, high-fiving, and enjoying their work.

Over the next few days, more and more people rush to the Ahr Valley to help. This figure will rise to around 200,000 in the subsequent months. More volunteers also arrive at the carpentry workshop. How do you feed so many people? “We had unexpected help there, too,” Rönnefarth says. A restaurant owner, who is a friend of his, brings a snack bar to his courtyard. For several weeks, he provides a cook who prepares complete meals free of charge for all those present, three times a day.

Ten days later, even the power supply is up and running again in the company. And this is how it happened: A man learns about the precarious situation of the carpentry business on Facebook. Subsequently, he gets hold of a huge power generator in northern Hesse, which is taken 300 kilometers to Dernau by truck. A team of helpers connects the power unit. Rönnefarth can’t remember exactly who the men are or where they come from. “They did it and we trusted them.”

Large machines through short official channels

Two weeks after the flood, large sections of the carpentry workshop are ready for operation — only the machines are still missing. But there is already a solution for this problem as well: A HOMAG team from service and sales has made every effort to help the customer get back on his feet as quickly as possible. While some provide on-site assistance with insurance appraisals, others organize new machinery for the company. Since HOMAG usually sells individually configured models, this is not so easy.

Nevertheless, they find a way. A panel dividing saw, provided by a distribution partner from Düsseldorf, and a sanding machine from the HOMAG warehouse are the first to arrive. A machining center that is normally located in a HOMAG sales room is also transferred to the carpentry workshop on a transitional basis. Gradually, the company resumes its work as the cleanup continues. After a few months, HOMAG is also able to deliver the first new machines — of course, with price discounts and long payment terms. The short official channel has worked. Maik Rönnefarth feels vindicated. “Obviously, we have been loyal to the right people over the years.”

This also applies to financial matters. The firm’s banks grant him interim loans, which the company needs until the insurance companies pay out. The managing director of the district savings bank even stops by in person and donates three laptops to the company.

Willingness to help and insurance policies can, of course, never replace all the damage that occurs in such an event. “Now we have to make the most of the situation,” says Rönnefarth. He has used the momentum of the redevelopment to realize a long-planned building extension. The company is growing and needs space. The amount of work has not diminished, even after the flood. Not a single order was cancelled. The next machines are about to be delivered — and just six months after the disaster, the company is working as before.

NEW WAYS OF WORKING

Whether video meetings, group chats, or interactive platforms — digital tools pave the way for modern and flexible forms of working. In the Dürr Group, a dedicated team is therefore driving the use of new apps and tools.

TEXT: **HEIMO FISCHER** — PHOTOS: **SASCHA FEUSTER**

Time was pressing when Ricarda Hohn was asked for advice by a colleague. For the first time, he had to lead an online workshop with 30 people attending. “He had only little experience with this type of exchange,” she says. She quickly explained several apps to him that are easy to use, among them the whiteboard — a template for virtual brainstorming that enables the whole group to collaborate simultaneously in real time. The feedback received after the workshop: The facilitation went well and the colleagues did a great job participating.

It is feedback like this that Ricarda Hohn and her colleague Mona Daub are particularly pleased about. The two are part of the Modern Workplace team. Together with employees from various parts of the Group, including IT, Communications, and HR, they are driving internal digitalization in the company’s day-to-day operations in order to enable contemporary ways of working. This is a task that has become crucial due to the pandemic and the trend toward mobile and hybrid working.

Leaving no one behind

Hohn and Daub search for interesting software on the market and think about whether it can be deployed in a useful manner in the company. This includes collaboration tools as well as project planners and digital platforms for exchanging information. In between these

Enjoying her job: Ricarda Hohn helps staff familiarize themselves with the new, digital working world.

The Modern Workplace team promotes internal digitalization in everyday business operations to enable contemporary ways of working.

tasks, the two explain apps in one-on-one meetings, advise departments, and organize software training for the entire Group, such as the Digital Training Days. During this one-week training, employees were able to participate in various webinars, learning about the Microsoft Teams collaboration tool and working in the cloud, among other things. Instead of relying on external coaches, the Modern Workplace team counted on the expertise within the workforce. The principle was successful, and the presentations by employees from the company's own ranks met with great approval.

Like everywhere else, the working world is also changing faster and faster in the Dürr Group, and no one should be left behind. "The pace of change is high," confirms Mona Daub. Modern software is updated every few months. You have to get used to the fact that a familiar button suddenly looks different, a menu has been rearranged, or the app has been equipped with a new function overnight. These are instances for which the Modern Workplace team also raises awareness among their colleagues. It rarely happens that employees take a fundamentally skeptical view of the use of new apps. In most cases, however, some rethinking is required when previously unknown applications encounter well-established work processes.

Unconventional ideas are welcome

To prevent the introduction of a digital tool from taking up too much time, employees can also continue their training in between tasks, in the staff kitchen or at their desks. Tutorials or interesting tips on new apps are regularly available on the intranet. One example is TeamsTalk, where the Modern Workplace team answers questions about the Microsoft application.

Hohn and Daub regularly think about additional formats. They have a lot of freedom in the process. Unconventional ideas are welcome. One example is TeamsToni — a character familiar to everyone in the Dürr Group who uses the collaboration tool. The stylized fox pops up in the Teams chat function several times a week with information about training courses or tips on how to use the software.

Is it older employees who tend to need tutoring in the digital world and must be guided by younger ones because the latter have fewer reservations? Ricarda Hohn considers this. "Not necessarily," she concludes. Older employees often contribute practical experience, which can be crucial for the appropriate use of digital tools. Besides, she thinks that it's more a question of character, not age. "There are many colleagues who have been with Dürr for 30 years and still love to deal with new things."

A vibrant working environment: Mona Daub heads up the Modern Workplace team.

GUEST CONTRIBUTION

Looking back and ahead

TEXT: **INGO STADER** — ILLUSTRATION: **NIKLAS HUGHES**

PERSONAL DETAILS
Dr. Ingo Stader advises and supports well-known companies in the reappraisal and presentation of their history, as of 2013 with his own history consultancy, H&C Stader. He holds a PhD in history and has studied Dürr's past intensively.

A few years ago, I was surprised when someone told me that they didn't even know there were companies that were more than 100 years old. Now, I am a historian and it is my profession to focus on tradition and origin. Therefore, I may well have a somewhat selective perspective. However, a look at the statistics shows that, in fact, not even eight percent of companies in Germany are older than 100 years. This begs a number of questions: Why do so few companies become so old? How do they manage to survive crises and world wars? Is there a "recipe for success"? And: Who were and are the people behind these companies; the players? The longer I think about it, the clearer it becomes how special such an age is for companies and what a wealth of experience is passed on from generation to generation. History does not repeat itself, but experiences, both positive and negative, crises and successes can very well be applied to the present and the future.

The history of Dürr is full of examples and anecdotes that repeatedly illustrate the company's ability to change: its path from a metal shop for roof flashing to a plant engineering firm, the courageous leap across the Atlantic in 1964, or the decision to go public. The key players assumed a special role in the process: The ability to recognize opportunities and then seize them is a very decisive factor for the longevity of a company. Acting this way is a typical characteristic of many successful entrepreneurs, but there is another decisive aspect: a sense of responsibility. You can only succeed by being aware of the long-term consequences for the company and its employees when making decisions. This brings to bear what Heinz Dürr so aptly puts in a nutshell: "The company is a social event." This anticipates everything that is understood today by purpose, social responsibility, and sustainability.

The study of history is very rewarding and by no means backward-looking. So, working on Dürr's corporate history was also an exciting search for the company's identity for everyone involved. For me as a historian, it is always highly interesting to see that the attitude and principles of a company need to have grown historically to establish them permanently as a living corporate culture. This is where the power of history lies.

SPECIAL INSIGHTS
In 1896, tinsmith Paul Dürr founded a craftsman's workshop in Cannstatt near Stuttgart, which was later to become one of the world's leading mechanical and plant engineering firms. By scanning the QR code, you can find out more about our long and multi-faceted corporate history.

"The apartments of tomorrow are flexible.
They adapt to our changing life circumstances."

It's time to rethink how we live. This is what **Josef Zerle** firmly believes. He considers rigid living space to be no longer sustainable. Instead, we must build houses such that the size and function of the rooms can be varied quickly and easily.
Meet Josef Zerle again here in the magazine on page 16.

DON’T LAY IT ON TOO THICK

A uniform layer of paint is an important quality feature for cars. Adapting paint shops to this requirement is complex. New simulation software from Dürr makes this task easier and reduces the number of tests with real car bodies.

TEXT: **HEIMO FISCHER** — PHOTOS: **PETER JÜLICH**

The mouse pointer moves along the virtual car body and stops over the hood. Tjark Bringewat has discovered a problem area. “Too little paint is being applied here,” says the software developer, describing small circles on the corresponding spot with the cursor. Then he repeatedly varies the settings of the program and starts new simulations.

Tjark Bringewat works at Dürr’s Digital Factory, a cross-departmental software competence center. He clearly enjoys the digital tool that he helped develop. It is a new module that makes an existing application even better. With the Dürr **DXQ**3D.onsite software, it was previously possible to program and simulate the work of painting robots. Users could check on the screen whether the robots were reaching all the relevant points along the car body on their pre-programmed paths and what clearance they needed to avoid getting in each other’s way. In addition, users were able to check compliance with the scheduled cycle time with the help of the digital twin. “Now, the thickness of the paint layer can also be estimated, visualized, and digitally optimized from the user’s desk,” says Bringewat.

Automobile manufacturers had requested this additional module, because it considerably simplifies the complex configuration of painting lines. This work is always necessary when a plant is newly commissioned, or if the paint or the vehicle model to be painted is changed. A five-member team of software developers and application technology specialists spent two years working on the new digital tool.

“In the simulation program, we have greatly simplified the actual painting process.”

CHRISTOPH HECKELER,
APPLICATION PROCESS DEVELOPER

Not even half a millimeter thick and yet crucial: A uniform layer of paint is considered an important quality feature for cars.

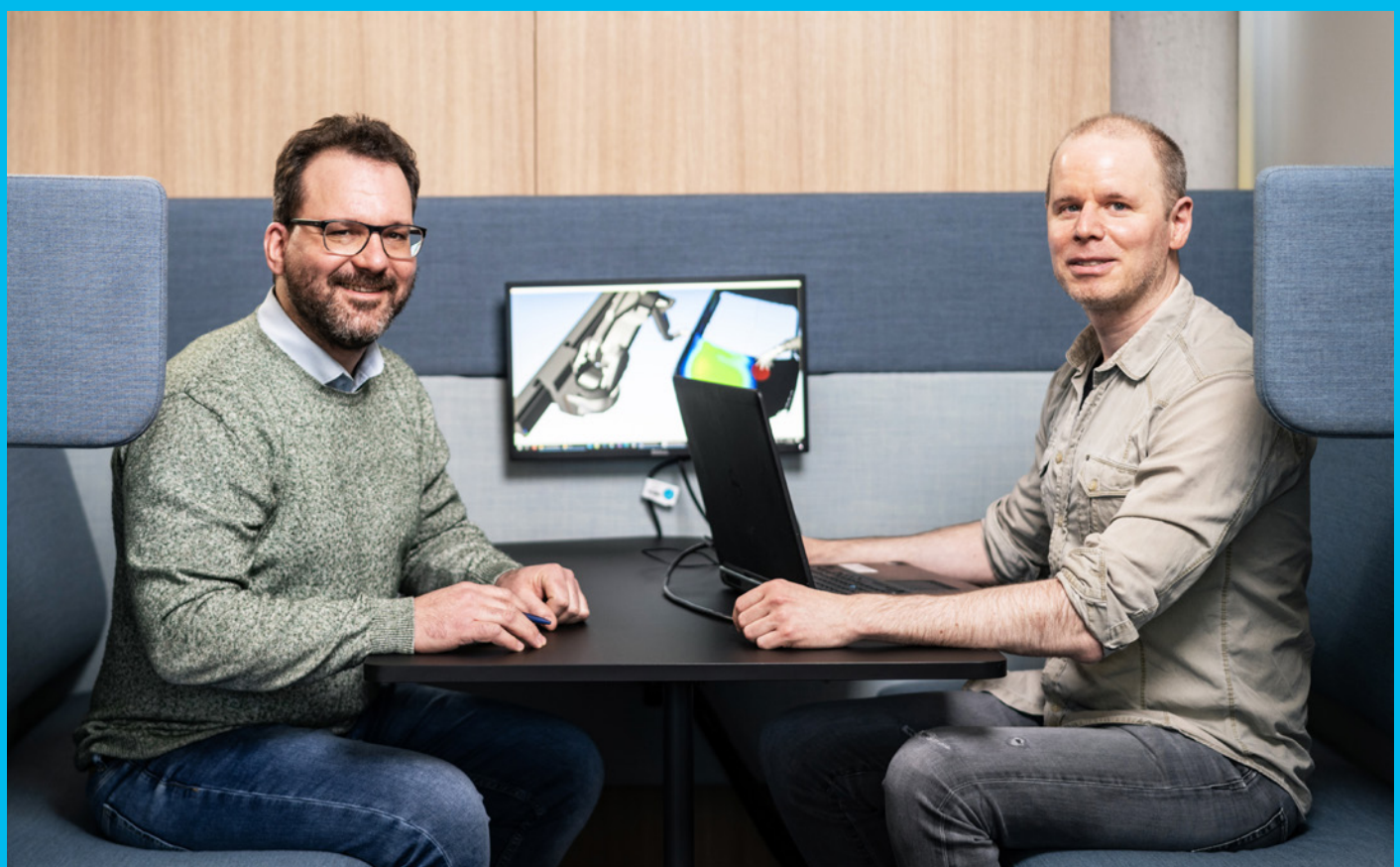
Fewer car bodies go to scrap

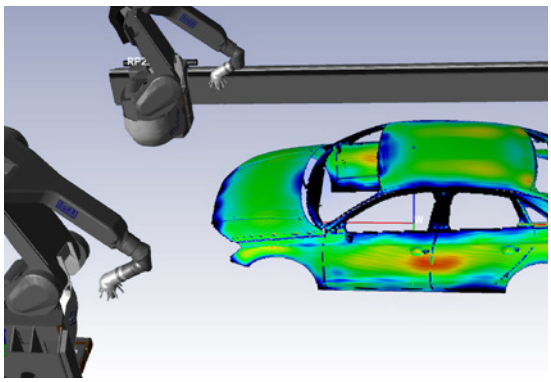
Before a painting line starts up, a team of experts has to set up all the procedures with utmost precision. The size and shape of the car bodies, but also the color and type of paint play a role in the process. All parameters must be coordinated before the start of operations. This takes weeks and is expensive, since manufacturers have to provide car bodies specifically for this purpose and send them through the painting line on a trial basis. After each test run, they are checked for errors and the configuration is adjusted if required. Depending on the model, ten or more car bodies may be painted and then sent to scrap. The new software, however, allows the settings for a paint layer that is as uniform as possible to be optimized on the PC so that a large part of the time-consuming test runs can be eliminated.

> “The thickness of the paint layer can be optimized from the user’s desk.”
>
> TJARK BRINGEWAT,
> SOFTWARE DEVELOPER

Painting car bodies is a science in itself: The appropriate amount of paint must be applied at each point. How much that is in each case is not very easy to determine in advance. After all, car bodies are complex structures. If the robot arm with the atomizer wanders over a boldly curved hood, the paint layer can vary in thickness at different points.

Christoph Heckeler and Tjark Bringewat are in a great mood as they take a look at the simulation tool together.





PAINT LAYER THICKNESS

TOO THIN 100% TOO THICK

EVERYTHING IN THE GREEN?

The simulation tool belonging to the DXQ3D.onsite software is very easy to use. Just one click of the mouse brings the digital robot station to life, where the car body is painted within a very short time frame. Different colors illustrate the painting result after the robots have finished their work. Problem areas are visible at first glance. In order to achieve a more uniform paint layer, the settings can now be varied. Only when the right parameters for an optimum coating result have been found virtually will the real-life test runs begin.

5 MIN

IS ROUGHLY WHAT THE SIMULATION TOOL NEEDS TO PAINT A CAR BODY VIRTUALLY

3D

VISUALIZATIONS OF THE CAR BODY ILLUSTRATE THE PAINTING RESULT

Problems like this can be easily solved with the new tool. The program creates its own 3D file format of the car body. It only takes into account information that is relevant for the simulation. This reduces memory space and computing time and has a decisive advantage: The simulation can be performed not only on mainframe computers, but also on normal computers such as those installed in paint shops. At the click of a mouse, the car bodies can be painted virtually within a few minutes.

In order to prove this, Tjark Bringewat starts the software on his notebook. Several clearly-arranged buttons appear on the screen, with a car body in the middle. It is flanked by four animated robots spraying paint. The car body is still black, but various color fields are gradually emerging. They show the thickness of the paint layer in the various areas of the car body. Red-colored areas indicate that the paint layer is too thick, while blue areas could use more paint, Bringewat explains.

A dictionary from the lab

The program allows the simulation of various scenarios in order to improve the quality of the paint application. This works, among other things, by setting two variables. One of them is the so-called spray pattern width. It shows the surface area covered by the paint particles flying out of the atomizer and can be compared in a figurative sense to the width of a brush. The other variable is the percentage amount of paint that comes out of the spray head.

“Here, we have greatly simplified the actual painting process,” explains Christoph Heckeler, application process developer at Dürr. It is not actually possible simply to adjust the spray pattern width and the percentage paint flow rate. In fact, they result from the properties of the paint used and specific operating parameters such as the painting distance and the speed of the atomizer.

But instead of taking these influencing variables into account as early as during simulation, the development team only considers them in a second step. This happens in real-life tests in the Dürr laboratory — not on car bodies, but on small test panels. This is easier, cheaper, and just as good. The values of these laboratory tests are reflected in digital feature maps and relate the behavior of atomizer and paint to the optimized parameters from the simulation tool. “You can think of the result as a dictionary,” Heckeler says.

It is fed into the simulation program, and the software automatically translates the previously determined virtual parameterization into settings for the real paint job. “The first test painting of a car body is then carried out with this pre-optimized parameter set,” explains Heckeler. This makes commissioning more efficient and enables automakers to achieve saleable paint quality faster. In addition, the new digital tool reduces material costs and results in fewer unevenly coated car bodies. Depending on the initial situation, the number of car bodies that go to waste through test runs is estimated to be reduced by up to 50 percent. A beta version of the simulation tool, which has been in use at some automotive manufacturers, has already proven its worth. Now the product is ready for the market.

Heckeler doubts that one day test runs with real car bodies will no longer be necessary. “The painting process is too complex for that.” But Dürr will, of course, develop further ideas to make painting more economical and sustainable. The simulation of the painting process is just one of many important building blocks on the way to a fully digitalized paint shop.

Domain knowledge in application technology meets digital know-how: Process experts from product development and software specialists from the Digital Factory have developed the new simulation tool in close collaboration.

Turning old into SUSTAINABLE

Sustainability is becoming a focus of attention also for vehicle manufacturers. Dürr is positioning itself as a partner for the green ambitions of its customers. Damir Wagner is a Key Account Manager in the service department and supports automakers in retrofitting their existing plants with resource-saving and low-emissions technologies.

TEXT: **STEPHAN KÖHNLEIN** — PHOTOS: **PETER JÜLICH**

Damir Wagner prefers to be on site with his customers. Yet due to the coronavirus pandemic, this is currently not always possible as much as usual. And still: Grabbing a cup of coffee in the morning and booting up his computer is the only constant in his workdays. "Every day is different; it always depends on what my customers need at the time," says the 59-year-old. Wagner is a Key Account Manager at Dürr. In this function, he supports Volkswagen and other automotive manufacturers, offering so-called plant assessments for upgrades of existing paint shops. This is a market that promises strong growth for various reasons.

Why an upgrade is worthwhile

More than 60 percent of all paint shops in the automotive industry worldwide are over 20 years old and therefore often no longer up to date. Outdated technologies increase the need for maintenance and cause high operating costs.

10–15

PLANT ASSESSMENTS

a year are carried out by Dürr for its customers worldwide

In addition, there is the risk that old equipment will fall short of the growing environmental standards. Plus, they often no longer meet the automakers' own requirements for energy-efficient and sustainable production.

But the costs for building a new paint shop are sometimes in the three-digit million euros. With figures like these, it is worthwhile for a company to take a closer look at whether its existing equipment can be modernized for significantly less money. Another advantage: While a new plant usually takes more than a year to build, Dürr can generally carry out necessary upgrades within a few weeks, sometimes even during ongoing operation.

Assessment only takes seven to twelve days

"Today, new paint shops are almost exclusively being built in Asia," Wagner explains. "In other regions, for example in Europe and North America, we examine the existing plants and see what can be done there." And there is a wide range of options that Dürr offers its customers, tailored to their needs. During the assessment, which usually takes between seven and twelve days, a team from Dürr first checks the equipment and analyzes the relevant data. Subsequently, a tool calculates the savings potential. On this basis, Dürr experts discuss various measures that are then implemented according to the customer's wishes. "There is no such thing as impossible when upgrading an existing facility," Wagner says.

BY 2050

many automotive manufacturers want to be carbon neutral

33%

LOWER CO_2 EMISSIONS in the paint shop after switching to the EcoDryScrubber

In his experience, the automakers' biggest concern is that the conversion measures will lead to longer production downtimes. For the modernization of paint booths, Dürr has therefore developed a step-by-step conversion concept in which the individual steps can be implemented during the regular plant closures over the company holidays, when the assembly lines in the production halls are at a standstill anyway.

Paint separation as the biggest lever

The most effective step on the way to more sustainability in the paint booth is Dürr's **Eco**DryScrubber. Unlike conventional processes, this system does not separate the excess paint particles — the so-called overspray — using water and chemicals. Instead, it uses limestone powder as a natural bonding agent. The effect: The elaborately conditioned booth air remains dry and can therefore be used several times. Wastewater treatment and the disposal of paint sludge are also no longer required.

The switch from wet to dry separation alone reduces energy consumption in the entire paint shop by around 25 percent. CO_2 emissions decrease by as much as one third. If you

consider the complete manufacturing process of a car, these savings also make a difference: Here, energy requirements can be reduced by 10 percent — a huge lever on the way to a more sustainable automotive factory.

The market for such solutions is considerable: In Europe alone, around 200 painting lines are still operating with wet separation — and Dürr is asserting its position as market leader in the conversion to the dry and significantly more sustainable alternative. Wagner sees several reasons for this.

Experience and personal contact

Dürr, for one thing, offers comprehensive solutions from a single source, ranging from application technology to central control — all technically coordinated and highly efficient. For another, Dürr also supports the systems of other manufacturers. And then there are the many years of expertise of the company and its employees. The assessment of a plant only works in a team combining different perspectives and approaches. Professional experience is a very important factor here. "You are dealing with old equipment," Wagner says. "Young colleagues first have to familiarize themselves with the technology of 20 years ago. So, it is good to have someone with the appropriate knowledge and experience on your team."

Wagner has been with Dürr for 32 years. Having worked in spare parts sales and as a project manager, he moved up the ranks to become department manager. For the past two years he has been responsible for important key customers in the service area sales department. In doing so, he benefits greatly from his knowledge about Dürr and its products that he has acquired over the decades.

But in addition to expertise and solutions from a single source, there is another important factor: personal contact with customers on site. A close relationship of trust has grown with many of them over the years. "Of course, it is better if I can put across the benefits of our solutions to customers in personal meetings," says Wagner. "Above all: The activity is at the customer's site. Only when I can see the situation with my own eyes do I know what I have to do after that."

"There is no such thing as impossible when upgrading an existing facility."

DAMIR WAGNER,
KEY ACCOUNT MANAGER
IN THE SERVICE DEPARTMENT

10%

LESS ENERGY
is required by automakers during the entire production of a vehicle, thanks to the **Eco**DryScrubber

Sustainability booster

The paint shop accounts for almost half of the energy consumption in automotive production. At the same time, the painting process offers many approaches for reducing energy, material, and space requirements as well as CO_2 emissions. Dürr specifically develops products that help reduce the ecological footprint of paint shops. There is also a lot of green potential in digitalization.

Intelligent energy management

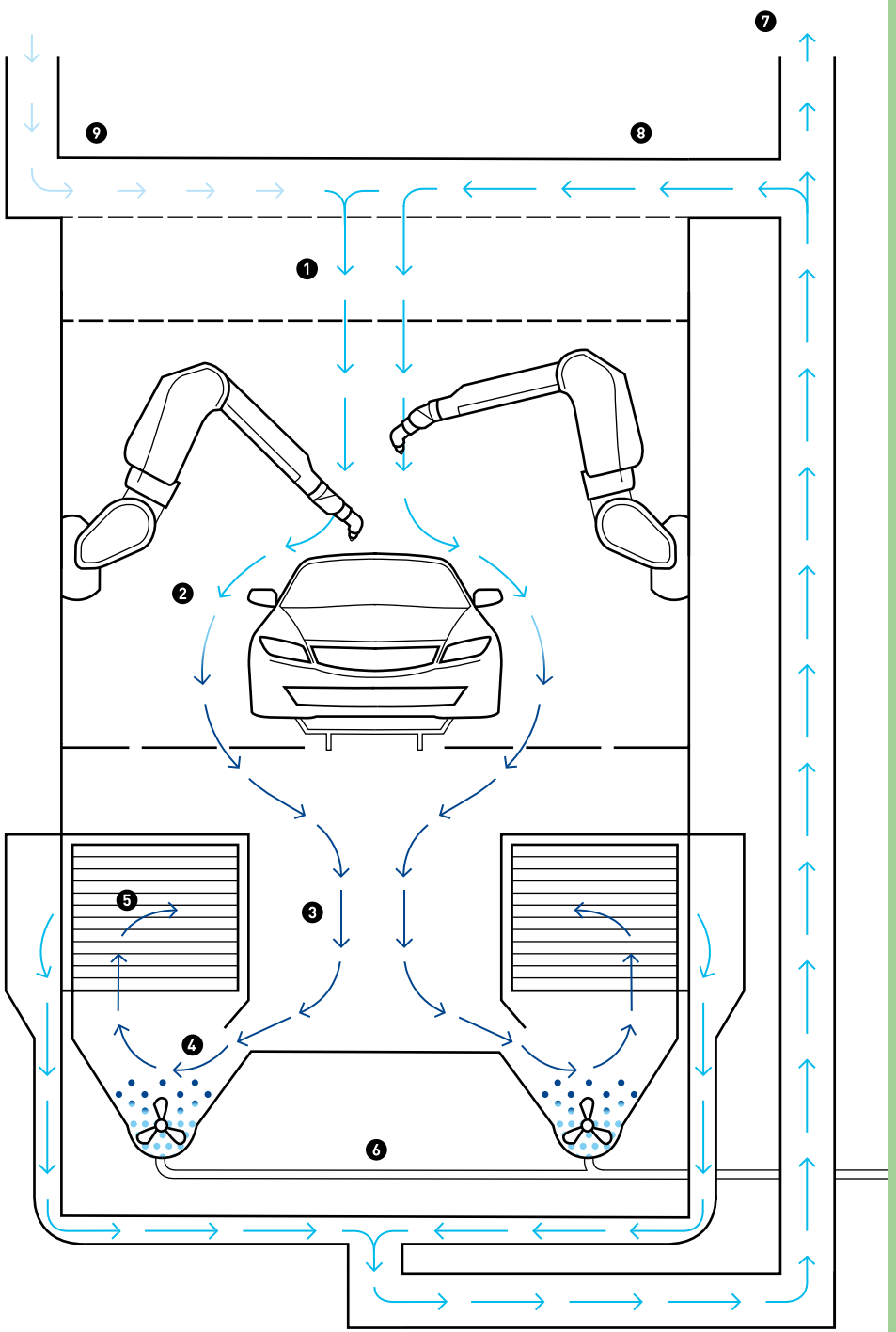
The **DXQ**energy.management control software can be used to identify savings potentials throughout the paint shop. The smart application monitors consumption values and enables uncomplicated analysis of energy requirements for any period of time. On this basis, plant operators have the opportunity to investigate deviations, find causes, and optimize energy requirements. The focus is on transparent and consumption-oriented production without compromising overall equipment effectiveness. The software can also be retrofitted in existing paint shops.

A revolution in car body curing

A lot of energy must be expended for curing freshly applied paint coats, particularly for heating the car body. Since this energy has previously come from natural gas, the oven has a negative impact on the automakers' carbon footprint. This changes with the **Eco**InCure oven for innovative car body curing. The oven can be heated electrically so that significant amounts of CO_2 can be saved using power from renewable energy sources: around 40% in the entire paint shop. In addition, this innovative oven reduces overall energy consumption through efficient utilization of waste heat and its compact design. Thanks to the reduced housing surface, there is less heat loss into the production environment.

EcoDryScrubber

No single measure is as effective in the sustainable modernization of old paint shops as the switch from wet to dry separation. Natural product instead of chemicals and recirculation instead of energy-intensive fresh air treatment: The **Eco**DryScrubber is the must-have for environmentally conscious plant operators.



1. Air flows evenly into the paint booth. In order to achieve an optimum painting result, the air has been previously conditioned. Its temperature is 23°C and its humidity is 65%.
2. During painting, some of the atomized paint does not land on the car body but in the booth air.
3. This so-called overspray is transported by an air stream to filter modules under the painting zone.
4. The filter modules contain natural limestone powder. This is swirled up and binds the paint particles of the overspray.
5. Highly efficient HEPA-12 filters separate the mixture of limestone powder and paint from the booth air.
6. The limestone powder is automatically supplied and evacuated. Saturated limestone powder can be reused, e.g. in the cement industry.
7. Part of the booth air is first routed to downstream exhaust-air treatment and then to the outside.
8. The larger proportion of air, approximately 80%, is reused. Unlike fresh air, this recirculated air already has the right temperature and humidity level. Only minor readjustments are required. The energy-intensive conditioning of fresh outside air is significantly reduced. The high recirculation rate is the reason for the massive energy savings achieved by the **Eco**DryScrubber.
9. The supply of fresh air is reduced to a minimum.

IN BRIEF

Quick click *furniture*

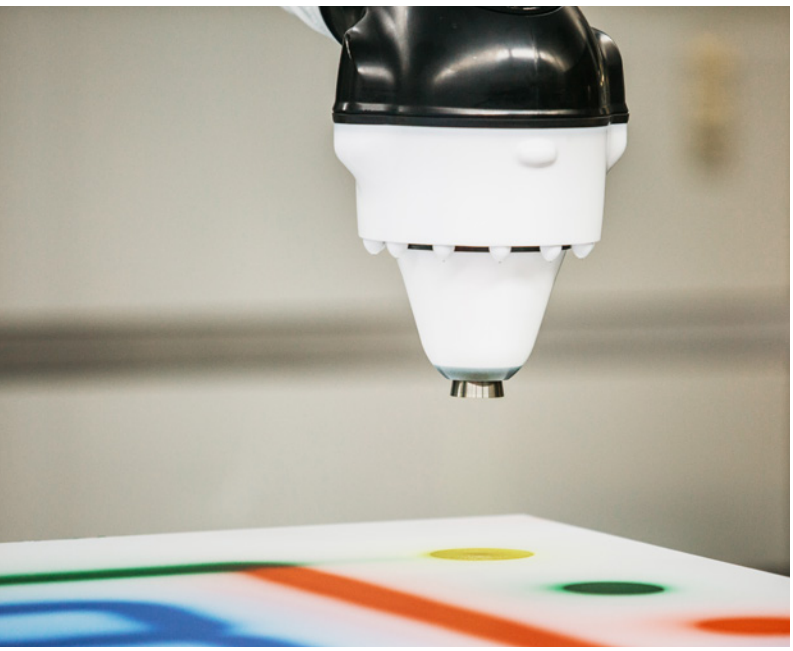
Anyone who has ever laid parquet or laminate flooring knows: Click systems are a fine thing. Now, they also facilitate the assembly of furniture. Together with its Swedish customer Välinge, HOMAG has developed a process for producing click furniture that is extremely easy to assemble, without tools, screws, or dowels. This is good news, especially for users who have to set up and dismantle their furniture frequently, such as exhibition stand constructors.

Large-scale project *for clean air*

To comply with emission regulations and prevent environmental pollution, industrial companies around the world are investing in technologies that can clean the exhaust air of their factories. Dürr's regenerative thermal oxidizers, which oxidize the polluted exhaust gas in a combustion chamber, are particularly in demand. At a Chinese chemical group, four such plants went into operation in July 2021, followed by three more in January 2022 — a project of superlatives for Dürr's environmental technology specialists.

A new *approach*

Before a fully assembled car rolls off the production line, it is thoroughly tested. Until now, factory workers have driven the vehicles to separate test stands for this purpose. That is where, for example, headlights and chassis geometry are adjusted correctly and the ABS is tested. Thanks to a new approach from Dürr, these measuring and setting processes can be brought forward from the end of the line to the assembly line and automated. In this process, the car is no longer driven to the test stand, but is transported by a conveyor system that is already in place. The advantages are: The complete inspection area at the end of the line is downsized, previously necessary pits are no longer required, and automakers save on transportation and working time.



Chameleon

Admittedly, there is little visual resemblance between the fascinating reptile and Dürr's bell-shaped high-speed rotary atomizer, which makes painting cars a highly efficient affair. And yet, they have something in common: Color changes are a breeze for both. While the chameleon uses them for communication and camouflage, they provide the automaker with maximum flexibility in painting car bodies. One car in red, the next in yellow: The new **Eco**Bell4 atomizer generation manages color changes in a record time of just four seconds, thus reducing paint and solvent consumption to a minimum. This not only saves operating costs, but also reduces environmental impact because the air is polluted with fewer harmful substances.

Thumbs up
for the digital event

Trips, physical gatherings, and large events have been reduced to a minimum since the outbreak of the coronavirus pandemic. Many things have shifted to the digital world — including customer contacts in the daily work routine. With the Digital Summit in October 2021, Schenck created virtual proximity to its customers. Based on the motto "The next giant leap in balancing", the three-day online event focused on the question of what the best solutions for sustainable, digital, and efficient balancing will look like in the future. In addition, the nearly 600 participants learned about new products, software solutions, and current market trends. Although a virtual event cannot completely replace direct exchange, the feedback from customers was positive. And there was also a thumbs-up from the Schenck team.

COMPANY PROFILE

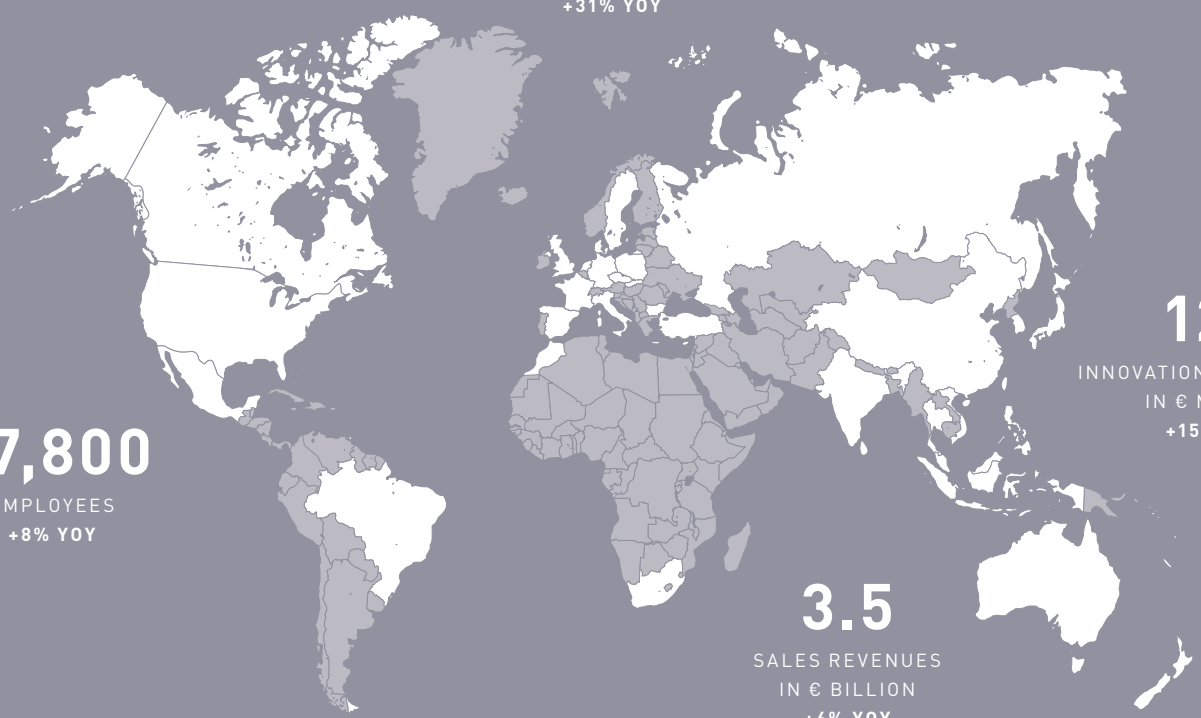
The Dürr Group is one of the world's leading mechanical and plant engineering firms with extensive expertise in automation and digitalization/Industry 4.0. Its products, systems and services enable highly efficient and resource-saving manufacturing processes in different industries. The Dürr Group supplies sectors like the automotive industry, mechanical engineering, chemical, pharmaceutical, medical technology and woodworking industries. It generated sales of €3.5 billion in 2021. The company has more than 17,800 employees and 120 business locations in 33 countries. The Group operates in the market with the brands Dürr, Schenck and HOMAG and with five divisions.

PREPARED FOR TOMORROW

120
BUSINESS LOCATIONS

4.3
INCOMING ORDERS
IN € BILLION
+31% YOY

95
PRODUCT INNOVATIONS



124
INNOVATION INVESTMENT
IN € MILLION
+15% YOY

17,800
EMPLOYEES
+8% YOY

3.5
SALES REVENUES
IN € BILLION
+6% YOY

PUBLISHING INFORMATION

PUBLISHED BY
Dürr AG
Corporate Communications &
Investor Relations
Carl-Benz-Strasse 34
74321 Bietigheim-Bissingen
Germany
Tel +49 7142 78 - 1785
Fax +49 7142 78 - 1716
corpcom@durr.com
www.durr-group.com

CHIEF EDITOR
Andreas Schaller

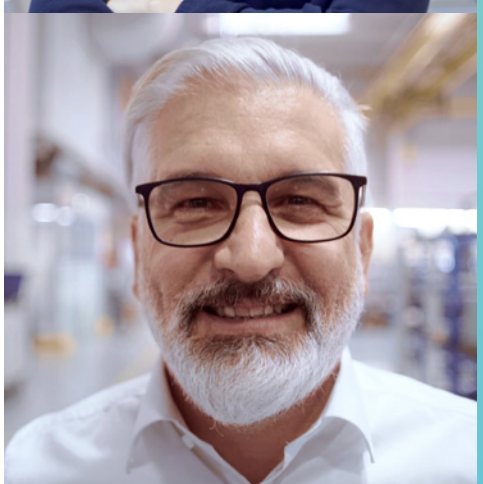
EDITORS
Claire Busche, Mathias Christen, Heimo Fischer, Anna Gottschalk, Stephan Köhnlein, Johannes Winterhagen

PHOTOGRAPHY AND ILLUSTRATIONS
B&O Gruppe, Scott Brauer, Cameron Dewallace, Sascha Feuster, Ralf Grömminger, Niklas Hughes, Peter Jülich

CONCEPT AND DESIGN
Kirchhoff Consult, Hamburg

PRINTING
Beisner Druck, Buchholz in der Nordheide, Germany

This magazine is also available in German.



We save no **energy**, we save no **time**, we save no **ressources**... when it comes to what truly counts: **climate protection.**

WE TAKE RESPONSIBILITY With our 2030 climate strategy, we want to help achieve the 1.5-degree target set out in the Paris Climate Agreement. Keen to find out how? Scan the QR code for more information.

WWW.DURR-GROUP.COM